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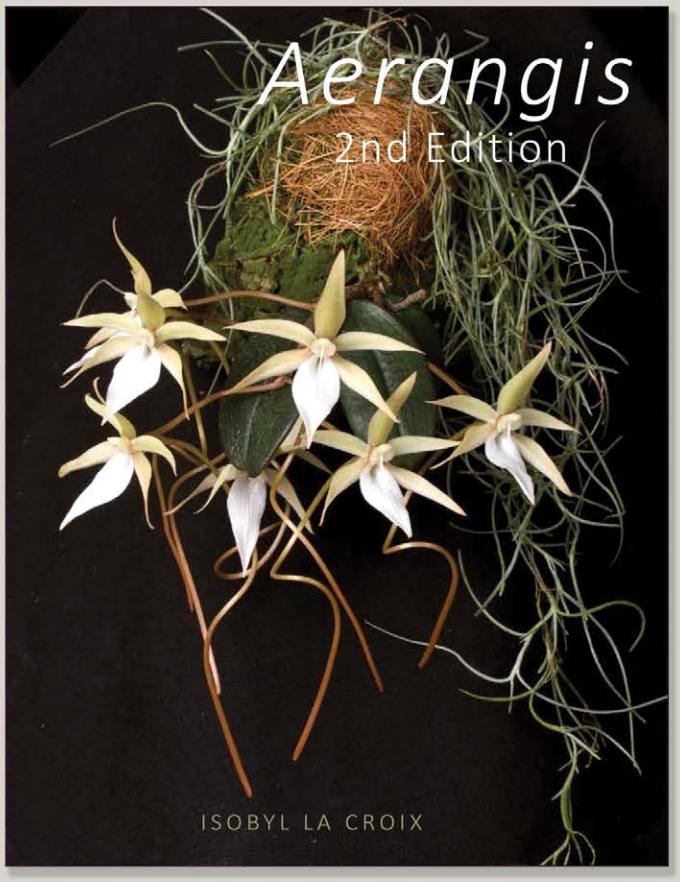
ORCHIDS

THE BULLETIN OF THE AMERICAN ORCHID SOCIETY

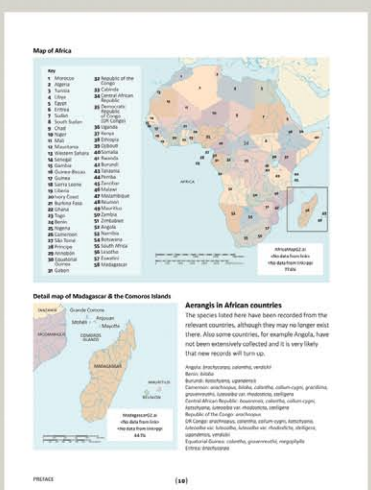
VOL. 91 NO. 9 SEPTEMBER 2022

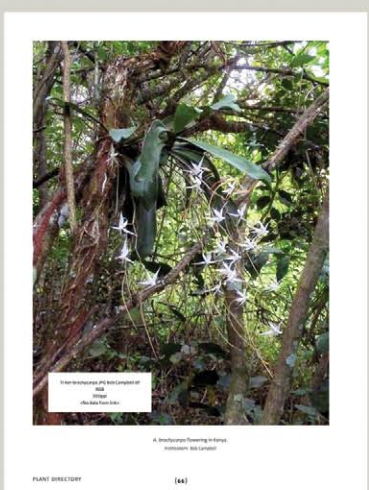
AERANGIS 2nd Edition



Author: Isobyl la Croix
ISBN: 979-8-9859580-0-3
Pages: 228
Images: 270
Page size: 7.5 x 10 inches (190 x 255 mm)
Cover format: Hardcover

The genus Aerangis is the focus of this spectacular book by Isobyl la Croix who spent many years studying African orchids in their native habitat.
It features detailed descriptions of the 59 species, accounts of the terrain, climate and habitats in which they live, and cultivation advice. These orchids, which grow on branches and rocks in the forests of Africa and Madagascar, have long nectar-filled spurs that release a delicate scent at night attracting hawk moths. This feature, along with their often disproportionately large flowers, make them rewarding to grow and, given the right conditions, they will flower year after year. Many are threatened in their native habitat and home cultivation makes an important contribution to their long-term welfare. Beautiful photographs of the plants and essential botanical information make this a unique reference that will deght orchid lovers.





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The Bulletin of the American Orchid Society

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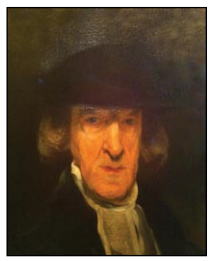
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FEATURES

DEPARTMENTS

In This Issue

FRONT COVER

Stanhopea Hesperides 'Goodwood' HCC/AOS (*inodora* × *tigrina*) beautifully photographed by Ed Cott. The plant was grown and exhibited by Peter and Inge Poot in July of this year at a monthly meeting of the Toronto AOS judging center. The four striking flowers, exhibited at the peak of perfection, were 5.31 inches in diameter (13.5 cm).

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PRONUNCIATION GUIDE

Pronunciation of orchid names can be daunting for the novice and experienced grower alike. Presented below is a simplified pronunciation guide specific to the names found in this issue of *Orchids* magazine. An attempt has been made to represent each syllable using easily recognized sounds or words separated by hyphens and not standard phonetic symbols. Check out the Orchidist's Glossary on our website at https://www.aos.org/orchids/orchidists-glossary.aspx.

aclandiae (ak-LAND-ee-eye)
alba (AL-ba)
alexandrae (al-lex-AN-dree)
amethystoglossa (am-eh-thiss-toe-GLOS-sa)
ampliatum (am-plee-AY-tum)
anosmum (a-NOSS-mum)
aquinii (ak-WIN-ee-eye)
Arachnis (a-RAK-niss)
Aranda (a-RAN-da)
armeniacum (are-men-ee-AY-kum)
Aspasia (a-SPAY-zee-a)
astranthum (ast-RAN-thum)
bellatulum (bell-AT-yew-lum)
Brassavola (brah-SAH-vohl-la)
Brassia (BRASS-ee-a)
briegeri (BREE-ger-eye)
Broughtonia (brow-TONE-ee-a)
Bryophyllum (bry-OFF-ih-lum)
bulbosa (bulb-OH-sa)
Calanthe (kal-AN-thee)
calycinum (kal-ee-SYE-num)
Calypso (kal-IPS-oh)
Catasetum (kat-a-SEE-tum)
Cattletonia (kat-leh-TONE-ee-a)
Cattleya (KAT-lee-a)
Chrysomorphum (kry-soh-MORE-fum)
cirrhosum (seer-HOE-sum)
Cischweinfia (see-SHVINE-fee-a)
Cochlioda (kok-lee-OH-dah)
Coelogyne (technically see-loh-GYE-nee but usually heard as see-LOJ-ih-nee)
coerulea (see-ROO-lee-a)
Collare-stuartense (kol-lar-ee-stew-are-TEN-see)
Comparettia (kom-par-ET-tee-a)
cordigera (kore-DIJ-er-a)
Crassulacean (krass-yew-LAY-see-an)
crinitum (kry-NEE-tum)
crispum (KRIS-pum)
cristatum (kris-TAY-tum)
Cycnoches (SIK-noh-keez)
Cymbidieae (sim-BID-ee-ee)
Cymbidium (sim-BID-ee-um)
Cypripedium (sip-rih-PEED-ee-um)
Cyrtochilum (sir-toe-KYE-lum)
decora (DEH-kore-a)
Dendrobium (den-DROH-bee-um)
denticulatum (den-tik-yew-LAY-tum)
Dimerandra (dye-mer-AN-dra)
emarginata (ee-mar-jin-AY-ta)
Encyclia (en-SIK-lee-a)
Epicattleya (eh-pih-KAT-lee-a)
epidendroides (eh-pih-den-DROY-deez)
Epidendrum (eh-pih-DEN-drum)
gaskelliana (gas-kell-ee-AY-na)
glanduliferum (gland-yew-LIF-er-um)
Gomesa (GO-mase-a)
Goodyera (good-YEAR-a)
Grammatophyllum (gram-mat-oh-FILL-um)
grandiflora (gran-dih-FLORE-a)
Guarianthe (gwar-ee-AN-thee)
guttata (gut-TAY-ta)
harrisoniana (har-ris-sone-ee-AY-na)
Heteranthocidium (het-er-an-thoh-SID-ee-um)
insigne (in-SIG-nee)
intermedia (in-ter-MEED-ee-a)
Jenneria (jen-NER-ee-a)
juncifolia (jun-sih-FOLL-ee-a)
Laeliocattleya (lay-lee-oh-KAT-lee-a)
leopoldii (lee-oh-POLD-ee-eye)
loddigesii (lod-dih-GEEZ-ee-eye)
Lycaste (lye-KAS-tee)
Masdevallia (mas-deh-VAHL-ee-a)
Maxillaria (maks-ill-LAIR-ee-a)
Mendelii (men-DELL-ee-eye)
Miltonia (mil-TONE-ee-a)
Miltoniopsis (mil-tone-ee-OP-sis)
montanum (mon-TAN-um)
mossiae (MOSS-ee-eye)
Myrmecocattleya (mir-meh-koh-KAT-lee-a)
Myrmecophila (mir-meh-KOF-ih-la)
noezliana (no-zl-ee-AY-na)
obryzatoides (ob-rih-zay-TOY-deez)
obryzatum (ob-rih-ZAY-tum)
Odontoglossum (oh-don-toh-GLOSS-um)
Oncidiinae (on-sid-EE-ih-nee)
Oncidium (on-SID-ee-um)
Pachyphyllum (pak-ih-FILL-um)
Paphiopedilum (paff-ee-oh-PED-ih-lum)
Papilionanthe (pap-ee-lee-oh-NAN-thee)
Phalaenopsis (fail-en-OP-sis)
pictum (PIK-tum)
planifolia (plan-ih-FOLE-ee-a)
pompona (pom-PONE-a)
povedanum (poh-veh-DAY-num)
praestans (PRAY-stanz)
praetertinctum (pray-ter-TINK-tum)
pubescens (pew-BES-senz)
purpurata (per-per-AY-ta)
pustulata (pus-tew-LAY-ta)
rhopalorachis (roe-pal-oh-RAK-iss)
Rhyncholaeliocattleya (rink-oh-lay-lee-oh-KAT-lee-a)
rosea (ROE-zee-ah)
Rossioglossum (ross-ee-oh-GLOSS-um)
sanderae (SAN-der-eye)
sanguinea (sang-GWIN-ee-a)
sanguineum (sang-GWIN-ee-um)
Schoenorchis (show-en-ORE-kiss)
Schomburgkia (shom-BURG-kee-a)
Sigmatostalix (sig-mat-oh-STAY-liks)
sincorana (sin-kor-AY-nah)
Sobralia (soh-BRAHL-ee-ah)
Solenidiopsis (sole-en-ee-dee-OP-sis)
Sophronitis (soff-ron-EYE-tiss)
speciosa (spee-see-OH-sa)
spectatissimum (spek-ta-TISS-ih-mum)
spicerianum (spy-ser-ee-AY-num)
Spiranthes (spy-RAN-theez)
Stanhopea (stan-HOPE-a)
Symphyglossum (sim-fih-GLOSS-um)
Systeloglossum (sih-stel-oh-GLOSS-um)
tibicinis (tib-ih-SIN-iss)
tigrina (tih-GRYE-nah)
tigroides (tih-GROY-deez)
trianae (TREE-an-ee)
triumphans (try-UM-fanz)
Vanda (VAN-da)
Vanilla (van-ILL-la)
veitchiana (veech-ee-AY-na)
venustum (ven-OO-stum)
villosum (vil-LOH-sum)
Zygolum (zye-GOH-lum)
Zygopetalum (zye-goh-PET-a-lum)

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In addition to vital support through membership dues, the American Orchid Society relies on grants, bequests and other gifts to support its programs. We would like to thank the following donors for gifts received between July 1, 2022 and July 31, 2022.

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IN JULY, I had the opportunity to attend the Fort Lauderdale Orchid Society's (FLOS) monthly meeting. What a wonderful group! It is interesting to attend different society meetings and see the similarities and differences as compared to how your local group works. There are always new ideas to learn or innovative ways to approach the things you are already doing in your society meetings.

For example, one really nice thing the FLOS does is have a separate raffle plant only for AOS members. Every AOS member that attends the meeting gets one ticket and they raffle a very nice plant separately from their other raffle plants. At my local society, we offer an extra ticket to the main raffle for AOS members along with giving a ticket to every visitor and new member in their first six months. When one of the new members wins, they are crazy happy for their new plant! We used to give a free ticket for just wearing your official society name tag but got away from that when our name tag coordinator stopped showing up to our meetings! The FLOS then ends their raffle with a large plant where all the losing tickets from the prior raffles are put into the drawing for that plant.

The FLOS plant table is also done a bit differently than in my society. They offer first and second place ribbons, voted on by the attendees, for both flower quality and plant culture across about half a dozen different groups (cattleyas, vandas, etc.). One of the local members, Chris, introduced the winners and asked the plant owner to speak a bit on the background of the plant and how they grew it. It is a fantastic way to engage the group as there are always several different winners. There were a few new growers who were winners in different categories who were over the moon that they won and were recognized in front of the group. This is a great idea to energize your meetings and build excitement, especially among your newer growers!

One of the items that my local society does that I did not see at FLOS was a silent auction. Our members can bring up to three plants for the silent auction "sale" with 30 percent of the proceeds going to our society and 70 percent going to the member. It is an easy way for our members to clean out a few divisions every month or get an overgrown plant to someone who will enjoy working on it.

We also get members who donate plants with 100 percent of the proceeds going to our society. And if we get large donations of plants from a member, we split them between the raffle and the silent auction.

If you have some fun things that you do in your meetings that you would like to share with other societies, please email them to our Affiliated Societies Chair Edna Hamilton-Cirilo (ecirilo@AOS.ORG). She would be happy to share them via the AOS Corner newsletter.

It was also interesting to see the same types of people at the FLOS meeting as I have in my society. There is the person who only ever buys five raffle tickets but ends up winning one or two plants every meeting no matter how many dozens of tickets are with each plant. There is the person who waits for the refreshment table to be put out…and then "dinner" is served. And, there is also that member who always sits in the aisle seat of the second row and everyone else knows to find a different seat.

Every society has those members who contribute to the meeting's success month

[1] Jill Smith with her culture winning *Cattleya* Hawaiian Wedding Song (Angel Bells × Claesiana).

[2] Chris Morales (arrow) discussing the plant table at a July 2022 Fort Lauderdale Orchid Society meeting.

in and month out. FLOS is no exception — Sue and Craig behind the welcome table, Paul and Francisco handling the raffle, Chris introducing the plant table, and others.

The evening before the meeting, my hosts Jill and Gerry Smith took me around the neighborhoods in Fort Lauderdale looking for the native orchids they and other members of their society had installed over the preceding years as part of the "Million Orchid Project." This effort, led by the Fairchild Tropical Botanic Garden and sponsored by the AOS and the local orchid societies, has been well documented in prior *Orchids* magazine articles (see for instance Setzer, 2014).

This included a stop at a house where the homeowner came out of his garage and asked what we were doing looking around in his trees! After a quick explanation that we were looking for the native orchids that were supposed to be there, he got excited and invited us into his sideyard to show us the huge *Grammatophyllum* in full bloom that he was growing under a tree! Oh, to live in South Florida! We did not find any of the native orchids in his trees, but we likely found a new member for FLOS!

Perhaps there is an orchid replanting opportunity in your local area? You may not be able to put them in trees, but native orchids grow everywhere and maybe there is an opportunity to partner with a local nature preserve or protected area to replant some lost beauties (see, for instance, Reinoso 2015)!

— Jay Balchan (email jay@aos.org).

References

Reinoso, J. 2015. Confessions of a Crazy Orchid Lady: Part 1. How I Spent My Summer. . . . *Orchids* 84(8):492–497.

Setzer, K. 2014. Saving Florida's Orchids. The Million Orchid Project. *Orchids* 83(6):337–339.

There is no Such Thing as Orchid Fertilizer

By Robert Pavlis

IF YOU ARE on the hunt for orchid fertilizer you can stop looking. There is no such thing except in the minds of marketing departments and in the minds of the consumers that have been convinced by marketing.

Have a look at these two fertilizers: Dyna–Gro Orchid–Pro 7–8–6 fertilizer and Dyna–Gro Foliage–Pro 9–3–6 general plant food. The ingredient list for both products is identical and includes ammonium nitrate, potassium nitrate, potassium phosphate, ammonium phosphate, calcium nitrate, magnesium sulfate, and some minor nutrients. You may recognize this list of chemicals as the main ingredients in just about every fertilizer including ones for lawns, houseplants, flower beds, roses, and even tomatoes. There is no magic ingredient that is specific to orchids.

You might be familiar with the special Michigan State University's (MSU) Magic Orchid Fertilizer. It was developed as an all–purpose general fertilizer and is used on Easter lilies, poinsettias, annual bedding flowers, perennials, ferns, conifers, cacti, succulents, and hundreds of tropical plants. It was never designed for orchids, but it does grow great orchids.

Still do not believe me? Try this simple exercise. Use Google to find images of orchid fertilizer. I have done that in the attached image.

These are popular orchid fertilizers supplied by orchid experts. One of them has a NPK of 7–8–6 with the nutrients in about equal amounts. But then there is a 13–2–13 which suggests orchids do not need a lot of phosphorus. A 20–10–20 suggests orchids need equal amounts of nitrogen and potassium, but the 30–10–10 fertilizer suggests orchids need three times more nitrogen than potassium.

How can all of these be perfect for orchids when they are all different? They cannot be. The reality is that orchids grow in a range of fertilizers and excess nutrients just get washed down the drain. Plants use nutrients in a ratio of 3–1–2 and this goes for orchids as well although there is some evidence that a bit more potassium is better. A ratio of 3–1–3 is probably best. The brand does not matter because the ingredients are all the same.

—Robert Pavlis, has been growing orchids for 30 years and is the author of the popular blog GardenMyths.com as well as several books: Soil Science for Gardeners*,* Plant Science for Gardeners*,* Building Natural Ponds and Garden Myths *– Book 1 and 2*

Call For Nominations for three Trustees for the 2023-2026 term on the American Orchid Society Board of Trustees.

What are Trustees and what do they do? Trustees, along with the Officers, oversee the budget, the programs and operation of the AOS. They are members of the various committees that undertake the bulk of the interactions with the Members of the AOS. They are ambassadors for the AOS. They commit their time and talents to the AOS.

How are Trustees nominated? Members may nominate any member in good standing, including themselves, and shall provide a rationale as to why the nominee should be considered. The Nominating Committee will evaluate all nominations, and a slate will be presented for the vote, per the by-laws, before the election at the Members Meeting in the spring of 2023.

What are the requirements for becoming a Trustee? The following have been determined by the Board and will be used in the evaluation of candidates. Candidates shall:

- be members of the AOS,
- embrace and actively help carry out the activities/projects which support the mission and priorities of the AOS,
- exhibit personal integrity and ethical behavior,
- be a team player who actively participates in board meetings,

Expertise in some of the following is desirable and will weigh in the evaluation:

- have board experience, preferably with a non-profit organization.
- business administration, marketing, financial and organizational management,
- understand basic financial statements and balance sheets,
- understanding of legal concepts,
- development/fundraising,
- strategic planning and implementation,
- conservation, research, or education.

What are the Responsibilities of a Trustee?

- attend virtual meetings when called (typically one per month),
- attend two annual in person members' meetings (pays their own travel expense),
- actively participate in and contribute to Board activities, committees, special projects,
- financially support the AOS in a manner commensurate with one's ability while seeking additional financial support elsewhere,
- advocate on behalf of the AOS and be ambassadors to the orchid community.

Send nominations to chairnominatingcommittee@aos.org. Nominations will be accepted up to the end of day on October 22, 2022.

September: The Month of the Snoozer

By Thomas Mirenda

Thomas Mirenda

THE ALARM GOES off seemingly much too early in September. Much of the world is back to work and school this month with all the activity, progress, hopes and fears this induces. For a while now, many of us thought things would never be back to normal and indeed, the world may not ever be quite the same as it was before the pandemic. But are things ever quite the same from year to year? As humanity has evolved and developed new technologies from generation to generation our lives do change, hopefully for the better and this age is no different. We want to believe that the natural world is a constant that runs through all of our various realities. The idea that there will always be stunningly beautiful coral reefs, verdant mountains and meadows, and orchid-rich forests to visit someday, sustains many of us though our daily challenges in our workaday world and the rigors of raising families. Nature and its many glories are what makes the rest of it worthwhile and are in large part, the reason so many of us surround ourselves with beautiful gardens, plants and pets. It is that concept of *biophilia*, the desire to be close to the beauty of the natural world that drives us to collect and grow orchids. The challenge of successfully growing and blooming them far away from their natural habitats is the essence of our orchid obsession.

Collectively, our devotion to nature and conservation is well represented in the American Orchid Society. We can and should all be proud that AOS leadership devoted the profits generated from our centennial celebration to our conservation endowment, allowing us to increase our outreach to other areas of the world where orchids are imperiled. Too often, we humans think we are helpless to affect positive change, and when we get that wake-up call, represented by the pandemic or climate crisis, it is so easy to just press the snooze button and stay oblivious just a little longer. The AOS has proven that we are committed to a world where orchids thrive, both in cultivation as well as in their natural habitats. This is why I am so gratified to be an AOS member and volunteer and look forward to a future of love and appreciation for these most magical and deserving species.

THE FALL This month heralds the resumption of so many things, school, work, projects and so on, but also the resumption of growth of many of your orchids. Since late June, many montane orchids such as miltoniopsis, cattleyas and cymbidiums have slowed their growth as they probably have been stressed by excessive heat, and some may even have perished. As cooler temperatures, particularly nighttime temperatures, prevail, there will be renewed growth of many orchids as well as the initiation of many flower spikes, something we all are hoping for. In general, though, especially among your warm-growing species and hybrids, pseudobulbs have achieved their ultimate girth and are getting ready to bloom. It is a very good time to go through your collection and search out back bulbs that may be senescing or rotting and remove them. This might even involve some dividing and repotting. Even if it is seemingly too late in the year to repot, you can usually get away with it in September, and it is better than having necrotic tissue such as rotting pseudobulbs and roots in your pots over the winter. A dose of fungicide at this time is not a bad idea either.

WAKING UP A little different from the spring awakening we experience among our orchids in March and April in the northern hemisphere, now is the time to be on the lookout for spike initiation in many orchids. As the photoperiod (daylengths) shift from longer days to longer nights and temperatures cool off subtly, these are the signals that trigger reactions in your plants that tend to bloom seasonally such as phalaenopsis, cymbidiums and certain cattleyas and guarianthes attuned to autumn blooming. It is a season I anticipate with great pleasure and excitement every year. Even though flowers are not due for another month or two, seeing the spikes beginning to emerge is so comforting, life-affirming and hopeful. It genuinely makes me happy, and perhaps a little relieved.

ARRANGEMENTS It may seem early to be thinking about staking and grooming your plants, but it is truly something you should ponder starting about now. As you go through your collection looking for spike initiation, rearrange your plants so that these developing inflorescences can grow unobstructed over the coming months. Often spikes are hidden under leaves and may get kinked or stuck somehow in dense foliage. Arranging them so they get exposed to the light will make for stronger and more graceful inflorescences. Cattleyas and guarianthes have sheaths that can sometimes restrict bud development or even rot them. It can sometimes be helpful to gently liberate developing buds by peeling the sheaths away, but this must be done with the utmost caution to not damage the tender developing buds within. Use your time now seeking out these growths and perhaps placing them with a guiding stake so you can track their progress as they emerge. In addition, spikes can emerge at some odd angles. Remember most of the orchids we collect are epiphytes in which inflorescences tend to arch or descend pendently if they had their way.

Pectabenaria Little Angel 'Judy' AM-AD/AOS (*Habenaria carnea* × *Pecteilis hawkesiana*); exhibitor and hybridizer: Leon Glicenstein; photographer: Bryan Ramsay.

While I love to see what a plant will do naturally, most of us want to display our plants with their inflorescences upright and flowers well presented. As flower buds develop and become heavier, this will almost always require staking for the best possible presentation.

AWARENESS AND ENGAGEMENT After a long hot summer, it can be easy to get complacent about your growing, especially as things finally seem to be going so well. Do not fall into this trap. Now, as plants are taking a sigh of relief from what they all experienced earlier in the year, it is more important than ever to stay aware and involved in your orchids' welfare. You are almost in the home stretch of cultural care and the enjoyment of flowers that are coming in the fall, winter and spring. Your plants are finally waking up. Do not hit the snooze button. Get to work. A multitude of blooms is on its way. After all, is that not what our efforts are all about?

— Tom Mirenda has been working professionally with orchids for over three decades. He is currently an AOS trustee and is a past chair of the AOS Conservation Committee. He is an AOS accredited judge in the Hawaii Center (email: biophiliak@gmail.com).

"NATURAL" FUNGICIDES

QUESTION

I have some questions on home remedy fungicides. Can you use baking soda as a fungicide? If yes how do you mix and apply it? Are there other home remedies that can be used as a fungicide?

ANSWER

Baking soda does work for a limited range of pathogens. It works pretty well on mildew and rusts. Many people use it for powdery mildew on roses. It is a preventative not a curative. It prevents the fungal spores from sprouting, which is related to the pH of the residue it leaves behind.

To use, mix a tablespoon of baking soda in a gallon of water and apply as a spray to your plants. You will get better coverage on orchid leaves if you add a surfactant or a couple drops of dish washing liquid to break the surface tension of the solution. It is not a panacea and it will not work on everything but it also causes no harm to your orchids.

Cinnamon also works, especially for crown rot in phalaenopsis plants. Again, cinnamon is not a guarantee but it is readily available and a reasonable first remedy to try. Apply by shaking it on as a dry powder until you have complete coverage of the infected area. In addition to cinnamon's natural antifungal and bactericidal properties, it also works to pull water out of the infected tissue.

Another readily available household remedy is hydrogen peroxide. Apply it as a spray without dilution (3%). Hydrogen peroxide has both antifungal and bactericidal properties like cinnamon. Keep in mind that all of these remedies are topical in that they treat only what is on the surface of plant tissues and offer no internal activity.

REBLOOMING

QUESTION

What do I do to get my phalaenopsis plants to rebloom? To rebloom my cattleyas, do I need complete darkness for 10–12 hours?

ANSWER

For most orchids, reblooming comes down to correct light and temperature levels. The most common problem is that they do not get enough light. The second most common reason for not blooming is temperature related. Winter and spring blooming phalaenopsis need a period of slightly cooler day and night temperatures or they will not flower. As an example of how temperature sensitive they can be, *Phalaenopsis amabililis* grows naturally in the hills around Manilla in the Philippines. The day-night differential in their habitat is about 10 F (5.6 C). During the summer, daytime highs reach 90 F (32.2 C), while the nighttime temperature may drop to 80 F (26.7 C). Late in the fall and winter, daytime highs and nighttime lows cool slightly and the plants have evolved to trigger flowering with that slight temperature drop. Take those same plants to Singapore where the day-night differential is more like 3 F (1.7 C) year round and they will not bloom. Phalaenopsis kept indoors in our modern houses where the temperature hovers in a tight range from say 68–72 (20–22.2 C) will not experience the chill they have evolved to need in order to trigger the formation of inflorescences. To get around this, try putting them closer to a window or in a room in your house that's kept cooler. This is often all that's needed to induce blooming.

Summer blooming phalaenopsis are brought into flower by other triggers that do not include temperature differential. For these phalaenopsis, light intensity and daylength are the operative triggers and it is important to give them somewhat brighter light than the winter-blooming group and the naturally longer days during the spring and summer months.

As for cattleyas, failure to flower can be because of insufficient light intensity during the growing period when new pseudobulbs are formed and matured. Key features of insufficient light in flowering size plants are the lack of sheaths and formation of smaller and perhaps less robust pseudobulbs. That said, many cattleyas are dependent on changes in day-night length much like poinsettias. Without a natural variation in the length of day, no matter how subtle, there is no signal to induce flowering. You may see terms such as "winter whites" or "fall purples" and this is your clue that these plants have been selected for those sharply defined blooming periods and will be dependent on changes in day length. Take as an example a "winter-blooming" cattleya. These plants do not begin to form buds until after the fall equinox and it is the gradual decrease in day length as

These questions were part of one or more recent monthly webinar Q&As and compiled by Larry Sexton for inclusion here. Each month, a Q&A webinar is held during the first two weeks of the month. To view recorded Greenhouse Chats (Q&A webinars) or register for a future one, see https://www. aos.org/orchids/webinars.aspx. Send questions to greenhousechat@aos.org — *Ron McHatton, AOS Chief Education and Science Officer.*

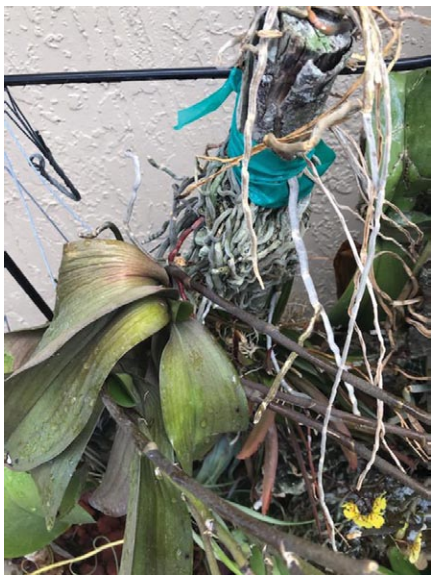
the winter solstice approaches that is the trigger to flower.

Changes in day-night length happen naturally in a greenhouse and plants can be placed on windowsills behind a curtain to shield them from artificial light at night. For plants grown under lights, the day length can be lengthened or shortened simply by changing the timer settings.

Day-length-sensitive cattleyas grown out-of-doors during the warmer parts of the year and brought in for the winter may fail to flower if the natural decrease in day-length is interrupted. Many who grow under lights set their timers for a reasonable day length when plants are first brought in and then shave perhaps ½ and hour off the length as fall progresses and then add that ½ hour back after the winter solstice passes to help mimick what plants experience naturally.

Unless a cattleya hybrid has been selectively bred to have a sharply defined flowering period, the further they are from pure species, the less the day length may matter. Many complex hybrid cattleyas will flower on each developing pseudobulb and thus flower more than once a year. When you buy hybrids that say they can flower 2–3 times a year, what that means is they are flowering on any new mature growth.

RESCUE OPERATION



This plant is still salvageable given sufficient watering. It is not the plant referred to in the question but simply used to illustrate a very dehydrated but still salvageable plant.

QUESTION

I purchased this plant. One month later I repotted it when the flowers became droopy and the roots started to decay. My mix is less coarse than the original mix. I also cut the spike hoping the plant would focus its energy on new roots and leaves. Anything else I can do to save this orchid?

ANSWER

What happens here is the plant gets over watered, then the leaves droop and the roots rot. The plant looks like it needs watering and you water more. This continues the vicious cycle and the plant will shed its basal root system and maybe leaves. To save the plant you need to get the flowers off as you did. Clean up the root system by getting rid of as many old dead roots as possible. Put the plant in new, better-draining potting mix, and keep it a little on the dry side. Usually the plant will send out new basal roots in about a month. Severely damaged leaves will not rehydrate but even plants that are in pretty bad shape can be salvaged given enough time. Once roots begin to grow, new leaf growth will begin and, over time, replace the lost or damaged foliage.

GREATIdeas

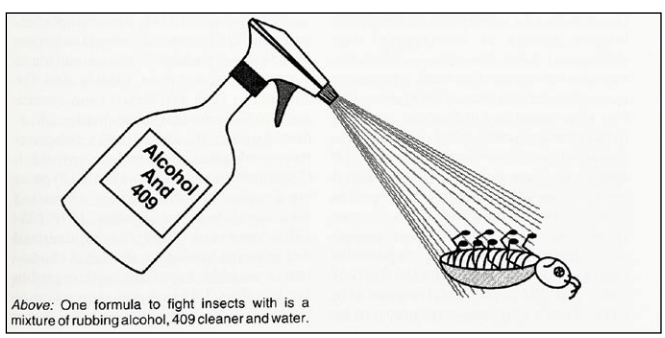
by Ed Wright and Bill Tippit

Mix One For the Uninvited Guests (Reprinted from the October 1994 AOS Bulletin 4(10):1167.

WE ARE EMBARRASSED to write on this subject, but it responds to the most-asked question we receive: "What insecticide do you use?" The answer (within limits): "None."

Every user should try new things on just a plant or two and observe the results under local conditions before doing anything new on a large scale. Always good advice, but essential when dealing with plant basics like food, media and insecticides.

The preparation we use first for all insects is mixed in a clean gallon (3.785-L) jug. We pour in one pint (0.5 L) of rubbing alcohol then fill the alcohol container with 409 cleaner so that we add a pint (0.5 L) of that to the same jug. We then fill the jug with tap water, agitate the mixture and fill hand sprayers sold at garden centers and hardware stores. Each sprayer is labeled ALC + 409 with a felt-tip pen before filling so we can tell at a glance what the mixture is. The same entry is on the gallon (3.785-L) jug. When we see an insect, we spray it. If we see red-spider damage, both sides of the leaf or leaves involved are sprayed. If scale is the culprit, we soak a cotton ball in our mix and gently scrub the infested area to penetrate the scale's armored shell. That's the extent of our basic insect-control program. We do not do preventive spraying for any insect. Under no circumstances would we ever touch an orchid leaf with a toothbrush. (Toothbrushes are made to polish the hardest exposed surface in the human body. Any use on plant tissue will produce small cuts that provide an open route for pathogens to attack the plant. Never use a toothbrush on your plants.)



Above: One formula to fight insects with is a mixture of rubbing alcohol, 409 cleaner and water.

Under our growing conditions we have no problem with this mixture, regardless of the genus on which it is used. It kills bugs, is kind to our plants and ourselves and is economical. In hot weather, the spray does have a slight tendency to dry buds on phalaenopsis, dendrobiums and blast buds and flowers on paphiopedilums, but then everything else does too. Other than that, we have never seen damage on any orchid plant that we felt was caused by the spray. If an insect persists, we do not hesitate to use more-exotic insecticides, but our use of commercial insecticides has dropped about 80 percent since we began the "Mix" as our first treatment.

When Worlds Collide

It makes for the best vacation!!

Text and photographs, unless otherwise credited, by Thomas Mirenda

PERHAPS I SHOULD have known in the back of my mind what I would find on Gobernadora Island, but I did not think about it very much until I arrived there. Since retreating from traditional work, I have been in the enviable position to travel extensively, especially through the winter months. Although I usually indulge my passions and go to orchid-rich areas to observe, photograph and better understand orchid species, occasionally I attempt something a little different. I have been fascinated with the islands off the Pacific Coast of Panama for many decades, not because of the flora, which I expected to be scrubby and not too interesting due to the torrid lowland temperatures and proximity to seawater, but for the incredible tides. Extreme low tides make the region, and particularly this island, an exceptional place to find superb seashells, another hobby of mine since early childhood. Going there for shelling has been on my bucket list for many, many years. Little did I know I would find an exceptional array of orchids there too. Indeed, it seems that two of the parallel universes I inhabit converged on this beautiful and rarely visited little island.

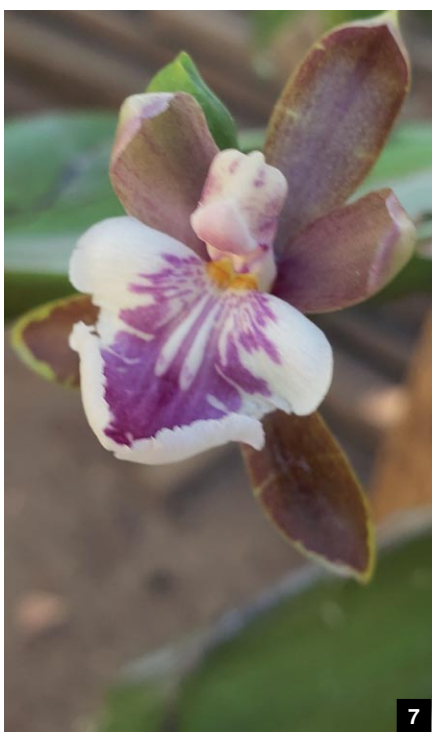
Among the challenges of getting to Gobernadora Island is finding a place to stay and arranging a boat to get there. After hitting several obstacles, I discovered there was a secluded lodge on the island, referred to as the "Art Lodge (www.artlodgepanama.com)," an exceptionally beautiful, improbable and eclectic place run by a remarkable couple from France, Valerie and Yves, both fine artists and admirable for their pioneer spirit, rugged tenacity and youthful degree of fitness. Valerie Ancelle, who now runs the place solo, is incredibly resourceful and has been a very positive influence on the local community, encouraging entrepreneurial interests among the residents who have been there for many generations. Through her extensive network on the island, she managed to arrange for her boat captain, Roberto Castillo, to pick me up at the port and take me directly to the Art Lodge. It was high tide when I arrived, and I needed to wade to shore. Luckily Yves, her partner, was there to help me with my bags by literally carrying them over his head! We were greeted by four beautiful dogs of a breed native to the area.

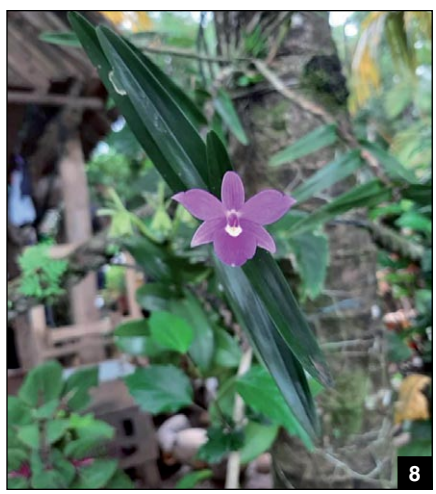
As we walked up the bluff to the lodge, accompanied by the curious and affectionate canines, I noticed to my delight that several orchids, including encyclias, brassavolas and catasetums were growing along the path. While these were not blooming, I had the feeling I would see others that were. Valerie's Art Lodge is completely open air and

[1] Access to Gobernadora Island requires a small boat. This is low tide, but arrival at high tide means wading waist-deep to get to shore! There are no roads or cars on the island!

[2] The Common room at Valerie's Art Lodge where we gather each evening for delicious vegan meals and fresh fruit.

[3] A small selection of cowry shells found at extreme low tide in this shelling paradise. The spotted ones are *Jenneria pustulata*.





[4] The epiphytic *Sobralia* species common on the island; likely *S. decora*.

[5] *Rossioglossum ampliatum*, or the turtle shell orchid, in many places and generally not in bloom, but these in Faviola's garden clearly getting excellent care and feeding were blooming luxuriantly.

[6] In the upper trails, huge plants of *Vanilla pompona* were just starting to bloom. While not the same quality as the flavoring derived from *Vanilla planifolia*, a desirable extract can be produced from this species. Photograph by Valerie Ancelle.

[7] *Aspasia epidendroides*, the more common of the two species of *Aspasia* found in Central America.

[8] *Dimerandra* species along the trail were always a nice surprise.

[9] *Catasetum* species growing in a very exposed location on the island.

[10] *Encyclia cordigera*, locally known as Orquidea Semana Santa, grows all around the island and several unusual color forms exist. It blooms reliably during holy week and has a heavenly fragrance. Photograph by Ubaldino Castillo.

beautifully designed and decorated with outstanding artwork made from mostly natural objects. The main common room of the lodge, where about six of us would gather each night for nutritious home-cooked vegan meals was full of books and natural objects about Panama and the natural history of these Pacific Islands. Later that day, I walked with Yves to a small village in the heart of the island for some supplies and perhaps a beer to quench our thirst on a hot dry day. On the way, were lush plants of *Aspasia epidendroides*, *Caularthron bicornutum* and *Encyclia cordigera*! But Yves moved too fast, and I was determined to keep up so I could not really linger and look at flowers at that time.

Internet access was very spotty at best, but there were some supposed hotspots. You could determine where they were by the presence of teenagers with their smartphones sitting around in the most improbable places in the middle of the forest or on otherwise secluded beaches. Later that evening just before dusk I wanted to check on some email correspondence, so I sought out one of the hotspots. Big mistake! I got hopelessly lost trying to get back to the lodge, thinking the beach would be my best route to get back, I had not considered that high tide had come in and I was forced onto rocky ledges and outcrops, dangerous for me to negotiate in almost complete darkness! I turned around and headed back to the village where Valerie and some of her young guests had come looking for me. What a relief! We walked the hour back to the lodge and sang songs together on the way. A lovely evening, with the fragrances of brassavolas and wild native plumeria in the air.

Valerie employs some of her neighbors to help around the lodge including a really lovely lady, Faviola Esther Bautista. She and her two sons Ubaldino and Nicanor Eduardo have a lovely compound on the beach about a half mile from the Art Lodge. An avid gardener and lover of plants, Faviola had an amazing garden full of rare plants and many fine orchids from the island including *Rossioglossum ampliatum*, *Dimerandra emarginata* and an epiphytic sobralia native to the island, that seemed likely to be *Sobralia decora*, but could have been a close relative. On my first visit to Faviola's garden (on the way to the central village), there were many plants in bud so I was anxious to return and see what they were and get some pictures. Ever industrious and entrepreneurial, Ubaldino and Nicanor were building a small lodge of their own for people like us to stay on future visits. I cannot wait to return and see how their garden has grown.

[11] Valerie Ancelle (right) who runs the Art Lodge, with two of her young guests, Catherine and German who rescued the author the night he was lost on the island.

[12] Left to right: Nicanor, Ubaldino and Faviola in their superb orchid garden.

There is an extensive array of trails on the island that run through some of the wilder portions of the highlands. There I met Damian, who keeps and manages these trails. Valerie humorously refers to these trails as "the superhighway" as they are often the quickest route from one side of the island to another. Damian lives a remarkable and rustic life on one of the highest points on the island and loves having visitors. He immediately cut some fruit and a perfect coconut to drink from while I waited with him for two young hikers to return. While there was certainly a language barrier between us, he was happy to show me his artwork and all the beautiful plants he surrounded himself with including many types of encyclias, catasetums and *Vanilla pompona*, which were all around the trails and just beginning to bloom. What idyllic lives some people have, with no need for much income, surrounded by beauty and sustenance from the land and serving as an ambassador to the rare but intrepid visitors to this amazing place.

Valerie has plans to farm vanilla there, she has large numbers of plants behind the lodge and I hope to help her create an outstanding orchid garden there. I saw many orchid plants I did not recognize including likely species of *Cycnoches*, *Stanhopea* and a wide variety of epidendrums. There are literally millions of *Brassavola nodosa* var. *rhopalorachis* there and I could imagine a truly magical stand of them around the lodge perfuming the open air through the night. I hope to also help establish a shell museum on her property so that people will understand and enjoy the incredible biodiversity in this one small place. A very small yet wonderful place where indeed, two worlds of mine collided.

— Tom Mirenda has been working professionally with orchids for over three decades. He is currently an AOS trustee and is a past chair of the AOS Conservation Committee. He is an AOS accredited judge in the Hawaii Center (email: biophiliak@gmail.com).

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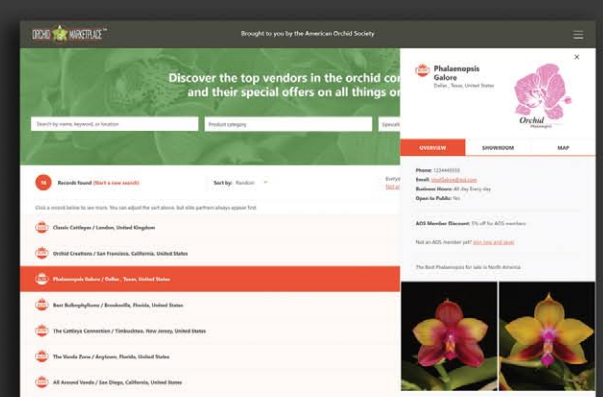

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Myrmecocattleya Bordighera

(*Cattleya intermedia* × *Myrmecophila tibicinis*)

A Lovely Primary Hybrid

Text and photographs by Judith Rapacz-Hasler

THE PARENTS *Cattleya intermedia*, also called the intermediate cattleya, is a lovely bifoliate species found over a fairly wide region including São Paulo, Santa Catarina and Rio Grande do Sul states of Brazil, Uruguay and Argentina. This species grows in the Atlantic coastal forest on rocks and small trees near the sea or streams, clearly enjoying the moisture of its surrounding environment. As the name indicates, it is an intermediate-type cattleya that, in its typical form, has pure white sepals and petals that, with time, turn a light blushed rose. The lip is white but is marked with dark pink to bright red at the margin. There are many named varieties of this species as well as numerous horticultural forms such as alba, semialba, coerulea and aquinii-types (splash-petal pelorics). They bloom in early spring with short inflorescences with minute floral bracts arising on newly matured, relatively short-to-intermediate pseudobulbs. This is a favorite species for cattleya growers because it is relatively compact and a faithful bloomer.

Myrmecophila tibicinis also known as *Schomburgkia tibicinis* was identified by Bateman in 1838 as *Epidendrum tibicinis*, moved to *Schomburgkia* in 1841 and assigned to the genus *Myrmecophila* by Rolfe in 1917. A common name for the species is the trumpet's schomburgkia. The name honors Richard Schomburgk, a German-born gardener and plant collector who went on to become the director of the Adelaide Botanic Garden in 1865. The species grows in seasonally dry, deciduous forests, at elevations ranging from 1,000–2,000 feet (300–600 m) in full sun on tree trunks and larger branches and is found in Belize, Costa Rica, Guatemala, Honduras, Venezuela and Colombia.

Unlike *C. intermedia*, *Mcp. tibicinis* is a giant-sized, warm-to-hot growing epiphyte or sometimes lithophyte with several apical, elliptic-ovate leaves. With long, erect, paniculate inflorescences that open successively, its fragrant flowers appear in a cluster at the apex. It is an easy-growing species and in hybrids, happy with seasonal rains in the summer and a dry period with occasional misting in the winter.

Visiting the spring orchid show on the island of Mainau in Lake Constance with thousands of orchid species and hybrids displayed in and around tree branches and dozens of old musical instruments, I noted this rather stunning orchid, hanging from a branch. What was it? The growth habit certainly looked like a myrmecophila with three long erect, paniculate inflorescences with over 20 gorgeous, white flowers, but the lip shape and color were rather unusual. Although the shape of the flowers resembled the *Myrmecophila* parent, the color of the sepals and petals, as well as the lip shape and color resemble the *C. intermedia* parent. This hybrid, having inherited inflorescences and floriferousness from the *Myrmecophil*a parent and color from the *Cattleya* parent resulted in a spectacular specimen to be admired.

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Myrmecocattleya Bordighera was registered by P. Maggi Ponti in 1967. Perhaps it is named after the coastal town Bordighera on the Mediterranean Sea in Italy. The plant that attracted my interest was cultivated by Stefan Reisch, who is responsible for the Glass and Display Houses Units at the Insel Mainau. He has been taking care of a large orchid collection for the past 25 years. The plant pictured here is mounted on natural wood and had three inflorescences with over 20 well-formed flowers with beautiful coloration, giving the appearance of a lovely bouquet. Flowering occurred in May.

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[1] *Myrmecocattleya* Bordighera
[2] A good example of the typically colored *Cattleya intermedia*.
[3] *Myrmecophila tibicinis*

Further Reading

Allikas, G. 2009. *Farewell Schomburgkia*. https://www.aos.org/orchids/collectors-items/farewell-schomburgkia.aspx. Accessed May 10, 2022.
Fandom (wiki). Accessed May 10, 2022.
Pfahl, J. 2022. *Internet Orchid Species Photo Encyclopedia (IOSPE)*. http://www.orchidspecies.com/catintermedia.htm. Accessed May 10, 2022

— Judith Rapacz–Hasler is a member of the AOS editorial board. She spends half the year on Florida's west coast and the remainder in Europe (email: jorapacz@wisc.edu).

Call for Award Nominations

by Jean Hollebone

AOS Voluntary Service and Recognition Awards

THE AOS AWARDS Committee is seeking nominations for its 2022–2023 awards for Outstanding Volunteer Service. These awards are intended to recognize and commend meritorious service to the AOS in multiple areas. Do you know an AOS volunteer who has worked for many years supporting one of our three pillars: education, conservation or research? Perhaps this person worked on a specific project, task or simply as an ambassador who encouraged you or others to join and serve the AOS.

NOMINATION PROCEDURES These require you to fill out, document and return a fillable form (on the AOS website under the tab About Us: Policies and Procedures: Awards Policy). It would include the nominee's name, address, phone number, email address and the award being considered, along with a brief (300 words or less) description of why you are nominating this person, the substantive achievement and the nominee's relevant background in orchids. The form and any accompanying data must be submitted to the chair of the Awards Committee (unless, for specific awards, other procedures are given) by October 31, 2022: jean@hollebone.ca.

REVIEW PROCEDURES Nominations will be reviewed by the appropriate committees and recommendations made to the Board of Trustees for final approval. Award winners will be announced at the annual spring meeting of the AOS.

Volunteer Service Awards for Individuals

These awards are described below as follows:

Gold Medal The Gold Medal is the highest AOS service award. It is given to an individual who exhibits distinguished service over a period of many years, in orchid culture, education, conservation, research, or for outstanding service to the orchids, the orchid community and AOS.

Silver Medal The Silver medal recognizes a specific, singular, exceptional contribution of outstanding service to a major project of the AOS or the orchid community.

AOS Award for Excellence in Orchid Hybridizing This award honors the achievements of a living orchid hybridizer. The nominee's career should have had a substantial impact on the orchid industry or demonstrated that the hybrids created resulted in a substantive horticultural advancement of breeding lines in one or more genera.

Thomas Sheehan Award for Outstanding Service by an AOS Volunteer recognizes and commends an AOS member who has demonstrated sustained and exemplary volunteer service that leaves a lasting, positive impact on the AOS and contributes to the long-term support of its programs and events.

Ambassador's Award This honor is awarded to an individual in recognition of outstanding, consistent and tireless

1 DAVID EDGLEY

2 TARA LUNA

[1] Charles and Susan Wilson, two AOS volunteers, working on a field conservation project on *Calypso bulbosa* near Edmonton, Alberta

[2] *Cypripedium montanum* var. *praetertinctum* photographed by Tara Luna while working on a conservation research project funded in part by an AOS grant.

contributions promoting the AOS. Recognition is intended for the recipient's lifetime of activities as an Ambassador.

AOS Fellow Fellows of the AOS are elected by trustees in recognition of their outstanding contribution to the scientific or horticultural advancement of orchids.

Certificates of Recognition are issued by the Board of Trustees to individuals who has completed a period of significant volunteer service to the AOS. Examples would be Board of Trustees members and committee chairs or committee members for completion of a specific and significant task within a committee.

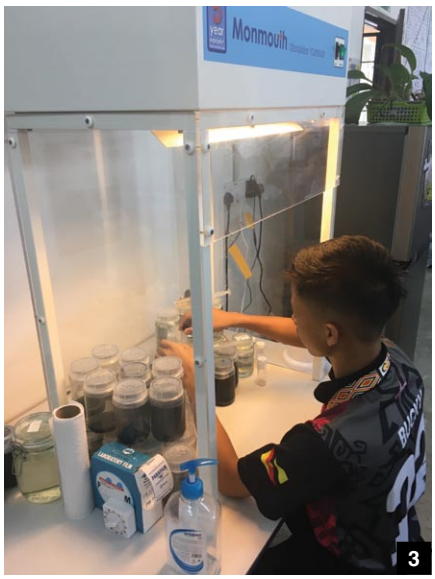
Society Awards

Distinguished Affiliated Societies Service Award (DASSA Awards) Affiliated societies are invited to submit a nomination for the Distinguished Affiliated Societies Service Award (DASSA) given to an affiliate society in recognition of sustained, outstanding contributions in areas of service and support in the field of orchidology. Nominations for the DASSA may be made by any member of an AOS affiliate and should be forwarded to Edna Hamilton Cirilo, chair, at ecirilo@aos.org. If you think your society may be a contender, please review the criteria for the award on the Affiliated Societies site and send your submission on the DASSA nomination form by October 31, 2022. The nomination form can be accessed at https://www.aos.org/AOS/media/Content-Images/PDFs/DASSA_Nomination_Form.pdf.

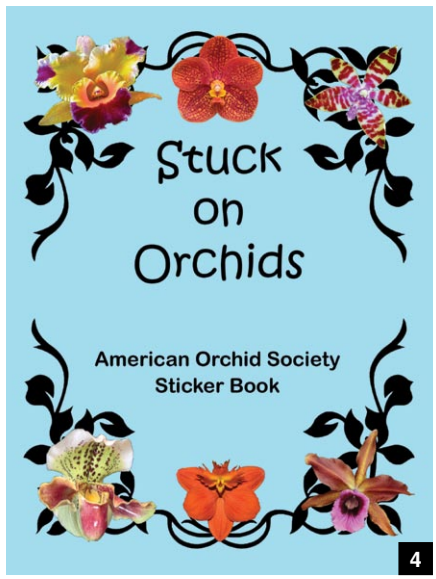
Recognition Awards

Education Committee Certificate for Meritorious Achievement in Orchid Education The AOS Education Committee's Certificate for Meritorious Achievement in Orchid Education is presented to "an individual or individuals for longstanding, exceptional endeavors in the field of orchid education."

The Education Committee is currently calling for nominations for the 2022–2023 award. The mission of the AOS Education Committee is to develop a variety of clear and concise educational materials, provide funding in the form of grants for advanced orchid education programs, and proactively cultivate new audiences through published AOS articles, external networking, webinars and social media. It is often too easy to take dedicated, talented volunteers for granted. We would like to acknowledge those that have given their time and talents to promote the mission of the Education Committee. Eligible candidates should be AOS members in good standing. This award is meant to showcase exceptional endeavors in orchid education, such as webinars, lectures, classes, projects or written materials.



SIMON PUGH-JONES 3



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[3] Sarawak student, partially funded by the AOS, working on *Dendrobium anosmum*, an orchid whose Sarawak range has been much reduced by habitat loss

[4] New AOS sticker book for children intended to introduce orchids to children while having fun.

Conservation Awards

The AOS sponsors two awards to recognize outstanding work in the field of orchid conservation.

The Conservation Recognition Award recognizes noteworthy orchid conservation efforts by individuals, groups, organizations and affiliated orchid societies. This award may honor work that has been completed over many years or may recognize outstanding achievement over a shorter period with the potential for more substantial contributions in the future. The AOS Conservation Committee may recommend up to four awards each year. Previously awarded projects are eligible for consideration. Self-nominations for this award are not accepted. More information is available at https://www.aos.org/about-us/orchid-research/conservation-awards.aspx.

The Philip E. Keenan Award recognizes the work of an individual in the study or preservation of native orchids of North America north of Mexico. Individuals may apply on their own behalf or may nominate someone whom they think is worthy of recognition. More information is available at https://www.aos.org/about-us/orchid-conservation/philip-e-keenan-award.aspx.

Both award winners and their projects will be featured in *Orchids* magazine.

Application for these prestigious awards should include a brief nomination statement that includes a short biography or history of the nominee and a rationale for the nomination. A concise description (up to two pages) of the project or endeavor and its effectiveness must be submitted along with the nomination, as well as no more than three letters of support from individuals who are familiar with the work.

Nominations will be accepted until October 31, 2022. Nominations and questions about these awards should be sent to conservation_committee@aos.org.

The Research Recognition Award is a new award approved by the Board of Trustees in January 2022 and is being offered for the first time.

The Research Committee is seeking nominations for the Research Recognition Award. Nominees must have produced a major impact on orchid research that has been nationally or internationally recognized by peers in the general scientific community. More details are provided on the Research Committee website: https://www.aos.org/about-us/orchid-research.aspx. Applications using the award's fillable nomination form should be submitted no later than October 31, 2022 to research_committee@aos.org.

Please put your thinking caps on and nominate those who you believe should be recognized for their volunteer service for the AOS.

— Jean Hollebone, Chair AOS Awards Committee (jean@hollebone.ca).

International Palm Society Biennial in Hawaii

October 9th–15th, 2022

Experience the lush, tropical Hawaiian Islands with the International Palm Society (IPS).

The IPS will host its 32nd Biennial meeting on Oahu and the Big Island with an optional pre-Biennial tour to Maui. We shall tour the most important private and public palm collections and gardens, enjoy knowledgeable and entertaining evening speakers, visit a world-renowned nursery, and reconnect with palm and tropical horticulture enthusiasts from all over the world. It will be a week-long immersion in tropical horticulture at its best!

Registration opens March 1st, 2022 and is limited to the first 150 participants. For more information and the full itinerary, please visit the IPS website, www.palms.org.

THE INTERNATIONAL PALM SOCIETY

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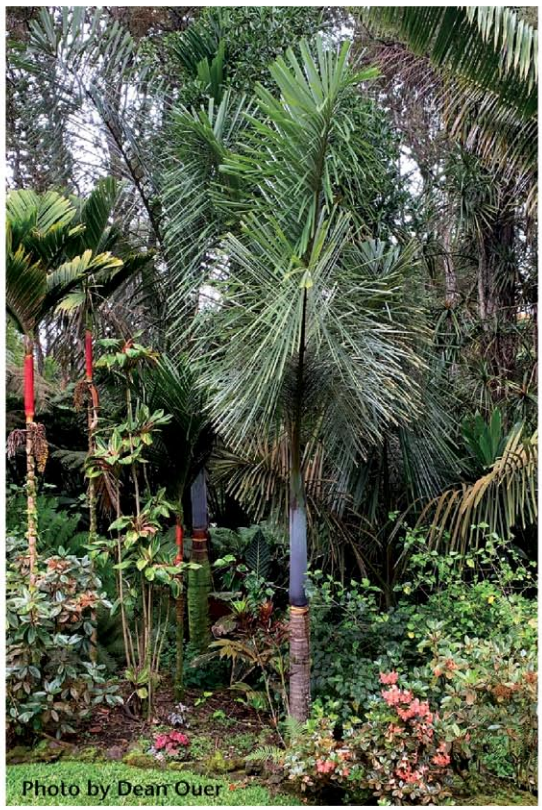

Photo by Dean Ouer

MAKING SURE PEOPLE CAN REACH YOUR AFFILIATED SOCIETY IS NOW EASIER THAN EVER

There's a new easier way to keep your society's AOS information current. An authorized Rep. can simply sign into www.aos.org with society credentials to update your AOS Profile immediately.

Click **Access your account and quick links**
Choose **My Account**
Click **Edit My Profile** (directly below "Welcome Back")
Make the necessary changes to contact details and address and **Save changes** (lower left corner of the screen)

Help us ensure the AOS Corner, renewal notices and important correspondence reach you. Update any time you have a change.

Winter will be here before you know it. Does your greenhouse run too cold? Now is the time to prepare.

Stick one side of Velcro disks a foot apart onto the inside of the north side of the greenhouse to fit the shape of the foil-covered, bubble-wrap-type batts like the material used as jackets for hot water heaters. It can be purchased in rolls. The foil will reflect light back into the greenhouse and the bubble wrap will help insulate against the cold. It may also be used to insulate the west side of the greenhouse on the outside to help keep the greenhouse cool during the summer months. — *Jean Allen-Ikeson*

Score Sheet News for the AOS

By Fr. Ted Baenziger

ON THURSDAY JULY 14, 2022, the *Houston Chronicle* newspaper published an article about the James Webb Space Telescope and its photos. The article used "wow factor" in the title and went on to say, "They really have the *wow factor* and spread the excitement…to the broader public" (Mishanec 2022).

How better to describe our own reaction to seeing, in real life, the captivating beauty of a well-presented orchid? We already have a term for wow factor in the word "outstanding" (used 29 times in the Judging Handbook; e.g., "outstanding aesthetic appeal" 6.2.9). Unfortunately, that term is never defined in our documents. I will deal with these two terms in this short explanation, for judges and non-judges alike.

Both "outstanding" and "wow factor" have a double reference, first for the observer and second for the plant or flower itself. In the first case, the personal reaction, we align the meaning with enthusiasm ("This is exciting, striking, impactful, interesting, stunning, unique, etc."). A certain joy, an aesthetic shiver comes over the observer. For amateurs of orchids, it may be the moment when we get hooked on orchids: "Wow, that is great, and I need to have one!" Or many. Or just one more…. And when we find out there are thousands of species and hybrids, we enter orchid heaven. Well, sort of.

When this reaction comes from a judge, that excitement is tempered by experience and the knowledge of what is usual or ordinary and, to the contrary, what is out of the ordinary: more beautiful, higher quality or better than expected. This applies to the entire range of awards we can give, from the Certificate of Horticultural Merit (CHM), a merit award to horticulture significance, through flower quality (Highly Commendable Certificate [HCC], Award of Merit [AM], First Class Certificate [FCC]), to judging exhibits and flower arrangements. A judge thinks, "We need to look at this more closely; the team cannot ignore the eye-catching quality of this clone." And thus, the plant is nominated, or chosen out of the field to be examined more closely.

Now the second aspect of these terms comes into play, that is, the quality of the thing itself. For judging purposes,


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the plant, flower, exhibit or arrangement must be compared to what we already know: is it just OK, good, great or super in comparison to others of its kind? The Handbook tells judges to keep informed about good practice ("at least 12 times each year" 4.6 4 and 4.6 5, and "at all times" 4.6 7). So, how do we judges evaluate what we see? Does it stand above others and elicit admiration?

Look at a plant, such as a cattleya, for instance. Is it in good condition (fresh, clean, fully developed, free of dead, injured or deficient growth)? Is the color clear, unflawed and aesthetically pleasing? Is the shape and configuration of the inflorescence correct and aesthetically pleasing? Are there special qualities that

should be considered? We can add here a strange term: "gestalt," which means the whole is greater than the parts, a factor that plays into the final evaluation.

To all these qualities, however, we must add, "How does this item stack up against all the others in the same category in the AOS system of awards?" Our cattleya must be measured against any others that have already been singled out for an AOS award. Does this one measure up or surpass what has already been garnered? After discussion by the team, it takes only one vote by a certified judge to score it; that is, to go on to the next step.

Here is where the score sheet comes in. Go back to the images NASA gave us recently. These are not just pictures. They are the results of teams of judges' discussion and reflection, making decisions for science and the public. So, also for AOS judges, we work to serve and improve the hobby through good science and for you, the public. To do so means we need some measurable scale to make our comparisons, and we divide that task into color, form and configuration, plus other considerations, achieving a score out of 100 points. Impact or "wow factor" quality plays its part. The present score sheet for quality presents significant flaws and omissions, and the AOS has appointed a working committee to improve what we have (Jean Ikeson, Charles Wilson, Laura Newton, Carrie Buchman, Deb Boersma and yours truly). We are working hard to incorporate this important concept of "wow factor," the quality that describes something as outstanding, into our product. Meanwhile…

For a CHM, a plant needs a minimum of 80 points, for an HCC, 75 to 79, for an AM 80 to 89 and so on. Each plant, arrangement or exhibit, thanks to *your* dedicated work growing and presenting great orchids, can earn the title "Awarded by the AOS" for your pleasure and that of those around you. They can rightly say, "Wow, that's great!"

NASA can produce awe-inspiring imagery, using countless public monies, years of research and hard work, we in the AOS can also claim to tickle your fancy, ignite your wow nerve and provide awe-inspiring examples through our efforts and those of countless orchid growers, ever since the AOS began in 1921, with permanent, recorded awards created in 1932 — 90 years running and still going strong.

Entry No:_____ Date:_____ Event _____

NAME of Plant _____

Parentage _____

American Orchid Society
Education. Conservation. Research.

Flower Quality Award Score Sheet

Scale Used _____

	1. SINGLE flower/ one inflorescence				2. MULTIPLE flowers or inflorescences			
	1.0 No Segment Dominant	1.1 One Segment Dominant	1.2 Two Segments Dominant	Score	2.0 No Segment Dominant	2.1 One Segment Dominant	2.2 Two Segments Dominant	Score
FLOWER FORM	☐	☐	☐		☐	☐	☐	
Overall Form/wow factor*	20	20	20		15	15	15	
* Sepal ☐ Petal ☐ Lip/Pouch ☐	5	9	6		5	9	6	
* Sepal ☐ Petal ☐ Lip/Pouch ☐	5	3	6		5	3	6	
* Sepal ☐ Petal ☐ Lip/Pouch ☐	5	3	3		5	3	3	
Flower Size/Proportion	10	10	10		10	10	10	
Subtotal	45	45	45		40	40	40	
FLOWER COLOR								
Overall Color/wow factor*	25	25	25		20	20	20	
* Sepal ☐ Petal ☐ Lip/Pouch ☐	5	9	6		5	9	6	
* Sepal ☐ Petal ☐ Lip/Pouch ☐	5	3	6		5	3	6	
* Sepal ☐ Petal ☐ Lip/Pouch ☐	5	3	3		5	3	3	
Substance & Texture	10	10	10		10	10	10	
Subtotal	50	50	50		45	45	45	
INFLORESCENCE								
Floriferousness/Habit/Arrangement/Stem	5	5	5		15	15	15	
TOTAL								

Signature _____ Student ☐

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[1] Although it can be sometimes difficult to define, there is no question that "wow" factor is certainly evident in this NASA image of the Cartwheel Nebula taken by the Webb telescope. Photograph courtesy of NASA.

[2] We see it in superior plants. This image is of *Paphiopedilum armeniacum* 'Milton Wittmann' AM/AOS (photographed by Milton Wittmann), a stunning line-bred cultivar compared to *Paph. armeniacum* 'Number One Son' FCC/AOS (photograph from the AOS award archives). Although this jungle-collected example was a show-stopper in its day, it clearly lacks the punch of a modern-day cultivar.

[3] In the proposed score sheet, Wow factor = overall aesthetic impression. Here the appropriate segment(s) are scored under form and color based on agreed dominance of sepal, or petal, or lip. For example, for lip dominant, check lip in the first row and use the appropriate column (9 points). For two segments dominant, check the first segment in the first row and the second segment in the second row and use the vertical column that provides each of the dominant segments 6 points. Multiple inflorescences can have a single flower each, e.g. Lycaste, for those, the multiple scale would be used.

References

Mishanec, N. 2022. *Southern Ring Nebula (NIRCam and MIRI Images Side by Side)*. Houston Chronicle, Thursday July 14, 2022 section A, 3A, 7A. https://webbtelescope.org/contents/media/images/2022/033/01G709QXZPFH83NZFAFP66WVCZ?news=true. Accessed July 16, 2022.

— Fr. Ted Baenziger, professor emeritus of French, has been an orchidist for 30 years, a Roman Catholic priest (Basilian Fathers) since 1976, and is presently the Chair of the Houston Judging Center, Texas. He has been an AOS judge since 2000 (email tbaenziger@gmail.com).

Orquídeas Para La Paz

by Tatiana Arias and Luis Eduardo Mejía

All photographs by Tatiana Arias unless otherwise credited

Making peace with nature through sustainable development and biodiversity awareness in Colombia

THE CAQUETÁ DEPARTMENT in Colombia is one of the places where civilians have suffered violence and displacement the most. With the signing of the peace agreement between FARC and the government in 2016, many scientists have been able to finally have safe access to this region of Colombia's rainforest landscapes. There is an urgent need to provide these communities with real opportunities for work, education and health to avoid their returning to coca cultivation and other illegal activities. Using our respective expertise as a botanist and an anthropologist, we collaborate with local communities within the legality of Colombia's conservation laws, providing education, training and governmental permits to create solutions-based opportunities for sustainable development and research, using orchids as a flagship species of our diversity.

In 2019 we met one of these settlers, Mary Polania, a schoolteacher infected with "orchid fever." Mary was forced to leave her home in San Vicente del Caguan many years ago and ended up buying a parcel at El Manantial in Florencia, Caquetá. Mary has been our inspiration ever since. A single mom of four children, she is an honest and hard worker dedicated to the conservation of orchids. Her dedication inspired us to design a project, combining science, community and economic development, using the richness of Caquetá's orchids as a pathway to peace. Starting in the Andean-Amazonian foothills and extending widely into the wilderness of the Amazonian rainforest, our research has led to increasing awareness of orchids in the region.

We wrote the proposal Orquídeas para la paz (Orchids for Peace) supported by the first author's research group in neotropical orchid epiphyte evolution and conservation that is registered in the Ministry of Science and Technology of Colombia. Many inhabitants of El Manantial, Florencia and the Caquetá population at large have been involved in this project revolving around orchids and making peace with nature. This project offers an alternative for communities to understand and appreciate the diversity of orchids in their areas while getting a

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[1] Visiting an indigenous community from the Coreguaje tribe at the Gorgonia reservation in Milan, Caquetá, Colombia.

[2] Birds eye view of "El Manantial" settlement, a nature community reserve near the city of Florencia, Caqueta. Photograph by Luis Eduardo Mejia.

[3] During our visit to the Coreguaje settlement we traveled in a canoe with members of the project and the indigenous community, to recognize and identify orchids they have in their territory and translocate them near their village.

[4] *Octomeria colombiana*.
[5] *Prosthechea* cf. *fragans*.
[6] *Acianthera casapensis*.
[7] *Catasetum tuberculatum* (female flowers)
[8] *Epidendrum* cf. *coronatum*.
[9] *Maxillaria discolor*.
[10] *Maxillaria parviflora*.
[11] *Cycnoches haagii* (female flowers)
[12] *Galeandra macroplecta*.

small income for daily activities using this same diversity in a sustainable manner.

The scientific components of this project include an inventory of the orchids of Caquetá, the construction of a community nursery to grow orchids from the region, and in which orchids are taken care of by the community and biology undergraduate students from the region. This nursery is located at 983 feet (300 m) above sea level, so every time our team makes explorations in Caquetá's lowlands below 3,275 feet (1,000 m) elevation, we make living collections to take to our nursery. This with the purpose of waiting for orchids to flower to be able to identify, photograph and press them for herbarium material we deposit at the regional herbaria. Also, orchid phenology is being tracked by undergraduate students all year round. We also track orchid spontaneous pollination to later take fully developed fruits to the in vitro seed cultivation lab located at the Universidad de la Amazonia. With the help of the orchid community and commercial growers and experts, we are prioritizing orchids with horticultural potential for Caquetá and assessing conservation needs. We already have a preliminary list of the most suitable orchids to start reproducing with these two goals in mind. Lastly, we have implemented a series of activities with the communities, reserves, students and stakeholders to promote orchid knowledge and conservation among the public. These activities include workshops, field guides, cultivation manuals, videos, the creation of a tourist orchid trail and the strengthening of demonstrative parcels around El Manantial.

We plan to do augmentation programs in areas where orchid diversity has been lost, also involving the reserves in community sciences using the iNaturalist and biodiversity inventories through bioblitzes, and eventually building orchid nurseries for them. We have sent for publication a checklist of orchid species from Caquetá that at the beginning of this program had 146 species in inventory from the literature and have increased that number to around 360 species. We are sure that based on the relatively small part of the territory we have explored, particularly in montane areas of Caquetá, this list could increase to more than 500, including new species. Even though the safety situation has improved in Caquetá during the last 10 years, there are still areas difficult to visit and with dense rainforest; however, we have also been losing many acres (ha) of land due to


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illegal Amazonian land colonization, illicit coca crops and cattle farms.

We believe that commercial orchid production is an important option for rural populations in remote areas of Colombia to increase environmental and economic sustainability for the region. Using a short-term solution in scientific and nature-based tourism, we hope to develop orchid horticulture for commercial purposes in the long term. We are pleased to note that this experience has attracted other people nationally and internationally and we are hoping to expand our work to the Colombian Department of Gainia where we are going to be working with former combatants.

Additional information

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_. *Guía de Orquídeas*. https://drive.google.com/file/d/1ytsfRyWE0jk7Sqm55WCrExEnceKFxV4N/view

— Tatiana Arias is an orchid research botanist at Marie Selby Botanical Gardens, Sarasota, Florida (Tarias@selby.org). Luis Eduardo Mejía is a Colombia anthropologist.

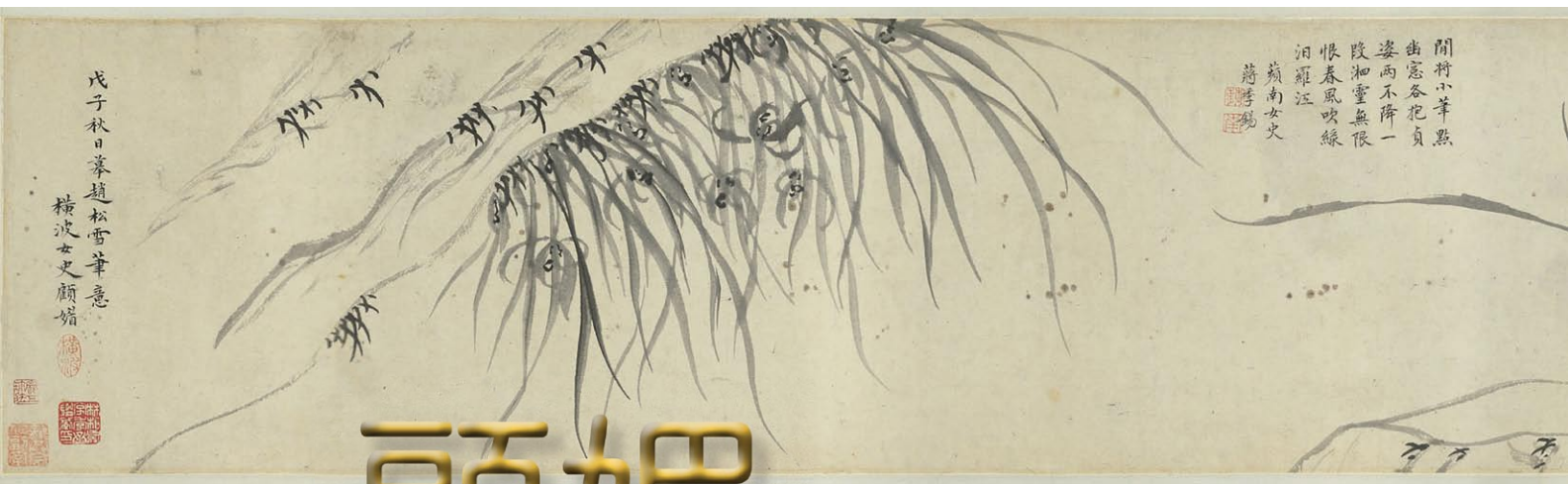
[13] Mary Polania in the newly constructed orchid nursery talking about orchids to visitors from El Caqueta.

[14] One of the five "farms" chosen to have orchids of the region on display. Each "farm" or "parcel" owner has the responsibility to care for these orchids, receive tourists and to tell them about "El Manantial," indigenous cultures and orchids, uses of some orchids, and general biology and orchid cultivation.

[15] Our nursery at "El Manantial" is the biggest in Caqueta with around 2,000 specimens of 150 species. The orchids displayed here are not for commercial purposes but for research, conservation, and enjoyment.

[16] During the past four years we have offered a series of workshops in orchid biology and cultivation. Initially experts from the Colombia Orchid Society trained Mary Polania, a biology undergraduate student at Universidad de la Amazonia in Florencia as well as other students who now they teach these courses to many around Caqueta.

[17] Harvesting germinated seedlings from flask to return to the nurseries.



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THE MANCHU INVASION of China was a time of great turmoil with political, religious and societal changes. Politically it was a decades-long conflict between the emerging Qing dynasty and the incumbent Ming dynasty. In religion, society was moving away from the strict view of Confucianism towards the more liberal world-view of Buddhism. Socially, art and poetry were expanding from the venue of gentlewomen to include the lower social classes of concubines and courtesans. Courtesans were able to own property in their own right; some courtesans invested their earnings in town mansions, country villas and gardens.

Amidst this chaos, Gu Mei (1619–1664) emerged as famous for both her beauty and her talent in painting and poetry; she was also gifted at music. Gu Mei, a native of Shangyuan in Jiangsu

[1] The well-known Ming courtesan, Gu Mei, depicted as an ascetic by the 17th-century painter, Zhang Putong.

Women Illustrators

by Wesley Higgins and Peggy Alrich

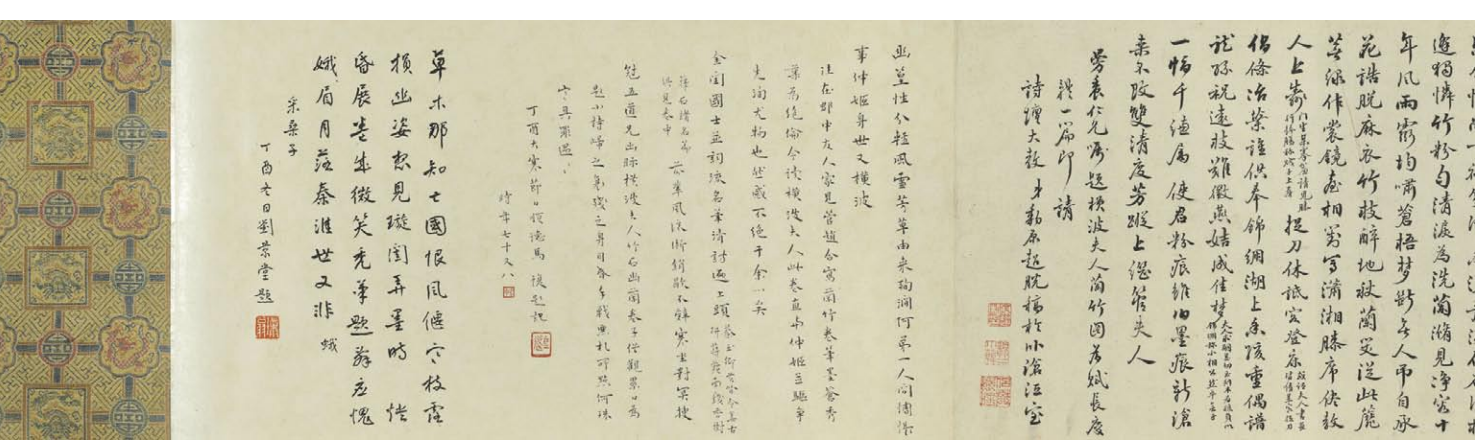
Gu Mei

Gu Mei

(modern Nanjing), was trained in the arts as a child in preparation for entertaining literati clients. She became a courtesan in the Qinhuai River district of Nanjing. Gu Mei soon gained an outstanding reputation in her profession, known for her beauty as well as her literary and artistic talents. The literati of the day often gathered to conduct literary and political discussions, inviting the courtesans to join them. In her lavish and extravagant Tower Meilou (house of bewitchment), she hosted a famous literary salon, which counted Chen Liang (Fushe activist), Qian Lucan (Confucian teacher) and Mao Xiang (author/poet) among its guests. Gu Mei is one of the Eight Beauties of Qinhuai described by late Qing officials. The other famed courtesans of this group are Ma Xianglan, Bian Yujing, Li Xiangjun, Dong Xiaowan, Liu Rushi, Kou Baimen and Chen Yuanyuan. Like all Chinese women of this era, Gu Mei's providence was linked to her male associates.

Fairly early in her career, in an episode that drew considerable attention, Gu Mei and one of her patrons, Liu Fang, fell so much in love that she promised to leave her profession to marry him. However, she later changed her mind, which led Liu Fang to commit suicide. Gu Mei, Liu Rushi (1618–1664) and Dong Bai (1625–1651) are among celebrated courtesans who sought the status of concubine (the side room), as a privileged quarter and refuge from the "floating world." Gu Mei left her profession (at age 23) to become the concubine of Gong Dingzi (1615–1673), an arrangement that was to last until her death.

Gong Dingzi was a promising official that served as a censor in Beijing. When Gu Mei became his concubine, she followed him to Beijing and witnessed the collapse of the Ming dynasty. When Beijing fell to Li Zicheng, Gong Dingzi continued to serve as a censor in Li's administration and also accepted the post of superintendent of police. During the next three decades, Gong Dingzi rose steadily through the Qing bureaucracy. His decision to serve more than one dynasty violated the Confucian principle of loyalty demanded of any official. Consequently, he has been portrayed as a mere careerist lacking moral integrity. Similarly, Gu Mei has been held responsible for his actions



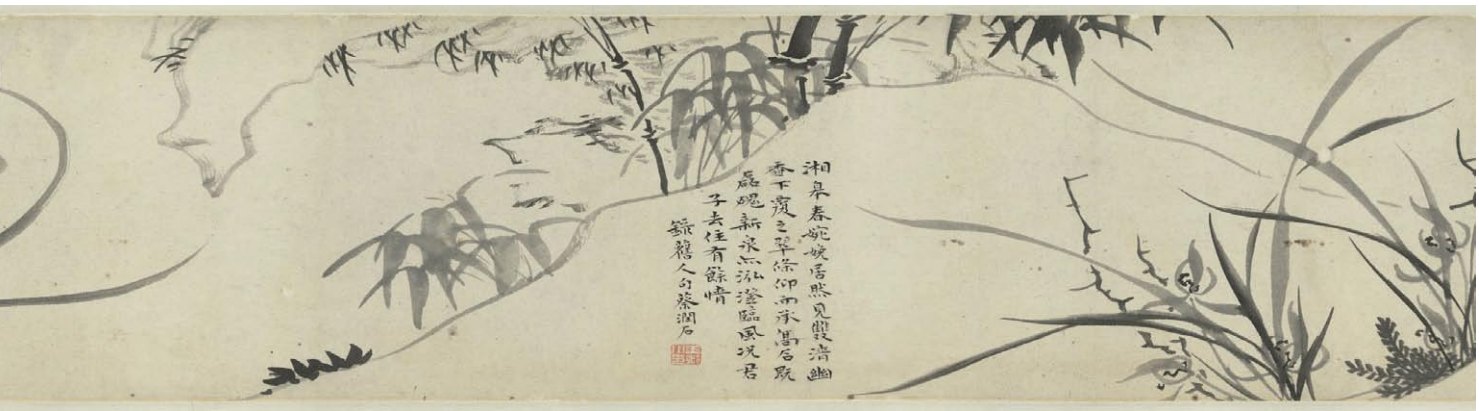
following the tradition that hold women accountable for the moral failures of men. Considering Gu Mei's fondness for a lavish lifestyle, it is likely that she did persuade Gong Dingzi to continue his official career after the collapse of Ming.

When the rebel army captured Beijing a mere 50 days after Gu's arrival, Gong recorded that he and Gu Mei threw themselves into a well but that their neighbors pulled them out. After Gong Dingzi surrendered, he defended himself saying: "I meant to kill myself, but my concubine would not allow me to do it." In Xiong Wenju's commemorative essay (1668) he recalls that Gu Mei fearlessly followed her husband and jumped into a well upon the fall of Beijing. It pointedly condemned officials who had disguised themselves as "pure elements" to earn promotions in the Chongzhen era and asserted that they betrayed the martyred emperor's faith when they surrendered to the rebels.

Gu Mei acted independently on at least two occasions. First, she saved the life of Yan Ermei (1603–1679), a well-known Ming loyalist who had been involved in anti-Qing activities: It is reported that Gu Mei managed to save his life by hiding him in her studio in Beijing. The second involved Zhu Yizun (1629–1709), a celebrated scholar poet official of early Qing: When he was living in extreme poverty, Gu Mei supported him with money from her personal savings because she admired his literary talent.

Gu Mei bore Gong Dingzi a daughter (?–1659). Gu Mei had always longed for a son and for that reason she persuaded Gong Dingzi to build a private Buddhist temple where the couple could pray for a son. It is reported that having failed in attempts to produce a son, Mei asked a sculptor to carve a mechanical figure of a male child from precious wood. This figure was supposed to have been so realistic that it could move. In the Gong family genealogy, Gu Mei appears as "Woman Xu," whose birth and death dates are unclear. Since Gu's dates of birth and death are well known, this record in the family genealogy was unambiguously meant to deprive Gu of her identity and erase her significance in Gong's life.

Gong openly demonstrated his love for Gu Mei, which attracted much



attention during their time as it offended the norms of Confucian ideals, and her influence over him became legendary. Gong Dingzi's collected work *Dingshan tang ji* contains a large number of poems describing the couple's life together. In the collected work of Gong Dingzi's colleagues, including Qian Qianyi and Cao Rong (1613–1685), a substantial number of poems are dedicated to the love between Gu Mei and Gong Dingzi. Certainly, Gong Dingzi seems to have been almost flamboyant in the public display of his love for Gu Mei, and the couple became a favorite topic of conversation in early Qing literature.

When Gu Mei died (1664), Gong Dingzi was unable to obtain official mourning leave. However, he did receive a three-month short leave to return home in 1666, so he traveled southward from Beijing with Gu Mei's coffin. Upon his arrival in his hometown, Gong found a number of friends waiting, including four famous loyalists — Yan Ermei (1603–1679), Du Jun (1611–1687), Tang Yunjia (fl. 1640s–1660s) and Fang Wen (1612–1669) — who had come from their different locations to take part in the burial. In the end, Gu Mei was laid to rest in a quiet corner of the Gong family cemetery in Taohuacheng, 30 miles (48.3 km) southwest of Luzhou.

Gu Mei the artist was famous for her beauty and talent, she was an expert in poetry, music and painting. Gu Mei was skilled in painting ink orchids, so original that she never followed the steps of her predecessors. As an orchid painter, she is noted for long strokes in her orchid ink works. According to Guochao Huazheng Lu (Record of the Qing Paintings) by Zhang Geng, she was as accomplished as Ma Shouzhen (1548–1604). After she married Gong, she changed her surname to Xu and assumed the nicknames of Shan Cai Jun and Meisheng. She received the title "Lady" (furen) from the early Qing court, and was often addressed as Hengbo Furen (Lady Hengbo) in Qing writings. Gu Hengbo was also known as Xu Mei and Xu Zhizhu.

Although Gu Mei was a prolific poet, few of her works have survived. The few poems that have survived are included in anthologies of female poets and biographical collections such as *Xianghai ji*, *Furen ji*, *Guixiu shichao*, *Qing huajia shishi* and *Hua zhenglu*. Gu Mei painted scrolls for Fang Zhenru (provincial governor), Gong Dingjian (politician) and Cao Rong (poet). She was much admired for her paintings of orchids which were a long-standing metaphor for the loyal subject.

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Zhang, Y. 2017. *Confucian Image Politics: Masculine Morality in Seventeenth-Century China*. University of Washington Press, Seattle, Washington.

Scoll Illustration: Jiuwan Tu (Orchid)
Gu Mei: The Ming dynasty
Handscroll: ink on twill-weave silk
11.22 inches × 72 inches (28.5 cm ×183 cm)

Cattleya Penny Kuroda and

Two Splash-Petal Enigmas. A Two-Part Report on the Registration

Part 1: *Cattleya* Penny Kuroda

BY JASON HARPSTER

IN HER ARTICLE, "*Cattleya* Penny Kuroda by Any Other Name," published in the April 2014 issue of *Orchids*, Laura Newton details how *C*. Penny Kuroda was originally registered with the wrong parentage. When *C*. Penny Kuroda was registered in 1976 by Mary Hernlund, the parents were listed as *Cattleya* Summer Snow × *Cattleya guttata*. Given that most splash-petal cattleyas have *Cattleya intermedia* var. *aquinii* in their background, Newton rightfully questioned where the distinct, peloric, splashed petals of *C*. Penny Kuroda and its progeny originated. There are a few exceptions to this rule, which will be explored.

The splashes on *C*. *intermedia* var. *aquinii* and its hybrids are markedly different from the flares associated with labiate or rupicolous cattleyas. The peloric petals of *C. intermedia* var. *aquinii* directly mirrors the pattern, stance, shape and ruffling of the lip (F. Clarke pers. comm.). Most labiate species have flared petal varieties, though few are accepted by the World Checklist of Selected Plant Families. Moreover, many rupicolous cattleyas have latent flaring that is often observed on the sepals and petals of their offspring, especially *Cattleya briegeri*. There are also examples of flares or veining found in former *Sophronitis* species and hybrids. Splash petal cattleyas are different from these other flared types as the petals and lip have a direct relationship where they affect the patterns, shapes, and form of each other. These phenomena where the lip and petals influence one another is why peloric petals tend to also be wider and have a propensity for cupping. If the lip is reflexed or recurved, then the petals will be as well.

Newton shows that *C*. Summer Snow (Bebe White × Clementine Goldfarb) could not have been used as a parent of *C.* Penny Kuroda as its breeding lines are all large labiate cattleyas. She recounted discussions with Bob Scully, Jr. who explained how easily misregistration could have taken place at that time in Hawaii. Hawaiian orchid hybridizers were

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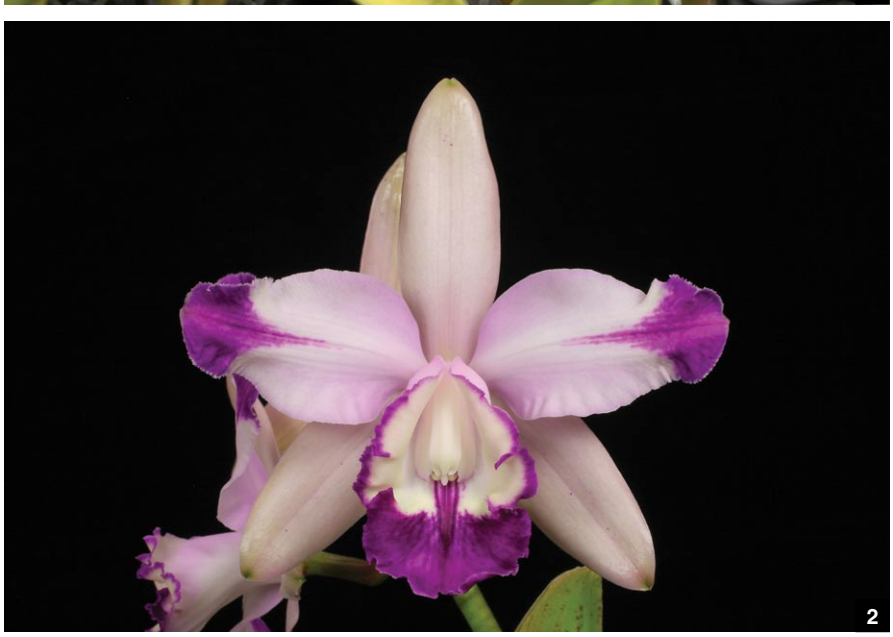

2 RAMON DE LOS SANTOS

Cattleya Hawaiian Fantasy

and Probable Parents of Two Hawaiian Hybrids

anxious to get their crosses out in the market and registrations were often an afterthought. Newton also described her efforts in reaching out to Mary Hernlund to learn more about the parents used in the original cross and how she reviewed other cattleya hybrid registrations from the same time period.

In reviewing other hybrid registrations, Newton discovered one potential parent with *C.* Summer Stars: a hybrid between *Cattleya* Henrietta Japhet and *Cattleya* Claesiana. The latter parent is the source of *C. intermedia* (*intermedia* × *loddigesii*) within this cross. From this analysis and subsequent conversations with other AOS judges, she suggested that the real parentage of *C.* Penny Kuroda is *C.* Summer Stars × *C. guttata*. This assertion and subsequent registration change by the Royal Horticultural Society (RHS; Shaw 2014) meant that *Cattleya* Sophia Martin is a later synonym of *C.* Penny Kuroda and is now used as a group to describe the nonpeloric version of *C.* Penny Kuroda.

Michael Blietz, an accomplished Hawaiian orchid grower, has uncovered new evidence that suggests the registration change for *C.* Penny Kuroda is incorrect. In his letter to the American Orchid Society (AOS) in February 2022, Blietz recounts how he recently received the cross book from the Mary Hernlund nursery that shows the parents of *C.* Penny Kuroda as *C.* Summer Snow × *C. guttata* var. *alba*. This cross is listed as #1265 in Hernlund's journal. Intriguingly, #1266 was also listed as a *C.* Summer Snow cross, but has since been edited to show the parent was actually *Cattleya* Summer Ski Slope instead. According to the stud plant inventory also listed in Hernlund's cross book, they never had the type variety for *C. guttata*, only *C. guttata* var. *alba* (stud plant #129-M). The M stands for mericlone (Blietz pers. comm.).

This seemingly innocuous distinction is quite a big deal from a taxonomic perspective as *C. guttata* f. *albina* was not found in Brazil until after 2000 (Blietz pers. comm.) and was not formally described until 2011 (Ximenes Bolsanella). Given that *C.* Penny Kuroda was made in 1976, the *C. guttata* var. *alba* was actually *Cattleya tigrina* var. *alba*. *Cattleya tigrina* has a convoluted history as it was long known as *Cattleya leopoldii* (Vershaffelt ex Lemaire 1860) and before that as *Cattleya guttata* var. *leopoldii* (Vershaffelt ex Lemaire 1854). *Cattleya leopoldii* var. *alba* was described in 1964 (Fowlie). References to *C. leopoldii* f. *alba* can be found as far back as 1958 in the *AOS*


AWARD ARCHIVES

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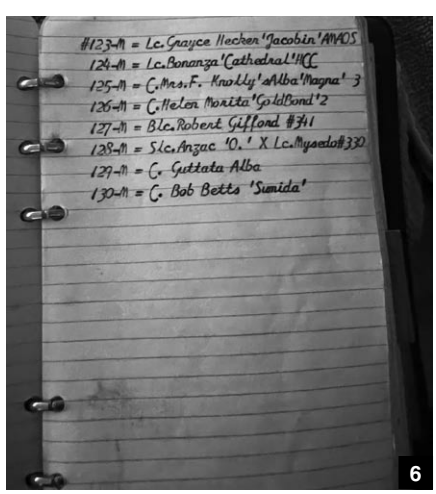

MICHAEL BLIETZ

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[1] *Cattleya* Penny Kuroda 'Spots' AM/AOS; grown by Fred Clarke.

[2] *Cattleya intermedia* (Aquinii form) 'San Carlos' AM/AOS; exhibitor: Ken and Amy Jacobsen.

[3] *Cattleya* Sophia Martin 'Jodi Lynn' AM/AOS; exhibitor: Mariano Reyes.

[4] Hernlund cross journal.

[5–6] Pages from Hernlund's stud plant list.

Bulletin where B.O. Bracey advertised selfed seedlings from a plant he acquired from a wealthy Brazilian collector (B.O. Bracey Co. 1958). A subsequent ad by Bracey in *Orchid Digest* in the late 1950s offered blooming-size seedlings for $125, which is approximately $1,250 when adjusted for inflation (Casamajor 2020). According to Fred Clarke, the famous cultivar 'Fields' came from the original selfing and was popularized by Stewart Orchids in the late 1960s and 1970s (Clarke pers. comm.). Even today, people still confuse *C. tigrina* with *C. guttata*.

This evidence would mean that *C.* Penny Kuroda and *C.* Sophia Martin are two different crosses. Moreover, *Cattleya* Caudebec and *Cattleya* Francisco Sueiro should no longer be viewed as horticultural groups of *C.* Penny Kuroda because they are the progeny of *C.* Penny Kuroda and *C.* Sophia Martin. It also means *C.* Penny Kuroda is one of the many crosses registered under *C. guttata* even though *C. tigrina* was used. According to Courtney Hackney, many crosses are registered to *C. guttata* because the RHS considered *C. guttata* synonymous with *C. leopoldii* for much of its history (2004). The most famous example is *Cattlianthe* Chocolate Drop, registered in 1965 by Stewart Orchids. In her article "*Cattlianthe* Chocolate Drop and Its Hybrids," Jean Allen-Ikeson (2018) remarks how Ernest Hetherington who made the cross said he used an amber/bronze form of *C. tigrina* as the capsule parent.

This new information about *C. tigrina* var. *alba* being used as a parent raises another point of contention: from where does the spotting on *C.* Penny Kuroda originate? *Cattleya* Summer Snow × *C. tigrina* var. *alba* would likely result in a cross similar to *Cattleya* Atalanta with heads of white-to-green flowers without spotting due to the alba color forms being used.

If Hernlund used *C. tigrina* var. *alba* in making *C.* Penny Kuroda, then all the offspring would be heterozygous and carry the alba gene, though they would be the normal color form. This theory is validated by Benjamin Kodama's cross *Cattleya* Hawaiian Variable, registered in 1982. The listed parents are *C.* Penny Kuroda × *C. guttata*. The actual parents Kodama used were *C.* Penny Kuroda 'Spots' AM/AOS and *C. guttata* var. *alba* (which was really *C. tigrina* var. *alba*) (Blietz pers. comm.). The cross, *C.* Hawaiian Variable, was aptly named as the offspring were a mix of albas, peloric, and brightly colored, heavily spotted flowers. The

7 HOWARD ANDERSON, SR.


8 KEITH DAVIS

homozygous alba offspring of *C.* Hawaiian Variable confirm that *C. tigrina* var. *alba* was used to make *C.* Penny Kuroda. It is not a coincidence that all the flowers of *Cattleytonia* Maui Maid made using an albino form of *Broughtonia sanguinea* (*C.* Hawaiian Variable × *Broughtonia sanguinea* var. *alba*) are white or green because both parents are alba forms.

According to Blietz, you do not usually get spotting that is as prolific and dominant as that found on *C.* Penny Kuroda unless there are two or more instances of spotted species in the hybrid's background. Hybrids with only one spotted parent will have varying degrees of spotting. Most of the offspring from a single spotted parent will tend to have some spotting that can be evenly dispersed throughout the petals and sepals or concentrated at the ends of the segments. Some plants may not have any spots, while others will be more heavily marked like the species in their ancestry. Hybrids of this type are typically more colorful and have fuller segments than the spotted species in their backgrounds.

This observation is evident when reviewing primary hybrids that only include one spotted species such as *Cattleya* Brabantiae (*aclandiae* × *loddigesii*), *Cattleya* Hybrida (1859) (*guttata* × *loddigesii*), and *Cattleya* Interglossa (*amethystoglossa* × *intermedia*). This is also why colored forms of *C.* Hawaiian Variable tend to have much more spotting than *C.* Sophia Martin.

After reviewing the numerous progeny of *C.* Penny Kuroda and the inventory from Hernlund's stud book, Blietz concluded that the color, splashing, and spots exhibited could only come from *C.* Interglossa. It is not a coincidence that all the selfings and original plants from *C.* Penny Kuroda were bifoliate due to the influence of *Cattleya amethystoglossa, C. intermedia,* and *C. tigrina*, all bifoliate species. The size of the spots and lavender color on the tips of the side lobes of the lip are in line with *C. amethystoglossa* and its hybrids. The spotting on *C.* Sophia Martin, for example, is finer and the bright color on the side lobes is absent due to the influence of *C. guttata*. The size and length of the splashes on *C.* Penny Kuroda also fit *C.* Interglossa because the peloric petals are mirroring the color and pattern on the lip.

Notably, the lavender color on the tips of the side lobes of *C. amethystoglossa* and its hybrids is dominant and present on almost every award and published image of *C.* Caudebec. This is remarkable as this feature is typically not present on any *C.* Sophia Martin plants that carry the same distinctly colored midlobe and white side lobes as *C. guttata*. The only exception is *C.* Sophia Martin 'J&T' AM/AOS, which appears to be a mislabeled *C.* Caudebec due to the number and intensity of the spots as well as the marked side lobes. *Cattleya* Sophia Martin 'J&T' is also the only recent award for the grex. In reviewing the award records for *C.* Caudebec and its parents, it is important to note that there are two different plants named 'Spots' that have both been used for breeding: *C.* Penny Kuroda 'Spots' AM/AOS, which is peloric, and *C.* Sophia Martin 'Spots' HCC/AOS, which looks like a brightly colored *C. guttata*.

It should also be noted that all the *C.* Sophia Martin awarded cultivars are spotted and do not have splashes. Although splashes on *C.* Sophia Martin are possible because *C.* Summer Stars has *C. intermedia* in its background, this is highly unlikely given the original parents used according to Alan Koch. Koch explains that

JAMES HARRIS


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FRED CLARKE


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LARRY VIERHEILIG


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WES NEWTON


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BAYARD SARADUKE


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ARTHUR PINKERS


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[7] Bracey's advertisement published in *Orchid Digest* in the late 1950s.
[8] *Cattleya tigrina* f. *alba* 'Bracey's Original'.
[9] *Cattleya guttata* 'Brecko Leopard' AM-CCE/AOS; exhibitor: Keith Davis.
[10] *Cattleya tigrina* 'Krull's Perfection' FCC/AOS; exhibitor: Krull-Smith.
[11] *Cattleya* Atalanta 'Hawaii'.
[12] *Cattleya* Hawaiian Variable 'Kyleidosplash' HCC/AOS; exhibitor: Kyle Saunders.
[13] *Cattleya* Hawaiian Variable 'Summer Splash' AM/AOS; exhibitor: Santa Barbara Orchid Estate.
[14] *Cattleya* Hawaiian Variable 'Rainbow Valley' AM/AOS; exhibitor: Jerry and Anita Spencer.

Ernest Hetherington originally made *C.* Summer Stars with alba parents to use for cut-flowers at Stewart Orchids. *Cattleya* Henrietta Japhet was a very popular cross used for corsages and was crossed with other popular albas such as *Cattleya* Bob Betts and *Cattleya* Bow Bells to create crosses such as *Cattleya* Juanita Wong and *Cattleya* Mount Baker in the 1950s. Given that the alba form of *C.* Claesiana was used to make *C.* Summer Stars, one would not expect any splashes because the peloric genes of *C. intermedia* var. *aquinii* are not present.

Koch has had the opportunity to observe a large number of *C.* Summer Stars hybrids bloom and has never seen a splash petal plant among the offspring. An inspection of the award record for *C.* Sophia Martin supports this observation as none of the four AOS awarded cultivars are peloric. The awards and published images for *Cattleya* Summer Spot (Summer Stars × *aclandiae*) and *Cattleya* Summer Rose (Summer Stars × *sincorana*), both created by Koch, also reinforce this supposition. These observations are important as they give insight into other related hybrids.

Considering this new information, is there any other evidence that supports the argument that *C.* Penny Kuroda is (Interglossa × *tigrina* var. *alba*)? Even though *C.* (Interglossa × *tigrina*) is, as yet, an unregistered cross, this hybrid has been recreated using caerulean parents. In the 2021 cattleya offering from Sunset Valley Orchids, Fred Clarke released SVO7181, *C.* (Interglossa 'SVO Blue Splash' × *leopoldii* f. *coerulea* 'Kathleen' JC/AOS). The resulting offspring have a distinct resemblance to *C.* Penny Kuroda and *C.* Caudebec, especially regarding the shape of the lip and general form. Like other crosses of this type, some of the plants inherited the genes for pelorism while others did not. The lip and spots make this form especially attractive.

Interestingly, *C. guttata* × *C.* Interglossa was registered by R. J. Williamson in 1974 as *Cattleya* Morningside Splash. Unfortunately, this cross does not have any awards or other published images and has never been used for further breeding. *Cattleya* Monte Elegante (Sophia Martin × Interglossa), however, has several awards and is strikingly like *C.* Penny Kuroda in form, color, and splash patterns. It is not surprising that *C.* Penny Kuroda and *C.* Monte Elegante have an uncanny resemblance since both hybrids have *C.* Interglossa as a parent with a dose of *C. tigrina* or *C. guttata*.

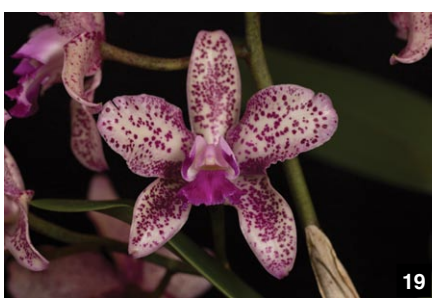
This analysis of the heredity influences of *C.* Interglossa as well as recommendations on what to do with the registration of *C.* Penny Kuroda will be continued in Part Two of this article. I will also explore additional surprises from Hernlund's cross book along with their impact on another prolific splash-petal hybrid, *Cattleya* Hawaiian Fantasy.

Acknowledgments

I am honored to have Laura Newton and Bob Hydzik as my editors and grateful for their contributions. I also thank Michael


15 JIM TEAR


17 FRED CLARKE


19 CARMEN JOHNSTON


21 BRIAN MONK


16 FRED CLARKE


18 AWARD ARCHIVES


20 FRED CLARKE

[15] *Cattleya amethystoglossa* 'Fajen's Orchids'; exhibitor: Fajen's Orchids.
[16] *Cattleya* Interglossa 'Leny' AM/AOS; exhibitor: Joe Headrick.
[17] *Cattleya* Penny Kuroda 'Spots' AM/AOS; grown by Fred Clarke.
[18] *Cattleya* Sophia Martin 'Spots' HCC/AOS; exhibitor: Fordyce Orchids.
[19] *Cattleya* Sophia Martin 'J&T' AM/AOS; exhibitor: Tomy Edwards.
[20] *Cattleya* Caudebec 'Marty's Orchids (4n mutation), grown by Fred Clarke.
[21] *Cattleya* Summer Stars.


DAVID GOULD

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WILLIAM ROGERSON

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Blietz, Fred Clarke, Anthony Curtis, Rory Jones, Alan Koch, Linda Thorne and Roy Tokunaga for their insights.

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— Jason Harpster is an AOS judge and Vice Chair of the Carolinas Judging Center. He cultivates around 2000 orchids which includes more than 500 species across 100+ genera. Jason hopes to make his collection available to the public by establishing a botanical garden with a focus on education and conservation in his home town of Southern Pines, North Carolina (jdharpster@gmail.com).


NOLLIE CILLIERS

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TECK HIA

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[22] *Cattleya* Summer Spot 'Carmela' HCC/AOS; exhibitor: David Gould.

[23] *Cattleya tigrina* var. *coerulea* 'Kathleen' JC/AOS; exhibitor: William Rogerson.

[24] *Cattleya* Interglossa-tigrina 'Boscia', grown by Nollie Cilliers, Plantae Orchids.

[25] *Cattelya* Monte Elegante 'New Port' AM/AOS; exhibitor: Robert J. Richter.

The Award Photography of Greg Allikas

Greg Allikas

AS WE INDICATED in last month's issue, the AOS lost one of its most prolific award photographers and consummate ambassador, Greg Allikas. In addition to his volunteer work with AOS publications and our early introduction to the digital age, for which he received a Silver Medal, Greg's beautiful photographic work has graced the pages of AOS publications for decades. Examination of the last 25 years of AOS awards affords Greg as the award photographer for more than 2,500 awards. On these pages we offer but a small handful of his stunning photographs

— Ron McHatton (email rmchatton@aos.org).

[1] *Paphiopedilum* Jordon Winter 'Crystelle' AM/AOS grown by Krull-Smith.
[2] *Vanda curvifolia* 'Adkins Crimson Cutie' HCC/AOS grown by Adkins Orchids.
[3] *Stanhopea* Lydia Bush 'Heinz Graf' AM/AOS grown by Plantio La Orquidea.
[4] *Paphiopedilum* Jennifer Reinoso AQ/AOS grown by Krull-Smith.
[5] *Phalaenopsis* Blue Ridge Dragon 'Asheville' FCC/AOS grown by Mike Mims.
[6] *Catasetum expansum* 'Mary Motes' AM/AOS grown by Motes Orchids, Inc.
[7] *Chysis* Maritza Bielecki 'Duchess of Dilworth' AM/AOS grown by Marc Burchette.
[8] *Tolumnia* Robefield 'Diana' AM/AOS grown by Carib Plants, Inc.
[9] *Rhyncholaeliocattleya* Krull's Dragon Fire 'Krull's Rainbow' HCC/AOS grown by Krull-Smith.
[10] *Epidendrum* Candy Valley 'Ice Candy' AM/AOS grown by Cal-Orchid, Inc.
[11] *Dendrobium* Silver King 'Grand Monarch' AM/AOS grown by James Curtis.

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Who Were These Guys, Part 18

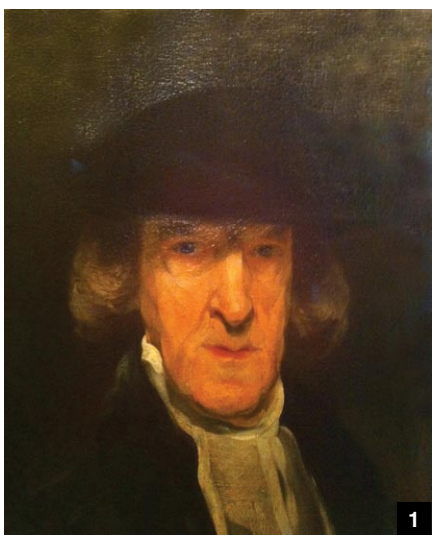
Conrad Loddiges (1738–1826) and The House of Loddiges

DAVID ROSENFELD, MD

THE SECOND HALF of the 19th century can be described as the era of "Orchid Mania" in England and continental Europe. The aristocratic elite craved new and exotic orchids from around the world to add to their ever-growing collections. During this time, the horticultural firms of Veitch (Rosenfeld 2019), Sander (Rosenfeld 2017) and Low in England, and Linden (Rosenfeld 2016) in Belgium continually provided new orchid species and hybrids to their frenzied patrons at exorbitant prices. Just as tulips in 17th century Holland became a craze, so did orchids in 19th century Europe. The saga of how orchids became a prized commodity begins with Conrad Loddiges and his nursery in the early years of the 19th century. This article will document how Loddiges's horticultural innovations and marketing skills eventually culminated in the Orchid Mania that enveloped Victorian society.

Joachim Conrad Loddiges was born in 1738 near Hanover, Germany. His father was a gardener on a local nobleman's estate. Loddiges received his botanical education, also as a gardener, from 1758 to 1761 in the Netherlands, before proceeding to London and taking up a position as a gardener with J.B. Sylvester. In 1771, he negotiated with another local nurseryman, John Busch, to purchase Busch's small import nursery in central London, including his stock and lists of customers and suppliers. Loddiges had a keen business sense and by late 1777 he had a successful and profitable nursery. During this same year, he published his first nursery catalog. This plant listing was one of the first in the world that used botanical scientific names and was trilingual using English, Latin and German.

During the next few decades, Loddiges dramatically expanded the business, purchasing several properties that were contiguous to the original nursery. By 1800, his nursery had become the largest and most profitable in England and possibly the world. Conrad Loddiges had two sons, William born in 1776, and George born in 1786. As they matured, they joined the burgeoning horticultural establishment and Conrad changed the company's name to Conrad Loddiges & Sons.



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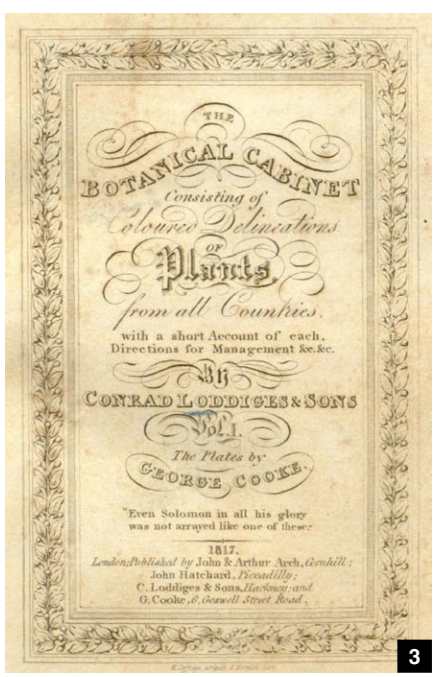

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[1] Joachim Conrad Loddiges (1738–1826)
[2] George Loddiges (1786–1846)
[3] Title page from Loddiges' *The Botanical Cabinet*.

It was in the 1790s that Loddiges first began the importation of living plants. Initially, the plants were mostly roses and fruit trees from North America. They were packed in sealed boxes and, despite being protected with moss against salt spray, the vast majority did not survive the journey across the Atlantic. Loddiges himself was reported as saying that only 5 percent of the shipments survived the trip. It was not until several decades later that Nathaniel Bagshaw Ward invented a transportable terrarium, dubbed the "Wardian Case," that increased the survival of plant shipments from across the globe. Loddiges & Sons were one of the first nurseries to employ this technology for their financial benefit.

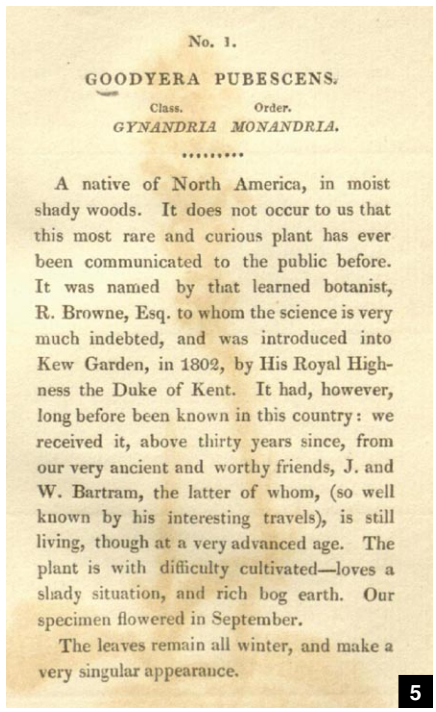
It was in the first decades of the 19th century that Conrad Loddiges & Sons changed the tropical nursery business forever. This was the construction of an immense steam-heated glass palm house: 80 feet long (24 m) × 60 feet wide (20 m) × 40 feet (12 m) high. It was the first of its kind. The paraboloid

shape, with strong but delicate iron ribs, dominated the skyline in central London. In addition to its striking shape, the heating system using steam-filled cast iron pipes below a latticed iron pavement was also an innovation incorporated into the structure. This palm house also had an elevated viewing platform 30 feet (10 m) above the ground, as well as a rain sprinkler misting system. The palm house was very similar to what we see now in modern conservatories. Here is a description from 1833: "In the palm house everything is in its luxuriance, the ferns are in most the most vigorous growth, the epiphytes flowering beautifully, *Oncidium divaricatum*, *O. flexuosum* and *Calanthe veratrifolium* are extremely conspicuous . . . supported by small twigs of bamboo." (Loddiges 1833 No. 2000)

Orchids entered the Loddiges business in increasing numbers beginning around 1812. By 1826, their catalog listed 84 different species. George Loddiges realized that orchids could become a significant source of income. The nursery began contracting with orchid collectors in the Americas and Asia who began supplying the company with an ever-increasing number of new species. Learning how to successfully grow epiphytes in a steam-heated environment was trial and error. With time and experience, the "House of Loddiges" became the leader in orchid culture.

The next important advancement in the world of orchids and tropical plants in England was also pioneered by Conrad Loddiges & Sons. They began using illustrations to market new and desirable species to the aristocracy and the broader public. George Loddiges called his publication *The Botanical Cabinet*. In this era, most books and other publications in Great Britain had voluminous titles and this periodical was no exception: *The Botanical Cabinet Consisting of Coloured Delineations of Plants from all Countries with a Short Account of Each, Directions for Management &c. &c*. For reasons that I cannot fathom, there is this additional bizarre statement on the title page: "Even Solomon in all his glory was not arrayed like one of these." Today we would describe these drawings as illustrated supplements to a plant catalog.

The *Botanical Cabinet* was published from 1817 to 1833. During those years, 20 volumes with 2,000 colored lithographic plates were produced. Remember, color photography did not come into existence until the mid-20th century. Of the illustrations, only 131 plates were of orchids. Interestingly, the first and last plates were of orchids: *Goodyera pubescens* was the first and *Cynoches loddigesii* the last. In addition to the illustration was an adjacent full page devoted to providing information about the plant's region of origin, its native environment, and a suggestion for successful culture. For 5 shillings per month (possibly equivalent to $10 today), a person could purchase a pamphlet with 10 colored lithographic plates or, if that was too expensive, a partially colored version for 2 shillings. It was a family project: Many of the drawings were executed by George Loddiges, his sister Jane and her


No. 1.

GOODYERA PUBESCENS.

Class. Order.
GYNANDRIA MONANDRIA.

.....

A native of North America, in moist shady woods. It does not occur to us that this most rare and curious plant has ever been communicated to the public before. It was named by that learned botanist, R. Browne, Esq. to whom the science is very much indebted, and was introduced into Kew Garden, in 1802, by His Royal Highness the Duke of Kent. It had, however, long before been known in this country: we received it, above thirty years since, from our very ancient and worthy friends, J. and W. Bartram, the latter of whom, (so well known by his interesting travels), is still living, though at a very advanced age. The plant is with difficulty cultivated—loves a shady situation, and rich bog earth. Our specimen flowered in September.

The leaves remain all winter, and make a very singular appearance.

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[4] The first plate of the first volume of *The Botanical Cabinet*, *Goodyera pubescens*, a species native to North America.

[5] Each color plate was accompanied by a page of text describing aspects of the species.

[6] *Paphiopedilum venustum* (as *Cypripedium venustum*).

[7] *Cycnoches loddigesii* was the last plate published. Inset photograph by James McCulloch: *Cycnoches loddigesii* 'Thanks Eric' AM/AOS grown by Stephen Helbling.


8 PAUL THURLIN


9 BRIAN MONK

husband E.W. Cooke were responsible for many of the other illustrations, and the engraving was done by E.W. Cooke's father. George Loddiges went out of his way to clarify with the public that he was not competing with the already established scientific journals of the day, including *Curtis's Botanical Magazine* and *Edwards' Botanical Register*. Following the 20th volume in 1833, publication ceased. George Loddiges explained, "Having been enabled to complete our twentieth volume . . . our labours are closed; the precarious state of our draughtman's health not permitting him to go on any farther" (Loddiges 1833, p. 2000).

The House of Loddiges was at its zenith during the publication years of the *Botanical Cabinet* and for the decade beyond. They published their first orchid list in 1839. The list was 25 pages long and included 1,024 orchids with their countries or regions of origin. The selection was diverse, with orchids from both the Americas and Asia. (Interestingly, I could not find some of the locations, such as Sakaramore and Kumaoon, even on Google Maps.)

Sadly, there was a precipitous fall in the House of Loddiges fortunes, culminating with the closure of the company in the 1850s. There were numerous reasons for the rapid decline. The founder Conrad Loddiges died at age 88 in 1826. His son George, who was the driving force behind the nursery after Conrad's death, and who chose orchids to be a prominent portion of their business, died in 1846. He was succeeded by his two sons. One son soon also died, and Conrad Jr. could not maintain the business. Other factors included increasing competition and the terrible progressive pollution in central London where the nursery was located. When Conrad Loddiges Jr. died in 1856, so did the House of Loddiges. The family of nurserymen that were the first to import orchids in quantity and to recognize the potential financial benefit that could be achieved through innovative marketing ended. Conrad Loddiges Jr. donated many of the most famous orchids in the collection to the Royal Botanic Gardens at Kew. The rest of the greatest collection of orchids in the world was auctioned to the orchid-crazed Victorian aristocracy.

Four orchids bear the family name Loddiges. All were described and named by the famous botanist John Lindley (Rosenfeld 2018). One deserves special mention, *Cattleya loddigesii*. Lindley described this wonderful Brazilian species in 1826, a few years after his identification of the first cattleya, *Cattleya labiata*. The influence of *Cattleya loddigesii* on breeding cannot be overemphasized. There have been 459 offspring (primary hybrids) and the species is found in the background of over 10,000 hybrids. Just as *C. loddigesii* had an immense impact on orchid hybridization, so the House of Loddiges had a similar influence on the ascendance of the orchid to the pinnacle of the horticultural world.

[8] *Dendrobium loddigesii* 'R.O.C.' AM/AOS grown by Hank Tan, named to honor Loddiges.

[9] *Cattleya loddigesii* 'New Hope' AM/AOS, grown by Blu Llama Orchids, is a stunning example of this species named to honor Loddiges.

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— David Rosenfeld, MD, has been growing orchids with his wife Joan for 40 years. David is a retired professor of pediatric radiology at the Rutgers Medical School. They have a 700-square foot (about 65-sq m) greenhouse with both warm and cool sections where they grow a mixed collection of species and hybrids. Their skill as growers is illustrated by their 110 AOS awards including 32 for cultural achievment. David has written 24 articles for Orchids *and last wrote about Joseph Dalton Hooker in the January 2022 issue (91[1]:43–45) (email: orchiddoc@ comcast.net).*

Orchids and Steel

BY ERICA HANNICKEL

WE MIGHT SET 1907 as the high-water mark for the Gilded Age orchid obsession. On Sunday, February 17 of that year, *The New York Times* — amid a political cartoon of Teddy Roosevelt proclaiming "Let Us Have Peace" while throwing out "Big Sticks," an article about the "men who handle Mr. Rockefeller's $43,000,000 fund," and tell-all details about the creation of an elite women's "Colony Club" to which Mrs. John Jacob Astor belonged — declared in large font with inset images of paphiopedilum, cattleya and laelia orchids that "The Orchid Craze Is At Its Height In Fashionable New York." Of course, *the* mark of one's arrival into high society was to regularly spend stupendous amounts of money on orchids. The Astors, Rockefellers and Carnegies bedecked their opulent homes with rare and beautiful cut flowers. The extended Vanderbilt family set a trend that a lavish wedding for one's daughter must include glittering white orchids. Every facet of a wealthy couple's nuptial decorations became a weekly feature in national newspapers. Money spent on perishable beauty was still money well spent, as it served to advertise the family business.

Several of the wealthiest Americans did more than flaunt their wealth with orchids. Some enhanced public and private orchid appreciation, including steel and real estate magnate Henry Phipps, who made significant donations to regional botanical gardens and public greenhouse construction. Businessmen Henry Clay Frick, Marshall Field, H.J. Heinz, C.L. Tiffany, Hamilton Twombly and Cornelius Vanderbilt were all known for their large private conservatories, employing dozens of gardeners and stocked with rare plants. Some millionaires additionally instructed their orchid growers to submit their coveted orchids in regional horticultural society shows and took home copious awards.

Many well-known tycoons were orchid collectors, but in truth they knew little about orchids. In this category fit railroad mogul and speculator Jay Gould, renowned for his cunning business sense — except when it came to orchids. The *New York Herald* wrote in 1896 that "many exquisite and rare varieties were numbered [in his collection], but an excessive price was paid for the most of them . . . careful, conservative buying by an orchid expert would have gathered it

Charles G. Roebling (c. 1915). From William E. Sackett, *Scannell's New Jersey First Citizens: Biographies and Portraits* (Patterson, NJ: J.J. Scannell, 1917–1918).

together at almost a fraction of the sum actually paid out."

Fewer still were millionaires at the turn of the 20th century who developed a genuine passion for hybridizing orchids and participating in the international orchid trade. This love of orchids, combined with the endless funds to enact luxuriant dreams, is something that can be traced through the historical record and within the genes that popular hybrid orchids still carry today. A rarer breed of industrialist became passionate about orchid innovation, building international orchid networks, sharing their knowledge with the public, and donating new hybrids to charitable auctions. One of these was Charles G. Roebling (1849–1918). He was internationally respected in the world of orchids.

As the president of John A. Roebling's Sons Company, Charles ran a profitable engineering firm that oversaw the completion of the Brooklyn Bridge. Less well known are his later ventures building steel and wire mills that produced materials for the Williamsburg Bridge and the Golden Gate Bridge. He additionally manufactured wire rope for the front during World War I and rigging for the Panama Canal, airplanes, trams, mines, elevators and many other structures. At their peak, the factories and machines he designed produced thousands of miles of wire per day. And when the Roebling brothers needed a more reliable source of steel, Charles designed and built their company town of Roebling, New Jersey, near their factory so that production would run smoothly. He had long lived in the shadow of his father, John Roebling, who died painfully of tetanus in 1869 after sustaining an injury during surveying he did for the construction of the Brooklyn Bridge. The elder builder was full of bombast and could not keep from boasting that the elegant structure would "not only be the greatest bridge in existence, but . . . the greatest engineering work on the continent, and of the age . . . a national monument and a work of art."

But Charles possessed a gardener's quieter soul. Having fallen in love with orchids as a young man, throughout the late nineteenth century he financed multiple botanical missions into the mountains of South America and throughout the Amazon basin, as well as to Samoa. Most importantly, he contributed to a loose international coalition of hybridizers in what has been called the First Golden Age of paphiopedilum breeding. Not only were new species discovered, but breeders shared pollinia to create primary hybrids and more complex crosses.

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Bridge building and orchid breeding became entwined metaphors for Roebling, who cultivated both plants and cities in his lifetime. Abram Hewitt, future mayor of New York City and speaker at the Brooklyn Bridge Opening Ceremonies in 1883 aptly described the bridge as "not merely a creation," but "a growth." Hybrid vigor — the increased size and strength developed in Roebling's crossbred orchids — was also found in the mixture of iron and carbon in Roebling's bridges: steel offered the required sturdiness and flexibility for a great arch.

Perhaps an extension of his professional thought process, in the early 1880s Charles began to collect orchids

[1] The Great East River Suspension Bridge, now known as the Brooklyn Bridge. Currier and Ives (1857–1907). Courtesy Smithsonian American Art Museum, Gift of Mrs. Evan M. Wilson.

[2] *Paphiopedilum* Niobe, (*fairrieanum* × *spicerianum*), was registered by British orchid breeders Veitch & Sons in 1889. Roebling soon used the cross to make other paphiopedilum hybrids. Warner, Williams, and Moore, *Orchid Album* (1893). Courtesy Biodiversity Heritage Library.

[3] Award-winning basket of Roebling's orchids, created by Clinkaberry, on the cover of *Gardening* magazine (1897). Courtesy Biodiversity Heritage Library.

with alacrity. He hired two of the most respected orchid growers of the age — Henry T. Clinkaberry and Jason Goodier — to take care of his greenhouses as well as hybridize several genera in his burgeoning collection. Roebling's orchids, like all orchids, were hybridized by collecting the pollinia of one plant with a toothpick and transferring it to the stigma of another. Once the orchid is cross-pollinated, the flower withers or falls off and the seed capsule grows. *Paphiopedilum* seed capsules, for instance, take nine to 18 months to mature. When ripe, copious quantities of dust-like seeds were broadcast on moss or at the base of mother plants. Germination was very low in his day, and if lucky, he might find seedlings growing after another one or two years. Once stout enough and separated into their own pots, paphiopedilum plants would take another three to five years to bloom. While tolumnias can be grown from seed to flower in as little as two years, cattleyas take an average of eight years to bloom. All orchid hybridizers are patient in this way, and Roebling was willing to put in the time to create beautiful new flowers. Roebling also began to contribute horticulturally to his community in other ways: he bedecked his church in orchids on holidays and sponsored city greening efforts.

Roebling's hybridizing program for his favorite orchid genera, cattleyas and paphiopedilums (called cypripediums in his day), required the same sort of long-term planning, development and adaptation to adverse conditions that his bridges did. Paphiopedilums are perhaps both the most anthropomorphized and oddest orchids for their often hairy and alluring petals and pouches. In addition, paphiopedilums seem as though their heads (the flowers) are suspended in air, too heavy for their necks (thin stems) to support. Much like engineering a suspension bridge's perfectly balanced "catenary curve," engineering attractive curves and proportions in orchids — along with a strength to withstand inhospitable environments — marks successful orchid hybrids. And in the long term, it is not just the creation and naming of a new orchid that matters in the wider world of horticulture; it is whether the hybrid has enough positive traits to be of use in future orchid breeding. By this measure, Charles Roebling was successful in revolutionizing steel wire construction and in adding to the growing diversity of beautiful collectible orchids.

Roebling was not a saint, of course. People remarked about his gruff personality, forged while breaking regular strikes at his factories and rebuilding after dozens of devastating fires, which occurred by accident and by arsonists (disgruntled employees and anarchists were regularly accused of destruction of property). His factories spilled wastes into the rivers they were built on, and tons of slag exited their furnaces. And although


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[4] *Paphiopedilum insigne* as *Cypripedium insigne in* Warner, Williams, and Moore, *Orchid Album* (1893). Courtesy Biodiversity Heritage Library.

[5] *Paphiopedilum insigne.* Courtesy Smithsonian Institution.

[6] *Cattleya* C.G. Roebling (1895) 'Blue Indigo.' SBM/JOGA. Photograph by Emmi Mattes.

close with his immediate family, including his brother Washington Roebling, wife, daughters, and a single son (of at least three born) who lived beyond early childhood, once the Roebling's Sons company was incorporated, the brothers often went six months without speaking to one another.

By 1895, Roebling had one of the finest orchid collections in the United States and cultivated the flowers in a sprawling complex of five greenhouses at his home in Trenton, New Jersey. His cool house sheltered thousands of masdevallias and odontoglossums. His temperate houses were awash in epidendrums, dendrobiums, cymbidiums, coelogynes, lycastes and zygopetalums. And his warm houses grew vandas, calanthes and appropriate-temperature paphiopedilums. He attested that "many hundreds" of species and primary hybrids were contained in his paphiopedilum collection. His best orchids were used as breeding stock to invent or recreate award-winning hybrids. His collection included *Paphiopedilum insigne* in brown and yellow tones, *Paphiopedilum charlesworthii* with its enviable pink dorsal sepal and round flower, the twisting spotted petals of *Paphiopedilum* Morganiae, *Paphiopedilum* Leeanum's green-tinged dorsal sepal, the golden-striped *Paphiopedilum glanduliferum* (then called *praestans*), and the hairy, undulating, magenta petals of *Paphiopedilum* Niobe. Roebling's cattleya house alone was 60 feet (18.3 m) long; there he focused on white flowers, including alba forms of *Cattleya aclandiae*, *gaskelliana*, *mossiae*, and *trianae*. He was sure to spend Sundays and rare holidays in his orchid greenhouses, and he and his gardeners racked up awards at regional orchid shows for almost 40 years.

In March of 1904, *American Gardening* ran a first-page feature on one of Roebling's most valuable plants: a division of *Paphiopedilum insigne* var. *sanderae*, described as a "chaste and rare variety," as well as the world's "finest known specimen of this rare orchid." From the Latin, *insigne* means eminent and distinguished, and these terms are certainly accurate if we also apply them to the orchid's role in paphiopedilum breeding for more than 150 years. *Paphiopedilum insigne* has been used as a parent in nearly 300 hybrids and lays claim to ancestry in more than 19,000 other progeny. It is one of the most important *Paphiopedilum* breeding species, in addition to *spicerianum*, *villosum* and *bellatulum*.


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[7] Roebling's *Paphiopedilum* (then *Cypripedium*) Garret A. Hobart on Lenox china plate he commissioned (1906). Private Collection. Photo © Christie's Images/ Bridgeman Images.

[8] *Paphiopedilum* Stone Crazy. Photograph Nolehace Photography/Bob Lewis.

Paphiopedilum insigne claimed its place in the halls of modern orchid hybridization through its stalwart constitution, known to withstand all kinds of abuse on Victorian windowsills. Its flowers sport an array of autumn colors and attractive spots, and its incurved petals were thought to epitomize modesty, making the orchid appropriate for all occasions. It remains a dependable species, producing multiple new fans and flowers annually.

Avid members of the Society of American Florists and Ornamental Horticulturists, Roebling and Clinkaberry together and separately won dozens of First Class Certificates for their orchids — the highest possible flower quality award — from the New York, Massachusetts and Pennsylvania Horticultural Societies. They additionally mounted large exhibits for the American Institute in New York. While regularly lauded for their individual plants, the artistry of their displays sometimes left something to be desired. At the Massachusetts Horticultural Society Orchid Show in May of 1910, a critic wrote that "it was impossible for anyone to see all the orchids without going through the maze of winding paths with many plants hanging overhead. In fact, it was an exhibit that could not be seen." Still, Roebling's display contained the most variety in orchids and took home second prize.

More importantly, Clinkaberry and Roebling also registered no fewer than 20 new cattleya, paphiopedilum, laeliocattleya and zygolum hybrids. Sadly, records of the genetic trees of most of them have been lost to history or were not properly recorded. Yet, a handful of their orchids have a continuing place in breeding today.

Roebling's major contributions to the orchid world underlined his relationships and priorities as an orchid breeder. As early as 1895, Roebling was honored by Henry Frederick Conrad Sander, the "Orchid King" and the preeminent orchidologist in Europe. Sander named a primary hybrid of two cattleya species, *Cattleya gaskelliana* and *Cattleya purpurata*, after the businessman. *Cattleya* C.G. Roebling (1895) bears large flowers ranging from white, to white with a royal purple lip, to so-called blue varieties depending on the parents used to make the cross. Roebling registered a few hybrids of his own in the meantime, and by 1903 donated a flamboyant new orchid to a Royal Horticultural Society fundraiser organized by Sanders. He could not resist naming the award-winning orchid after himself: *Zygopetalum* Roeblingianum (today *Zygolum* Roeblinganum), a bloom with chartreuse and maroon petals, a purple column and veined pink lip. With the 50 British guineas (about $7,300 USD today) the new hybrid fetched, the RHS was able to pay for a significant portion of the construction of a new Horticultural Hall. Charles also went on to name after himself the last orchid he would hybridize: it was another primary hybrid, *Cattleya* C.G. Roebling (1916), a cross of *C. harrisoniana* and *C. mendelii.* It too was a large white orchid, but it carried a ruffled, light lavender lip with lavender splashes on its petals.

Roebling often commemorated US presidents and vice presidents with his hybrids, participating in a trend that has now extended to naming orchids after First Ladies. Roebling dedicated many of his lady's slipper orchids to White House leadership through time: *Paphiopedilum*

Adamsii, James Garfield, Abraham Lincoln, Franklin Pierce, James K. Polk, and his most significant accomplishment in the genus, ironically enough, was *Paphiopedilum* Garret A. Hobart, named after the vice president to William McKinley who died after two years in office in 1899. The flower is comprised of three of the 19th century's most popular species (one-half *Paph*. *insigne*, one-quarter *Paph*. *villosum*, and one-quarter *Paph*. *spicerianum*). Hobart's strong constitution, fall colors and ruffled petals have led it to appear in the ancestry of 67 paphiopedilum progeny.

To offer some perspective on a century's worth of advancements in orchid hybridizing, compare *Paph*. *insigne* to *Paphiopedilum* Stone Crazy, hybridized in 2009. Contemporary international orchid judging associations award the most points to perfectly round, large flowers: that aesthetic has been the basis of the awards system for many orchid genera for generations. Hybridizers seek to create award-winning and popular flowers and thus emphasize certain orchid elements. So, whatever your taste, be assured that there is a paphiopedilum with colors, stripes, spots, warts or hair that will appeal to you.

For a man who ran a sharp business, Roebling never skimped on orchids — he spent several hundred thousand dollars on his collection and breeding program over the course of his life. Roebling wrote in 1901 that "one of the greatest pleasures of orchid culture is derived from hybridizing. It seems a long time to wait several years for a seedling to bloom, but when the hour comes that gives us a variety that not only is beautiful but has never flowered before, it repays us for all the trouble that has been given to the new plant." Upon his death in 1918, he was still cultivating more than 700 species, varieties and hybrids, with several thousand additional flowered and unflowered seedlings in his greenhouses. Charles' heirs sold the collection within months of his passing for $28,000 ($450,000 today); it was undervalued, due to the economic effects of World War I and the Spanish Flu. Clinkaberry and Goodier went to work for other wealthy orchid enthusiasts.

Although he rarely publicly flaunted his wealth, Roebling had immersed himself in orchidomania from 1906 to 1912, when he paid $3,000 (about $85,000 today) for a commission to paint 32 Lenox porcelain plates with images of orchids. The flowers were reproductions of blooming specimens, drawn in situ in his Trenton greenhouses. His plates, with elaborate gold-etched borders that included his initials, showcased both his named hybrids and orchid species. Included were star-shaped *Epicattleya* Nebo, by-then classic purple-webbed *Vanda coerulea*, hot pink *Cattleya* Mantinii, leopard-spotted *Odontoglossum triumphans* (now *Oncidium spectatissimum*) and several other assorted genera. And as any true orchid aficionado would require, the Latin names of the species were printed on the plates' reverse — also in gold. Roebling may very well have continued to commission Lenox plates painted with his favorite orchids, but in 1912 the artistry came to an abrupt halt, and Roebling's participation in orchid society shows declined. Less than two weeks after the last two orchid plates were painted (*Oncidium* Rolfeae and *Masdevallia veitchiana* var. *grandiflora*), Charles's 31-year-old sole son, Washington Roebling II, went down with the *Titanic*. Charles was shattered and increasingly reclusive for the rest of his life, and died six years later.

So it seems that the best and the worst of the Gilded Age and Progressive Era trends were represented in full in the orchid community. It was an age of excess, outrageous inequality, expansion and innovation. The orchid was "the flower of the moment, expensive and fragile," wrote *The Journal* in 1896. Expensive, certainly. Fragile? Not at all.

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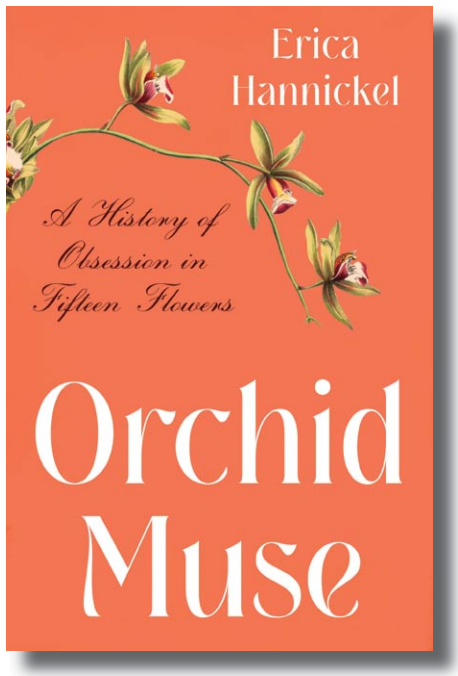

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—Erica Hannickel, PhD, is a professor of environmental history at Northland College in Ashland, Wisconsin. She last wrote for Orchids *in the February 2021 issue with her article* A Plea for the Exotics:The Early Years of the American Orchid Society *and our December 2019 issue. Find her at www.orchidmuse.com, Facebook or Instagram @orchid.muse or email ehannickel@northland.edu.*

Orchids Like Cacti?

Evolution of Crassulacean Acid Metabolism

BY JOSEPH ARDITTI

PHOTOSYNTHESIS IS THE process that makes life on earth, as we know it, possible. Using light energy from the sun, green plants convert carbon dioxide (CO_2) and water (H_2O) into sugar ($C_6H_{12}O_6$) and oxygen (O_2). The equation is:

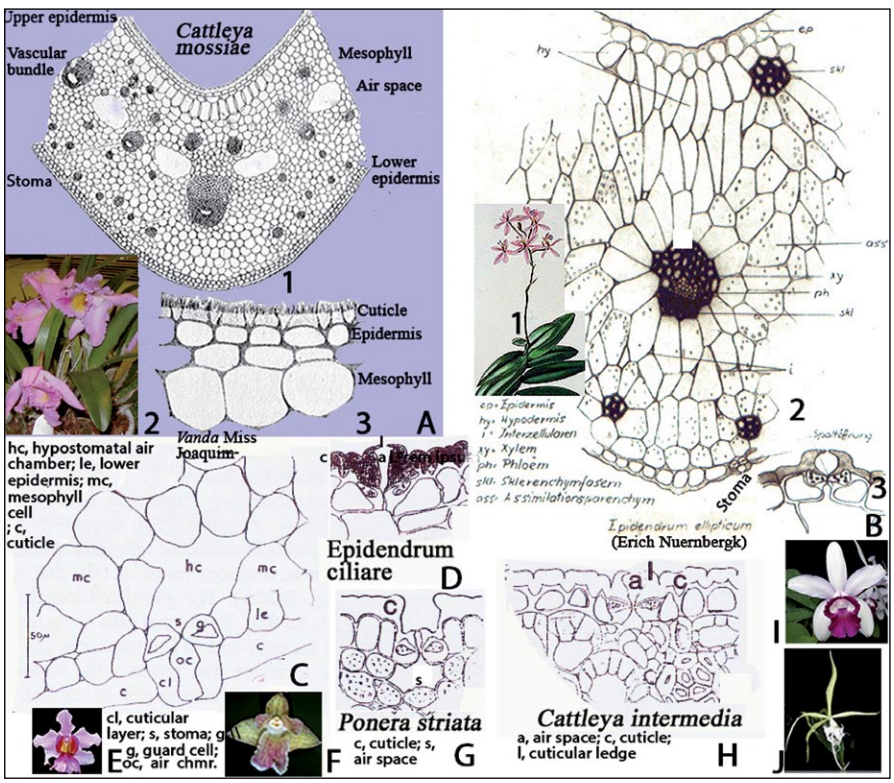
$$6CO_2 + 6H_20 = C_6H_{12}O_6 + 6O_2$$

The net effect is the conversion of light energy into edible chemical energy. Herbivores eat the plants. Omnivores and carnivores eat the herbivores. When any organism dies, fungi and bacteria decompose it.

Carbon dioxide is a gas. It enters leaves through microscopic pores called stomata, which must be open for this to happen (stoma is the singular, stomate and stomates are the English equivalents). But there is a dilemma. While CO_2 moves in when the stomata are open, water from inside the leaves evaporates through the openings. Oxygen, a byproduct of photosynthesis, also diffuses out. This is called gas exchange.

If plants have enough water or are subjected to a short-term mild shortage, the water loss through stomata, called transpiration, is not much of a problem. Stomata can stay open during the day. Under such conditions, plants carry out photosynthesis via a process called the Calvin-Benson cycle. The first stable product of this cycle has three carbons (it is 3-phosphoglyceric acid or 3-PGA). Therefore, this type of photosynthesis is called C3.

When water is in short supply for longer periods, or where aridity is continuous or permanent, transpiration must be reduced. Plants, which exist under such circumstances evolved several adaptations that store or conserve water. Water is stored through the succulence of leaves as in a large number of orchids including thick leaves, which may be flat as in cattleyas, several *Epidendrum* species and other orchids, or terete (cylindrical or cigar-shaped) such as those of *Papilionanthe* Miss Joaquim, the



Leaves and stomata of orchids, which fix carbon via Crassulacean Acid Metabolism (CAM). **A**. *Cattleya mossiae*, CAM orchid with flat succulent leaves. **1**. Cross section. There are no stomata on the upper epidermis. Stomata are present on the lower epidermis, but they are not drawn clearly. **2**. Flowers. **3**. Enlarged section of upper part of leaf. **B**. *Epidendrum ellipticum*, CAM orchid with flat thick leaves. **1**. Plant in bloom. **2**. Cross section of leaf showing no stomata on upper epidermis. Only a single stoma can be seen on the lower epidermis. It is covered by cuticular ledges. **3**. Enlarged stoma with cuticular ledges above it. Cells, which contain dots, are guard cells of the stoma. The dots are chloroplasts. **C**. Section of succulent terete leaf of *Papilionanthe* Miss Joaquim showing stoma with cuticular ledges above it. **D**. Stoma and cuticular ledges *Epidendrum ciliare,* a CAM orchid with flat leaves. Symbols are the same as in H. **E**. Flower of *Vanda* Miss Joaquim, a natural hybrid, which is the National Flower of Singapore. **F**. Flower of *Ponera striata.* This orchid has flat succulent leaves. **G**. Section of *Ponera striata* leaf with a sunken stoma. Dots in cells are chloroplasts. **H**. Section of the flat leaf of the succulent orchid, *Cattleya intermedia* with a stoma, which is both sunken and covered with cuticular ledges. Dots in cells are chloroplasts. **I**. Flower of *Cattleya intermedia.* **J**. Flower of *Epidendrum ciliare.* Sources: A1, 3, James Veitch & Sons. 1887–1894. A manual of Orchidaceous plants, reprint by A. Asher, 1963. B 2, 3. The late Erich L. Nuernbergk; E, Courtesy Dr. Tim Wing Yam; A2, B1, C, D, F–J, Old books, various papers, Wikipedia, World Wide Web.

National Flower of Singapore.

A second adaptation is the absence of stomata on the upper epidermis, which is exposed to the sun. Stomata are found only on the undersides of leaves, which are shaded.

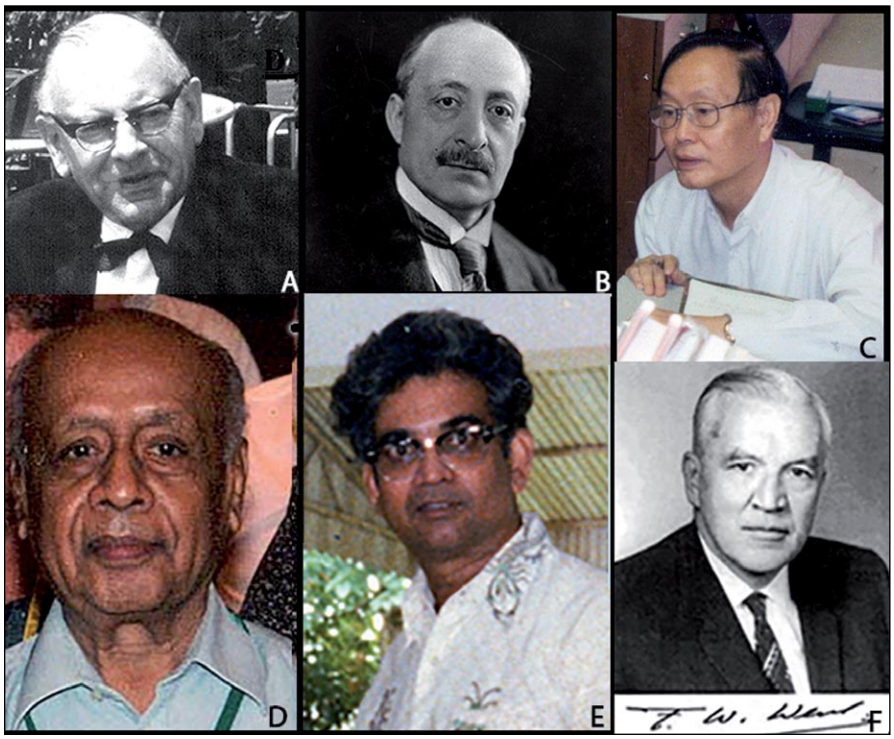
Not exposing stomata to unmodified outside atmosphere, which may be dry is a third adaptation, which involves cuticular ledges over the stomata or stomates that are sunken into the leaves. Both adaptations create spaces of dead (i.e., unmoving) air. The air in these spaces is more humid than the external atmosphere. This increased humidity reduces the gradient between the outside air and the leaf interior. When the gradient is lower, transpiration is reduced (that is, less water loss).

Closed stomata during the day would eliminate water loss entirely but will also make CO_2 uptake impossible. If the stomata were closed during the day and open at night, plants could take up CO_2 when it is cooler, humidity in the air is higher and transpiration (i.e., water loss) is lower. Plants that exist under hot and dry condition have evolved such a system. It is called crassulacean acid metabolism, abbreviated as CAM. The term "crassulacean acid metabolism" was coined because CAM was first discovered in studies of acid metabolism in plants that belong to the Crassulaceae.

Crassuacean acid metabolism is often traced to ancient Rome where people detected that some plants had an acid taste in the morning (Black and Osmond, 2003). Then there is a jump to the late 1600s in Ambon, Indonesia, where Georgius Everhardus Rumphius (1627, Germany-1702, Ambon, Indonesia) tasted several orchid plants and found them to be bitter and acid (Beckman 2003) and finally to India in 1815 where Benjamin Heyne (1770, Germany–1819, India), a German botanist and surgeon, detected and reported that certain succulent plants developed an acid and bitter taste at night.

In CAM, CO_2 enters the leaves at night and is stored as malic acid ($C_4H_6O_5$) in leaf cells until daybreak when the stomata close. After the stomata close, the malic acid releases CO_2 which is fixed via C3. The plants acidify at night (their pH drops) due to the accumulation of malic acid. About 5–10 percent of plants (including all cacti) fix carbon via CAM.

A question which could arise at this point is, "What does all this have to do with tropical orchids, specifically many of the species and hybrids growers like?"



Researchers of Crassulacean Acid Metabolism. **A**. Professor Erich L. Nuernbergk (dates could not be found). **B**. Professor Otto Warburg (1859–1938). **C**. Professor Choy Sin Hew (in his eighties in September 2021). **D**. Professor Adisheshappa Nagaraja Rao (1926–2014). **E**. Professor Popuri Nageswara "Dhani" Avadhani (b. 1932). **F**. Professor Frits Warmolt Went (1903–1990). Sources: A, D photographs by Joseph Arditti; B, Wikipedia; C, photograph by Dr. Jonathan O. Arditti; E, photograph by the late Mordechai "Mort" Arditti; F, courtesy the late Professor F.W. Went.

These orchids evolved and grow in the tropics, specifically tropical rain forests where water is abundant. Let us see.

In the late 1800s when Europeans were still learning about tropical orchids, a young German botanist named Otto Warburg (1859–1938) visited the Bogor Botanical Gardens in Indonesia. He must have known about nocturnal acidification in succulent plants because the phenomenon was first reported in Europe in 1804 by Nicholas Théodore de Saussure (1767–1845) and confirmed in 1812 by Benjamin Heyne (1770–1819), a German botanist for the British colonial government in India, who studied CAM by tasting a succulent plant, *Bryophyllum calycinum*, at night and during the day. He found that the plant taste was more acidic and bitter at night and early morning than in the afternoon.

While in Bogor, Warburg measured acidification of plants in the light and dark by titrating acidity with a sodium hydroxide (NaOH) solution. He expressed his findings as milligrams of sodium hydroxide (NaOH) per 10 grams fresh weight of plant tissue. His data (Warburg, 1886–1888) are hard to interpret because the difference in acidification in the light and dark in *Vanilla* (a succulent leaf orchid, now known to fix carbon via CAM) is only 6 mg NaOH (18.4 in the dark vs. 12.4 in the light). In comparison, he reported that *Oncidium* plants (known to have thin leaves and to fix carbon via C3), differ by 23 mg NaOH (35.8 vs. 12.8). Nevertheless, Warburg provided sufficient and convincing data about a number of orchids to be first to demonstrate that there are CAM orchids. On receiving his doctorate in 1927, Frits Warmolt Went (1903–1990), discoverer of auxin and coformulator of the Vacin and Went orchid seed germination medium (Vacin and Went 1949), "was . . . appointed as a botanist at the . . . Botanic Gardens in Bogor, Java, Indonesia." While there he became interested in orchids and noticed plants of *Schoenorchis juncifolia*, hanging in long garlands from trees and decided to study their CO_2 uptake. He "[S]uspended a piece of stem with 3–4 leaves in a glass tube through which ordinary forest air was sucked. The CO_2 content of the air which passed [over] the *Schoenorchis* [leaves] was measured.

Schoenorchis funcifolia . **A.** Closeup of leaves and flowers. **B**. Habit of plant. Sources: A, courtesy Marni Turkel; B, Wikipedia, World Wide Web.

Remarkably [for those days], the orchids took up CO_2 at night and gave it up during the day, [in the manner of] succulents (Crassulacean Acid Metabolism or CAM). Such CO_2 was not known to occur at that time in ordinary green plants, so I thought I had made a mistake. But it is now well known that CAM commonly occurs in all succulent plants including many orchids" (Went 1990). These findings confirmed Warburg's report. Unfortunately, Went never published them. There was not much research on CAM in orchids until after World War II. In the 1950s, Erich L. Nuernbergk, then at the Hamburg Botanical Garden, showed that thick-leaved orchids took up CO_2 at night (Nuernbergk 1964). He used advanced apparatus for the time. Therefore, his report was interesting and impressive.

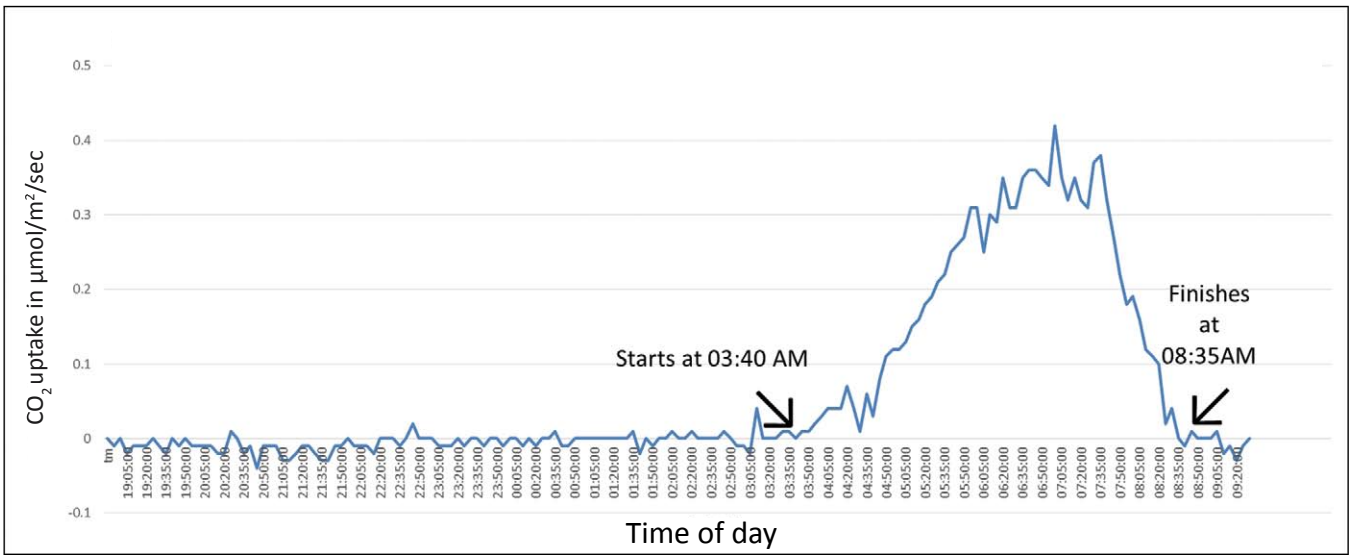
Robert L. Knauft, an undergraduate student in my laboratory, and I identified several products of CO_2 fixation by the thick (i.e., succulent) leaves of a cattleya, which are consistent with CAM (Knauft and Arditti 1969). We wanted to determine stomatal rhythms, but an appropriate and dependable tool was not available to us then.

A report that a number of thick-leaved orchids take up CO_2 and acidify in the dark (McWilliams 1970) demonstrated that some orchids fix carbon via CAM and confirmed Neurnbergk's report and our findings. Some of the data in this report (McWilliams 1970) are puzzling. A high pH of 5.7 is recorded for the CAM orchid *Rhyncholaeliocattleya* Maunalami, but a low pH was noted for the thin-leaf C3 *Spiranthes speciosa*. Regardless, most of the data agree with expectations.

Carbon-13 (a stable nonradioactive form of carbon heavier than the commom ^{12}C) values are not used as often to study CAM as acidity determinations, stomatal rhythms or fixation of radioactive carbon (^{14}C). However, this study, the first of its kind in Singapore, showed that "the isotopic composition of the carbon [^{13}C] of leaf tissue from 10 species and hybrids of orchids grown in Singapore fell into two groups." One of the groups consisted "of thick-leaved plants (0.08–0.16 inch; 0.2–0.4 mm). Their ^{13}C fixation was consistent with CAM." This confirmed the view that some orchids are CAM plants and others possess a C3 type of carbon fixation (Neales and Hew 1975). Professor Choy Sin Hew (now in his 80s and retired for many years) continued to work on orchids for his entire career, became the leading orchid scientist in Singapore in his time and was awarded the Singapore National Medal of Science for his research. Choy Sin and I have been friends for more than 30 years and collaborated on several projects. In retirement, he became an expert on Chinese *Cymbidium* species and the art that depicts them.

My longtime friends and collaborators at the National University of Singapore, Professor Adisheshappa Nagaraja Rao (1926–2014), Professor Popuri Nageswara "Dhani" or "Dani" Avadhani (b. 1932) and I showed that "The stomata of *Arachnis* Maggie Oei, *Aranda* Deborah, *Arundina graminifolia, Bromheadia finlaysoniana, Cattleya bowringiana* × *Cattleya forbesii* and *Spathoglottis plicata* (Orchidaceae) occur only on the lower epidermis of the leaves [as in *Cattleya mossiae*] and are located within hyperstomatic chambers formed by cuticular ledges extending from the guard cells."(Goh et al., 1977) These are characteristics of plants, which are adapted to arid conditions. We also demonstrated that "*Arachnis, Aranda* and *Cattleya* have thick leaves which exhibit crassulacean acid metabolism, and their stomata [are] open when acidity levels are lowest, or shortly thereafter . . . stomata of the thin-leaved *Arundina, Bromheadia* and *Spathoglottis* [are] open during the day" (Goh et al., 1977, Avadhani et al., 1982).

Subsequently, we demonstrated that



Graph showing nighttime uptake of carbon dioxide by *Opuntia ficus-indica* (Indian fig prickly pear cactus). Uptake begins at about 3:40 am and is complete at 8:35am. From Wikipedia Commons (Steveadcuk at English Wikipedia).

the roots of *Arachnis* Maggie Oei and *Aranda* Deborah fix carbon via CAM. We found that malic acid was the only labeled compound produced when the roots were exposed to $^{14}CO_2$ (Goh et al. 1983).

One hundred years after Otto Warburg first reported that thick-leaved orchids acidify in the dark, modern research showed that his discovery was valid.

– Prof. Frits Went and Prof. Erich Nuernbergk showed that succulent leaf orchids do take up CO_2 at night.

— Prof. Choy Sin Hew and Prof. T.F. Neales demonstrated that thick-leaved orchids fix ^{13}C in a manner consistent with CAM.

— Prof. P.N. "Dhani" Avadhani, Prof. A.N. Rao, Prof. Chong Jin Goh, R. Knauft, C. Hanegraaf, Prof. C.S. Loh and I as a group, and E.L. McWilliams working independently, showed that orchids with thick leaves:

- Produce malic acid at night.
- Synthesize other CAM-related substances in the dark.
- Possess stomata of the type generally found on drought-resistant plants.
- Show stomatal opening and closing rhythms consistent with CAM.
- Demonstrate CAM-like acidity rhythms.

No one single investigator or group provided all the necessary proof, but each of those mentioned here provided information, which when taken together, leaves no doubt that some orchids, like cacti, fix carbon via CAM.

After it was certain that thick (i.e., succulent) leaved orchids fix carbon via CAM, it became necessary to explain the presence in tropical plants of a carbon fixation pathway, which typically occurs under arid conditions. One explanation is that despite living in tropical jungles where water may not be in short supply, orchids grow under arid conditions because they hang from the branches of phorophytes (by definition, a phorophyte is a plant on which one or more epiphytes grow) or cling to their bark. Orchids, which grow on rocks, may have even less water (Nuernbergk 1964). Clearly, CAM enables orchids to survive scarcity of water or drought (Nuernbergk 1964). Another benefit of CAM to orchids has nothing to do with aridity. Crassuacean acid metabolism carbon fixation at night takes place when CO_2 levels in the canopies inside phorophytes (where many succulent orchids grow) are higher because the trees do not photosynthesize and take up CO_2. They produce CO_2 by respiring. Therefore, CAM orchids fix carbon from a CO_2-enriched atmosphere.

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— Dr. Joseph Arditti received his doctorate from the University of Southern California, Los Angeles in 1965 (which is also the alma mater of his son, Dr. Jonathan O. Arditti and his daughter in law, Dr. Alexandria N. Arditti). He joined the biology faculty at University of California, Irvine in 1966, spent his entire career carrying out research on orchids and retired in 2001. Professor Arditti dedicates this article to Dr. Lawrence Chao, a superb ophthalmologist in Irvine, CA.


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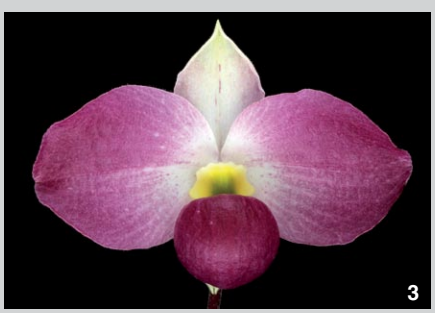
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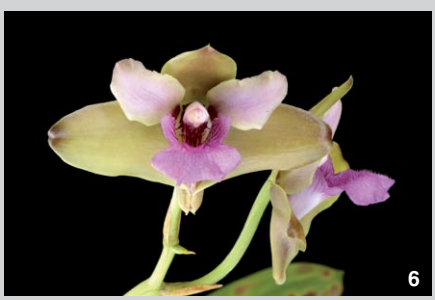
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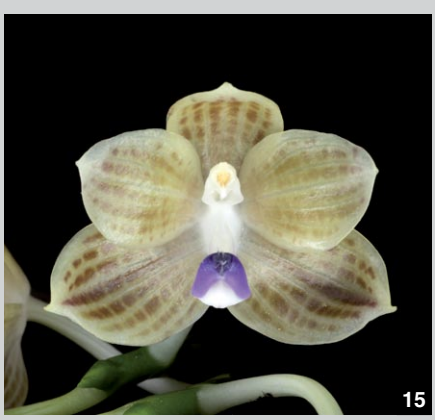

[1] *Cattleya tigrina* 'Palmetto Thunder' AM/AOS 82 pts. Exhibitor: Fred Missbach; Photographer: Charles Wilson. Atlanta Judging

[2] *Vanda* Crownfox Avocado Honey 'Blood Moon' AM/AOS (Siam Spots x Doctor Anek) 83 pts. Exhibitor: R. F. Orchids, Inc.; Photographer: Charles Wilson. Atlanta Judging

[3] *Paphiopedilum vietnamense* 'Claret' AM/AOS 87 pts. Exhibitor: Dave Sorokowsky; Photographer: Ramon de los Santos. California-Sierra Nevada Judging

[4] *Masdevallia deceptrix* 'Cross Your Heart' AM/AOS 82 pts. Exhibitor: Tyler M. Albrecht; Photographer: Ramon de los Santos. California-Sierra Nevada Judging

[5] *Bletilla ochracea* 'Adelain's Chasus' CCM/AOS 82 pts. Exhibitor: Charles and Susan Wilson; Photographer: Charles Wilson. Atlanta Judging

[6] *Bifrenaria verboonenii* 'Bonheur' CBR/AOS 0 pts. Exhibitor: Lynne Murrell; Photographer: Ramon de los Santos. California-Sierra Nevada Judging

[7] *Cattleya* Hint O'Blue 'Butterfly Kisses' HCC/AOS (Sea Breeze x *mossiae*) 76 pts. Exhibitor: Tyler M. Albrecht; Photographer: Ramon de los Santos. California-Sierra Nevada Judging

[8] *Phalaenopsis* Ruby Passion 'Melencia' AM/AOS (Phoenix Ruby x Brother Ambo Passion) 84 pts. Exhibitor: Ramon de los Santos; Photographer: Ramon de los Santos. California-Sierra Nevada Judging

[9] *Vanchoanthe* Ben Mianmanus 'Crownfox' HCC/AOS (*Vandachostylis* Evergreen Magic x *Papilionanda* Mimi Palmer) 78 pts. Exhibitor: R.F. Orchids, Inc.; Photographer: Charles Wilson. Atlanta Judging

[10] *Paphiopedilum* Hilo Night Hawk 'Austin Creek' AM/AOS (Wayne Booth x *adductum* var. *anitum*) 81 pts. Exhibitor: Dale Martin; Photographer: Ramon de los Santos. California-Sierra Nevada Judging

[11] *Phalaenopsis* Kingfisher's Dragon Wing 'Joy' CCM-AM/AOS (John Ewing x Dragon Tree Eagle) 87-85 pts. Exhibitor: Robert Hydzik; Photographer: Jeremy Losaw. Carolinas Judging

[12] *Paphiopedilum* Prince Edward of York 'Wolf Lake' AM/AOS (*rothschildianum* x *sanderianum*) 84 pts. Exhibitor: Looking Glass Orchids; Photographer: Jeremy Losaw. Carolinas Judging

[13] *Paphiopedilum* Prince Edward of York 'Anniversary' AM/AOS (*rothschildianum* x *sanderianum*) 85 pts. Exhibitor: Looking Glass Orchids; Photographer: Jeremy Losaw. Carolinas Judging

[14] *Bulbophyllum* Jan Ragan 'Michelle' AM/AOS (*lobbii* x *facetum*) 84 pts. Exhibitor: Graham Ramsey; Photographer: Jeremy Losaw. Carolinas Judging

[15] *Phalaenopsis javanica* (Blue form) 'Hector' AM/AOS 80 pts. Exhibitor: Ramon de los Santos; Photographer: Ramon de los Santos. California-Sierra Nevada Judging

[16] *Phragmipedium* D. Hiden Ramsey 'Pappy' HCC/AOS (*x richteri* x Lutz Röllke) 79 pts. Exhibitor: Graham Ramsey; Photographer: Jeremy Losaw. Carolinas Judging


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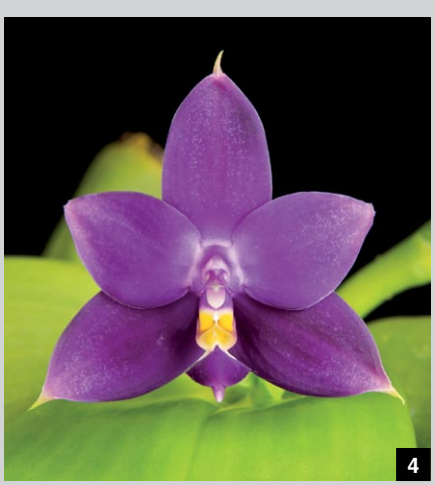
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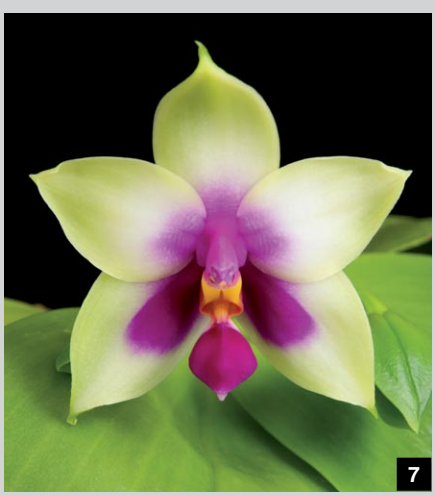
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[1] *Phragmipedium* Metolius River 'Amanda' HCC/AOS (Manzur la Aldea x Castle Rock Creek) 78 pts. Exhibitor: Graham Ramsey; Photographer: Jeremy Losaw. Carolinas Judging

[2] *Phalaenopsis* Mituo Love 'Rainbow' AM/AOS (Mituo Prince x LD Bellina Eagle) 80 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging

[3] *Phalaenopsis* Chienlung Happy Queen 'Grey Mims' AM/AOS (KS Happy Eagle x LD's Bear Queen) 86 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging

[4] *Phalaenopsis violacea* 'Mike Mims' AM/AOS 83 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging

[5] *Phalaenopsis bellina* 'David Mims' AM/AOS 85 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging

[6] *Phalaenopsis bellina* 'Sadie Leech' AM/AOS 83 pts. Exhibitor: Ben Belton; Photographer: Jeremy Losaw. Carolinas Judging

[7] *Phalaenopsis bellina* 'Vickie Lynn Mims' AM/AOS 86 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging

[8] *Phalaenopsis* Pylo's Jewel 'Blue Ridge' AM/AOS (Buena Jewel x *bellina*) 85 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging

[9] *Cattleya purpurata* (Flamea) 'Kathleen III' AM/AOS 80 pts. Exhibitor: William Rogerson; Photographer: Anne Kotowski. Chicago Judging

[10] *Miltoniopsis* Rene Komoda 'New Vision Orchids' HCC/AOS (Edwidge Sabourin x *santanaei*) 77 pts. Exhibitor: New Vision Orchids; Photographer: Richard Noel. Cincinnati Judging

[11] *Chelonistele maximae-reginae* 'Lindinha's Whiskers' CHM/AOS 86 pts. Exhibitor: Patricia Kono and Steve Gonzalez; Photographer: Nile Dusdieker. Chicago Judging

[12] *Cattleya* Lacey Michelle Matherne 'Kathleen II' AM/AOS (*aclandiae* x *tigrina*) 84 pts. Exhibitor: William Rogerson; Photographer: Anne Kotowski. Chicago Judging

[13] *Paphiopedilum* Pisgah Prayer 'Riley Mims' AM/AOS (Praying Angel x *rothschildianum*) 81 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging

[14] *Habenaria* Huron 'Windswept Rose' HCC/AOS (Tanager x *carnea*) 78 pts. Exhibitor: Windswept in Time Orchids; Photographer: Richard Noel. Cincinnati Judging

[15] *Habenaria* Huron 'Windswept Sunrise' AM/AOS (Tanager x *carnea*) 82 pts. Exhibitor: Windswept in Time Orchids; Photographer: Richard Noel. Cincinnati Judging

[16] *Paphiopedilum* Pisgah Prayer 'Blue Ridge' AM/AOS (Praying Angel x *rothschildianum*) 84 pts. Exhibitor: Mike Mims; Photographer: Jeremy Losaw. Carolinas Judging


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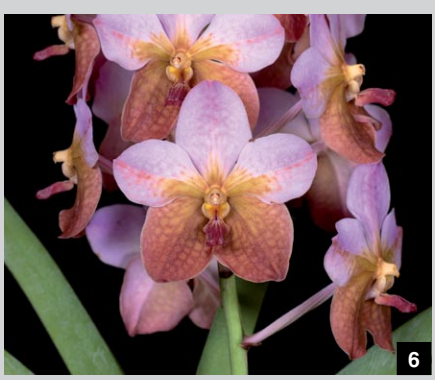
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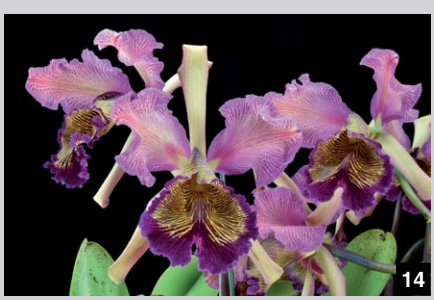
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[1] *Vanda falcata* 'Windswept' HCC/AOS 78 pts. Exhibitor: Windswept in Time Orchids; Photographer: Richard Noel. Cincinnati Judging

[2] *Encyclia bracteata* 'YourEye' AM/AOS 80 pts. Exhibitor: Juraj Kojs; Photographer: Carmen Johnston. Florida-Caribbean Judging

[3] *Habenaria* Trogon 'Windswept' JC/AOS (Tracey x Oriole). Exhibitor: Windswept in Time Orchids; Photographer: Richard Noel. Cincinnati Judging

[4] *Aerides rosea* 'YourEye' AM/AOS 80 pts. Exhibitor: Juraj Kojs; Photographer: Carmen Johnston. Florida-Caribbean Judging

[5] *Vanda* Motes Midnight 'Karina Motes' AD/AOS (Mary Motes x *tessellata*). Exhibitor: Motes Orchids, Inc.; Photographer: Carmen Johnston. Florida-Caribbean Judging

[6] *Vanda* Trowbridge Family Tres Hermanos 'Emilia Luna Motes' HCC/AOS (*lamellata* x Miami Mandarin) 79 pts. Exhibitor: Motes Orchids, Inc.; Photographer: Carmen Johnston. Florida-Caribbean Judging

[7] *Catasetum* Sweet Adaline 'Nicola' AM/AOS (Louise Clarke x Dagny) 85 pts. Exhibitor: Richard Fulford; Photographer: Carmen Johnston. Florida-Caribbean Judging

[8] *Paphiopedilum* Wössner Black Wings (syn. Johanna Burkhardt) 'Wacousta' AM/AOS (*rothschildianum* x *anitum*) 80 pts. Exhibitor: Dorothy Potter Barnett; Photographer: Lynn O'Shaughnessey. Great Lakes Judging

[9] *Paphiopedilum* Deperle 'OK' HCC/AOS (*primulinum* var. *primulinum* x *delenatii*) 75 pts. Exhibitor: Stephen Benjamin; Photographer: Lynn O'Shaughnessey. Great Lakes Judging

[10] *Paphiopedilum* Saiun 'Midsommar' AM/AOS (*sukhakulii* x *wardii*) 81 pts. Exhibitor: William Cadman; Photographer: Lynn O'Shaughnessey. Great Lakes Judging

[11] *Cattleya purpurata* (Flamea-Striata) 'Shogun's Seductive Glen' AM/AOS 82 pts. Exhibitor: Shogun Hawaii-Matthias Seelis; Photographer: Glen Barfield. Hawaii Judging

[12] *Coelogyne* South Carolina 'Matthew's Mind Melt' AM/AOS (Burfordiense x *pandurata*) 85 pts. Exhibitor: Dennis Seffernick; Photographer: Lynn O'Shaughnessey. Great Lakes Judging

[13] *Phalaenopsis* Walnut Valley Purple Pixie AQ/AOS (Purple Gem 'B #1' x Pixie Star 'SC Purple'). Exhibitor: Max Thompson and Bryon Rinke; Photographer: Bryon Rinke. Great Plains Judging

[14] *Cattleya dowiana* f. *rosita* 'Sebastian' AM-CCM/AOS 83-82 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging

[15] *Acianthera strupifolia* 'Bryon' CCE/AOS 92 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon Rinke. Great Plains Judging

[16] *Trichocentrum pumilum* 'Bryon' CCM/AOS 85 pts. Exhibitor: Bryon K. Rinke; Photographer: Bryon Rinke. Great Plains Judging


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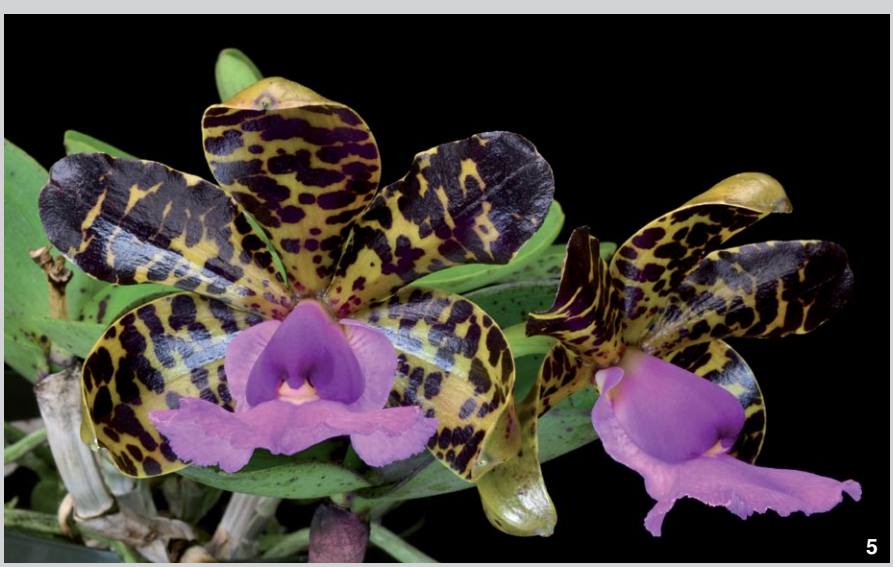
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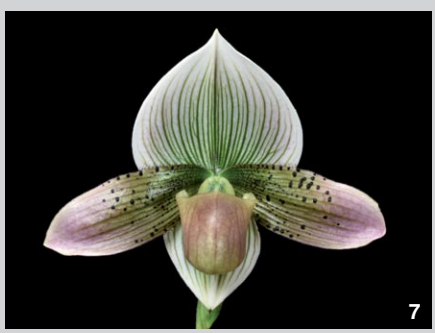
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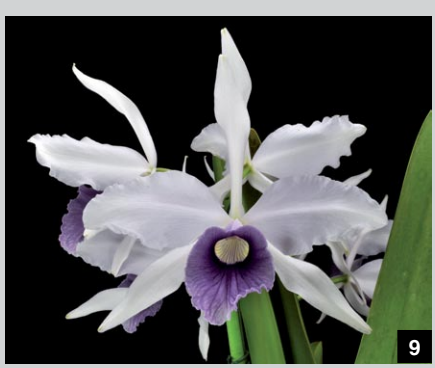
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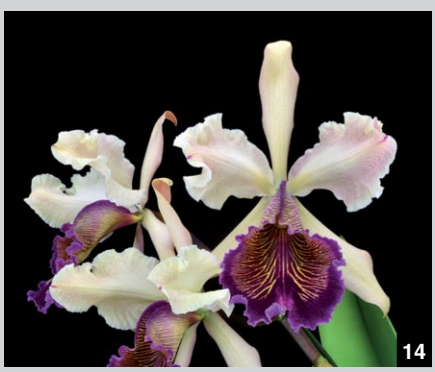
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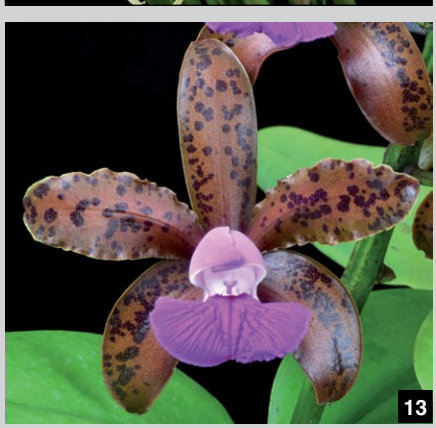
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[1] *Vanda* Aka's Old School 'Mahalo Ted' JC/AOS (Kasemfolia x Wirat). Exhibitor: Art Buckman; Photographer: Glen Barfield. Hawaii Judging

[2] *Paphiopedilum* Enchanting Pleasure AQ/AOS (Enchantingly Wood 'Green Charm' x Luna Pleasure 'Lehua Again'). Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging

[3] *Cattleya purpurata* (Semi-Alba) 'Isabel' HCC/AOS 79 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging

[4] *Paphiopedilum* Hawaiian Moonlight AQ/AOS (White Promise 'Hints' x Hawaiian Moon 'White Glory'). Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging

[5] *Cattleya aclandiae* 'Gabriel' AM/AOS 88 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging

[6] *Paphiopedilum* Macabre Aura 'Slipper Zone One Version' HCC/AOS (Macabre Grace x Fred's Aura) 78 pts. Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging

[7] *Paphiopedilum* Petula's Wood 'Slipper Zone Synsation' HCC/AOS (Petula's Pink Delight x Magically Wood) 78 pts. Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging

[8] *Cattleya purpurata* (Carnea) 'Shogun's Cherry Kiss' AM/AOS 82 pts. Exhibitor: Shogun Hawaii- Matthias Seelis; Photographer: Glen Barfield. Hawaii Judging

[9] *Cattleya purpurata* (Werkhauseri) 'Shogun's Silver Giant' AM/AOS 82 pts. Exhibitor: Shogun Hawaii-Matthias Seelis; Photographer: Glen Barfield. Hawaii Judging

[10] *Paphiopedilum* Spring Pleasure 'Slipper Zone Double Delight' HCC/AOS (Spring Sunset x Luna Pleasure) 77 pts. Exhibitor: Lehua Orchids; Photographer: Glen Barfield. Hawaii Judging

[11] *Cattlianthe* Bactia Ice 'Ice Baby' HCC/AOS (*Cattleya* Lavender Ice x Bactia) 77 pts. Exhibitor: Art Buckman; Photographer: Glen Barfield. Hawaii Judging

[12] *Brassavola nodosa* 'Shogun's Titan' AM/AOS 82 pts. Exhibitor: Shogun Hawaii- Matthias Seelis; Photographer: Glen Barfield. Hawaii Judging

[13] *Cattleya tigrina* 'Voodoo Child' AM/AOS 82 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging

[14] *Cattleya dowiana* 'Sunshine Daydream' AM/AOS 83 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging

[15] *Cattleya tigrina* 'Voodoo Queen' HCC/AOS 79 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging

[16] *Cattleya tigrina* 'Bill's Bounty' AM/AOS 87 pts. Exhibitor: Ben Oliveros and Orchid Eros; Photographer: Glen Barfield. Hawaii Judging


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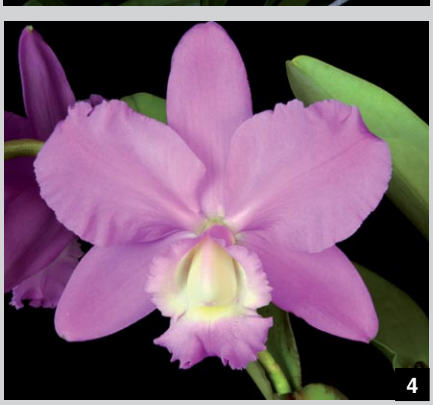
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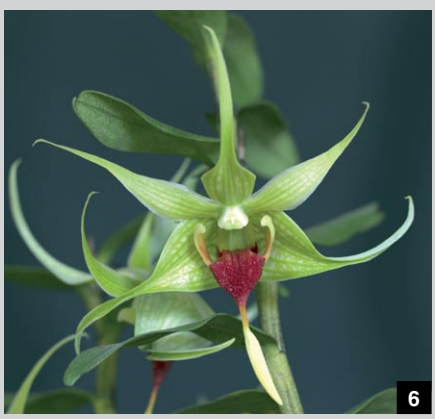
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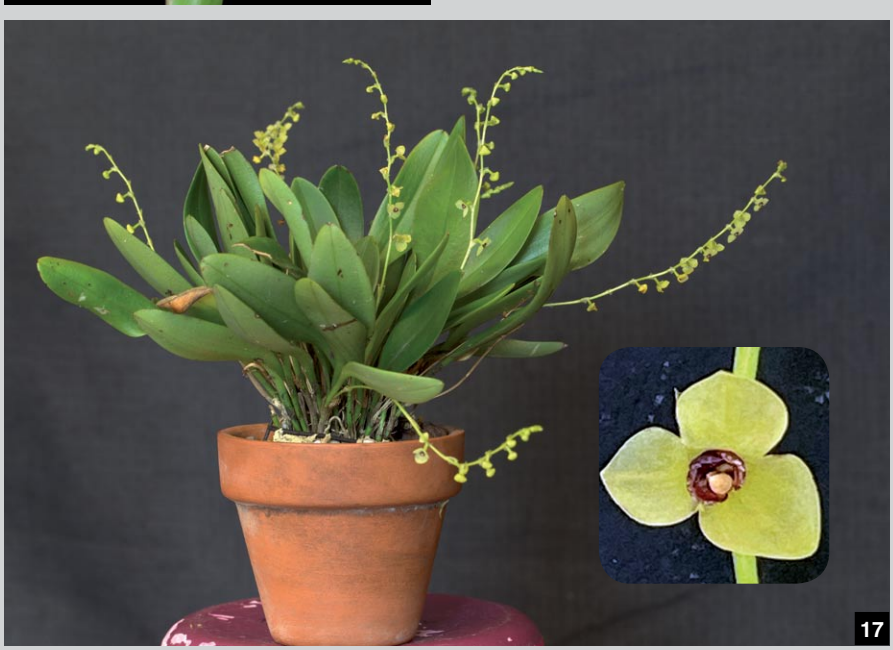

[1] *Brassocatanthe* Grand Chocolate 'Profusion' AM/AOS (*Brassavola* Grand Stars x *Cattlianthe* Chocolate Drop) 81 pts. Exhibitor: Art Buckman; Photographer: Glen Barfield. Hawaii Judging

[2] *Vanda* Rays Ozark Sunset 'Pottsy's Ozarks Sunset' AM/AOS (Copper Pure x Ken Kone) 80 pts. Exhibitor: Ray and Annette Potts; Photographer: Matthew Nutt. Mid-America Judging

[3] *Aeridovanda* Full Moon 'Chawin's Charm' HCC/AOS (*Aerides* Korat Koki x *Vanda* Bangkhuntian Gold) 78 pts. Exhibitor: Laurie and Sheila Skov; Photographer: Malcolm McCorquodale. Houston Judging

[4] *Cattleya* Heathii (1) '#9' AM/AOS (*loddigesii* x *walkeriana*) 82 pts. Exhibitor: Amy and Ken Jacobsen; Photographer: Chaunie Langland. Pacific Central Judging

[5] *Paphiopedilum* Joseíto 'Elaine' HCC/AOS (Nike's Sunny Delight x Pinocchio) 75 pts. Exhibitor: Derek Lowenstein; Photographer: Malcolm McCorquodale. Houston Judging

[6] *Dendrobium tobaense* 'Funkytown' AM/AOS 84 pts. Exhibitor: Sergey Skoropad; Photographer: Ming Ta Li. Northeast Judging

[7] *Dendrobium kontumense* 'Irene' CBR/AOS. Exhibitor: Al and Irene Messina; Photographer: Ming Ta Li. Northeast Judging

[8] *Angraecum coutrixii* 'Susan' CBR/AOS. Exhibitor: Chuck and Sue Andersen; Photographer: Teck Hia. Northeast Judging

[9] *Gongora tridentata* 'Irene' CHM/AOS 83 pts. Exhibitor: Al and Irene Messina; Photographer: Ming Ta Li. Northeast Judging

[10] *Cattleya walkeriana* (Coerulea) 'SVO' JC/AOS. Exhibitor: Fred Allen; Photographer: Ming Ta Li. Northeast Judging

[11] *Miltoniopsis* Bert Field 'Michelle's Magic' CCM/AOS (Mulatto Queen x Woodlands) 82 pts. Exhibitor: Joe Thomas; Photographer: Ming Ta Li. Northeast Judging

[12] *Dendrobium* Blue Bees 'All Alan's Fault' CCE/AOS (*lasianthera* x Blue Twinkle) 90 pts. Exhibitor: Kim Feddersen; Photographer: Ming Ta Li. Northeast Judging

[13] *Cattleya alvarenguensis* 'Irene' CHM/AOS 82 pts. Exhibitor: Al and Irene Messina; Photographer: Maurice Garvey. Northeast Judging

[14] *Phragmipedium* Frank Smith 'Sharon Langan' AM/AOS (Grande x *kovachii*) 84 pts. Exhibitor: Chaunie Langland; Photographer: Chaunie Langland. Pacific Central Judging

[15] *Stenoglottis macloughlinii* 'Timothy Henry' CBR/AOS. Exhibitor: Carrie Buchman; Photographer: Ming Ta Li. Northeast Judging

[16] *Dracula maduroi* 'Ryan' CBR/AOS. Exhibitor: Mary Ann Denver; Photographer: Ming Ta Li. Northeast Judging

[17] *Stelis azuayensis* 'Timothy Henry' CBR/AOS. Exhibitor: Carrie Buchman; Photographer: Ming Ta Li. Northeast Judging


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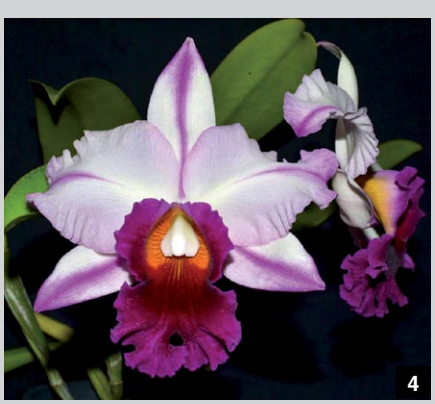
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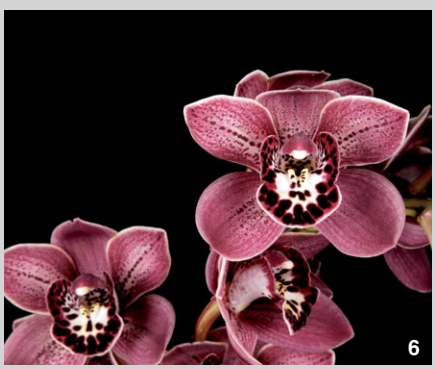
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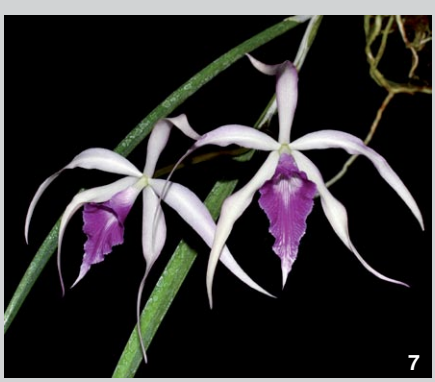
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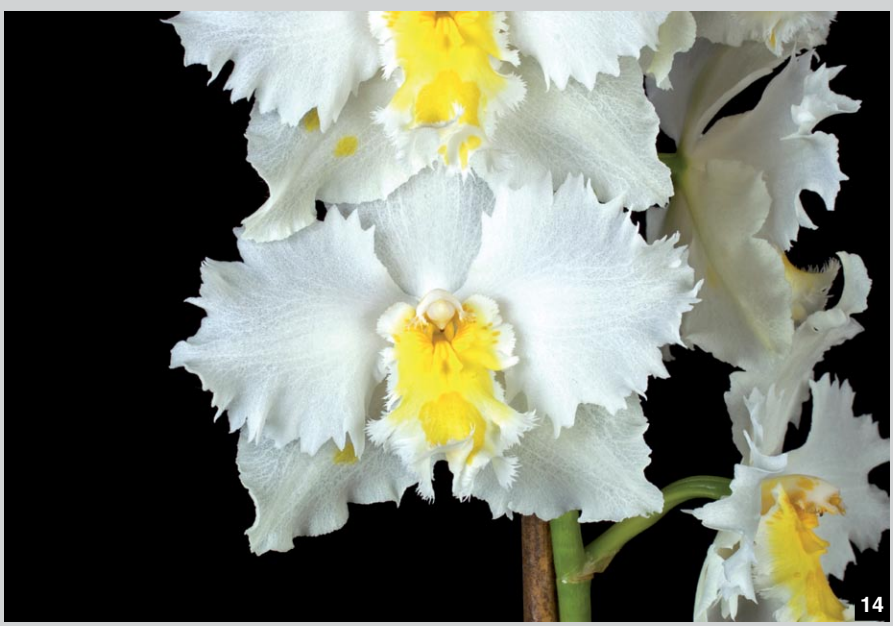
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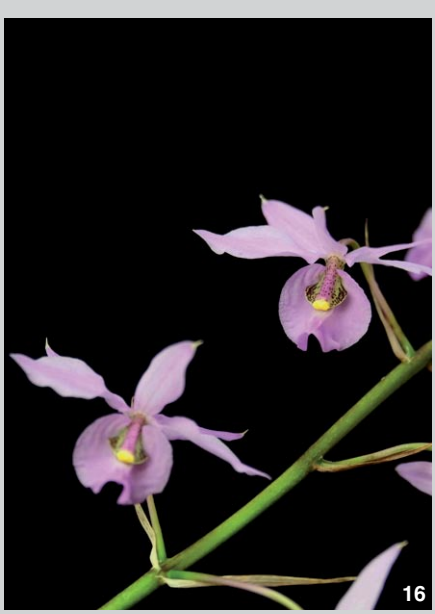
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[1] *Coelogyne kinabaluensis* 'Susan' CHM/AOS 80 pts. Exhibitor: Chuck and Sue Andersen; Photographer: Teck Hia. Northeast Judging

[2] *Cattleya* Philip Streeter 'Pink Plate' HCC/AOS (Mari's Song x *loddigesii*) 78 pts. Exhibitor: Amy and Ken Jacobsen; Photographer: Chaunie Langland. Pacific Central Judging

[3] *Phalaenopsis* Meen Estrella 'Aloha's Ruby' HCC/AOS (*cornu-cervi* x *tetraspis*) 77 pts. Exhibitor: Susan Heuer; Photographer: Mike Pearson. Pacific Northwest Judging

[4] *Rhyncholaeliocattleya* Radiant Star 'Edwin's Supernova' AM/AOS (Toshie Aoki x Robert's Choice) 81 pts. Exhibitor: Edwin A. Perez; Photographer: Fong Cing Li. Puerto Rico Judging

[5] *Masdevallia notosibirica* 'Cosmos' AM/AOS 82 pts. Exhibitor: Terry Thompson; Photographer: Mike Pearson. Pacific Northwest Judging

[6] *Cymbidium* Jean Hollebone 'Charming' AM/AOS (Frank Kageyama x Vogelsang) 82 pts. Exhibitor: Hatfield Orchids; Photographer: Arthur Pinkers. Pacific South Judging

[7] *Brassocattleya* Amethyst 'Julio David' AM/AOS (*Cattleya purpurata* x *Brassavola appendiculata*) 82 pts. Exhibitor: Julio David Rios; Photographer: Fong Cing Li. Puerto Rico Judging

[8] *Miltoniopsis phalaenopsis* 'Snowfall LCO' HCC/AOS 78 pts. Exhibitor: Jeremy Oversier Lylah Brudos; Photographer: Mark Van der Woerd. Rocky Mountain Judging

[9] *Brassidium* FANGtastic Bob Henley 'Geneva's Webslinger' HCC/AOS (*Brassia* Rex x Kenneth Bivin) 77 pts. Exhibitor: Thornton Conservatory; Photographer: Arthur Pinkers. Pacific South Judging

[10] *Dendrobium uniflorum* 'Jan' CCM/AOS 82 pts. Exhibitor: Skip Burke; Photographer: Mike Pearson. Pacific Northwest Judging

[11] *Cattleya rex* 'Mayu' HCC/AOS 78 pts. Exhibitor: William B. Green; Photographer: Mark Van der Woerd. Rocky Mountain Judging

[12] *Paphiopedilum* Yellow Fantasy 'Spencer Christian' HCC/AOS (Nike's Sunny Delight x *haynaldianum*) 77 pts. Exhibitor: Tom Walker; Photographer: Mike Pearson. Pacific Northwest Judging

[13] *Catasetum* Frilly Doris 'Machiavelli' AM/AOS (Doris's Choice x Dona Marie) 82 pts. Exhibitor: Rene E. Garcia; Photographer: Fong Cing Li. Puerto Rico Judging

[14] *Oncidium* Augres 'Polar' HCC/AOS (Mont Sohier x Pumistor) 78 pts. Exhibitor: Robert Culver; Photographer: Mike Pearson. Pacific Northwest Judging

[15] *Cattleychea* Siam Jade 'Lime Sherbert' HCC/AOS (*Cattleya* Penny Kuroda (Penny Kuroda Group) x Vienna Woods) 75 pts. Exhibitor: Donna Ballard; Photographer: Arthur Pinkers. Pacific South Judging

[16] *Barkeria melanocaulon* 'Louisiana' HCC/AOS 79 pts. Exhibitor: Alan Taylor; Photographer: Susan Hathorn. Louisiana Judging


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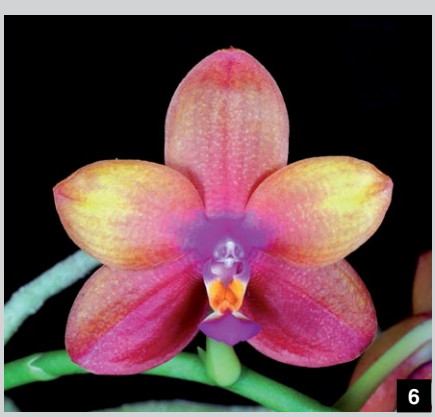
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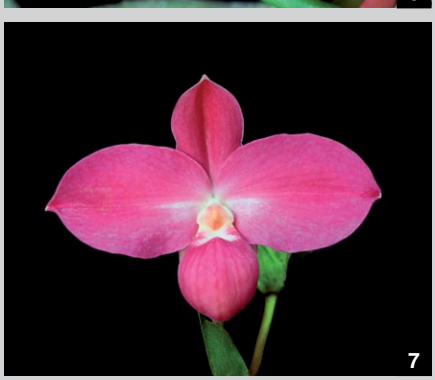
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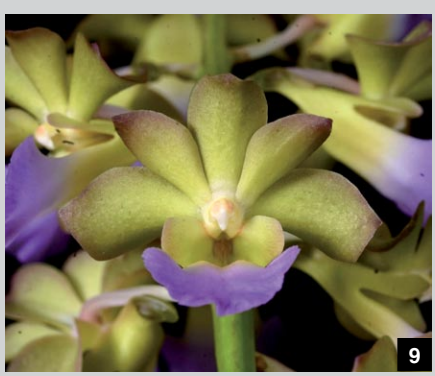
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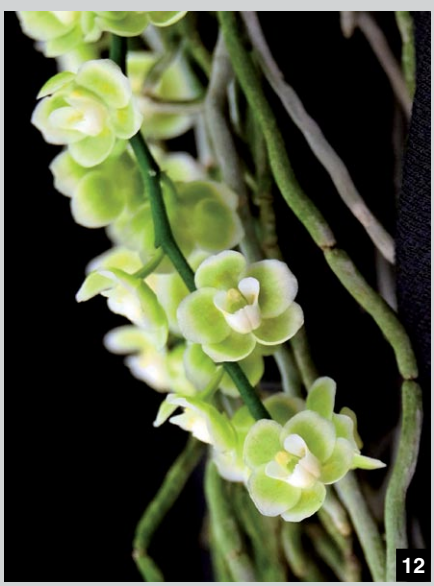

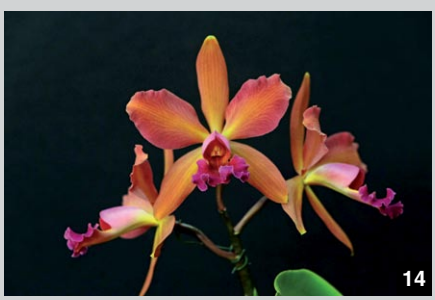

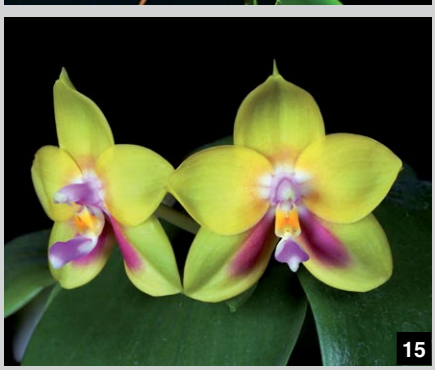

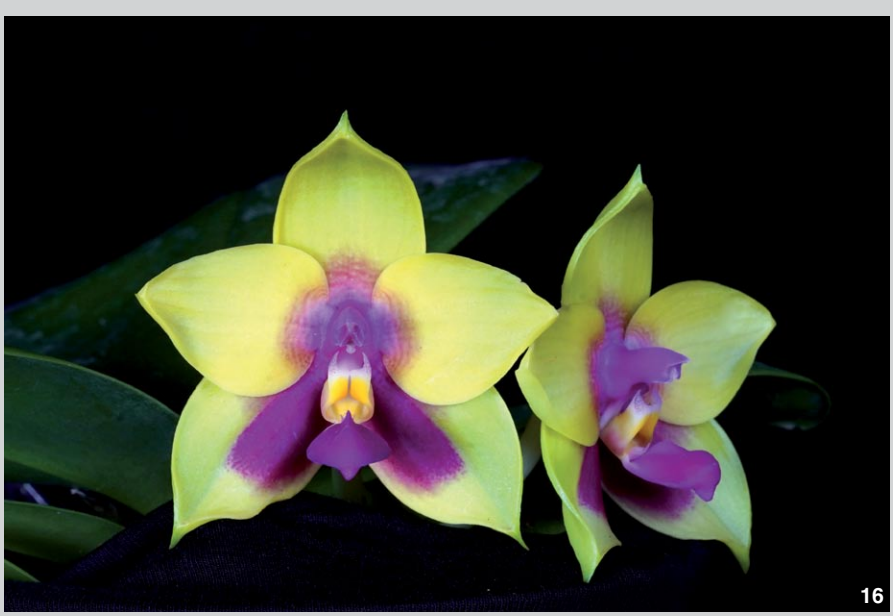

[1] *Vanda* My EmiLu 'Aria' HCC/AOS (Miami Velvet x Miami Mandarin) 76 pts. Exhibitor: David Genovese; Photographer: Wes Newton. Florida North-Central Judging

[2] *Paphiopedilum leucochilum* 'Fajen's Noir' HCC/AOS 76 pts. Exhibitor: Fajen's Orchids; Photographer: Wes Newton. Florida North-Central Judging

[3] *Papilionanda* Paksorn Fragrance 'Garrett's Midnight Kisses' HCC/AOS (Mimi Palmer x *Vanda insignis*) 79 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging

[4] *Brassavola* Crazyarachno 'Neblina su Compa Nanzi' AM/AOS (*perrinii* x *appendiculata*) 81 pts. Exhibitor: Adeljean Ho (Neblina Orchids); Photographer: Wes Newton. Florida North-Central Judging

[5] *Perreiraara* Marilyn Broeman 'Garrett's Think Pink' AM/AOS (*Vandachostylis* Pine Rivers x *Aerides* Korat Koki) 82 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging

[6] *Phalaenopsis* Krull's Red Dragon 'Krull's Sunset' AM/AOS (Ken Avant x Dragon Tree Eagle) 84 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[7] *Phragmipedium* Vingtaine du Roquier 'Catahoula Goliath' AM/AOS (Jersey x *kovachii*) 85 pts. Exhibitor: Eron Borne; Photographer: Susan Hathorn. Louisiana Judging

[8] *Vandachostylis* Voja's Little Bird 'Garrett's Small Favor' HCC/AOS (Thai Noi x *Rhynchostylis coelestis*) 77 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging

[9] *Vandachostylis* Kedah Bella 'Garrett's Green Mist' HCC/AOS (*Vanda vietnamica* x *Rhynchostylis coelestis*) 79 pts. Exhibitor: Sharon and David Garrett; Photographer: Wes Newton. Florida North-Central Judging

[10] *Aerides rosea* 'MV Rosy Cheeks' AM/AOS 83 pts. Exhibitor: Stuart Henderson; Photographer: Wes Newton. Florida North-Central Judging

[11] *Bulbophyllum beccarii* 'Krull-Smith' CHM-AM/AOS 84-81 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[12] *Chiloschista viridiflava* 'Snookie' HCC/AOS 77 pts. Exhibitor: Mary Mancini; Photographer: Susan Hathorn. Louisiana Judging

[13] *Stereochilus erinaceus* 'AAA' CHM/AOS 82 pts. Exhibitor: Stuart Henderson; Photographer: Laura Newton. Florida North-Central Judging

[14] *Cattleya* Catahoula Sunset 'Julia Katherine' AM/AOS (Mary Ellen Carter x *forbesii*) 82 pts. Exhibitor: Eron Borne; Photographer: Susan Hathorn. Louisiana Judging

[15] *Phalaenopsis* Krull's Yellow Prince 'Krull's Lemon-Lime' AM/AOS (Pylo's Eagle Passion x Dragon Tree Eagle) 84 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[16] *Phalaenopsis* Krull's Yellow Prince 'Krull's Julien' AM/AOS (Pylo's Eagle Passion x Dragon Tree Eagle) 83 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging


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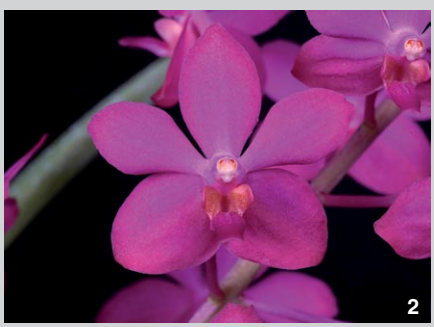
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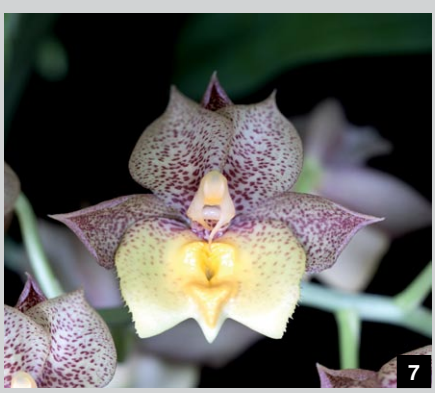
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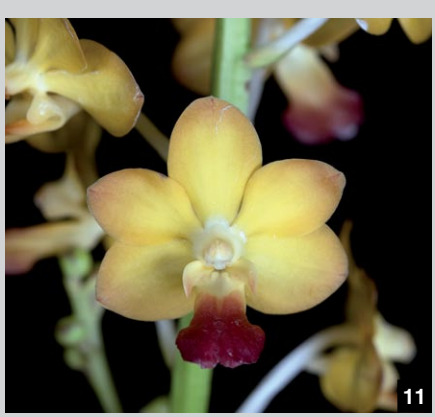
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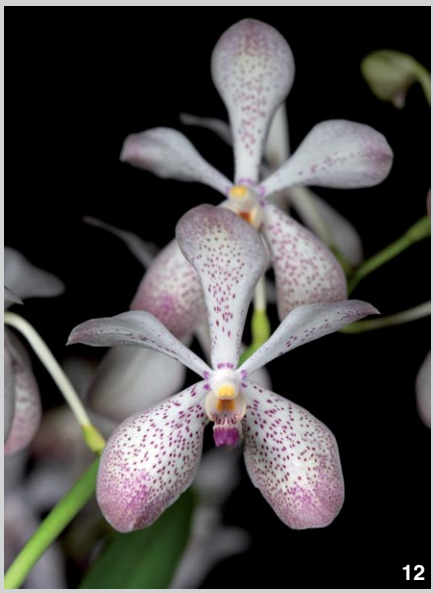


[1] *Catasetum* Graham Wood 'Krull-Smith' HCC/AOS (Extravaganza x Denti-grianum) 78 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[2] *Paravanda* Thai Flare 'MV Spit Fire' AM/AOS (*Paraphalaenopsis serpentilingua* x *Vanda* Peggy Foo) 85 pts. Exhibitor: Stuart Henderson; Photographer: Wes Newton. Florida North-Central Judging

[3] *Vandachostylis* Orchidkraft's Sapphira 'Jim Krull' HCC/AOS (Sasicha x *Vanda tessellata*) 78 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[4] *Encyclia* Orchid Jungle 'Cheryle's Final Florida Hurrah' HCC/AOS (*alata* x *phoenicea*) 77 pts. Exhibitor: Cheryle Daniel; Photographer: Wes Newton. Florida North-Central Judging

[5] *Cattleya* Memoria Jim and Emily Clarkson 'Memoria Jim Clarkson' AM/AOS (Precious Katie x Culminant) 85 pts. Exhibitor: Ryan Kowalczyk; Photographer: Wes Newton. Florida North-Central Judging

[6] *Vanda tessellata* 'Michael D. Gibson' HCC/AOS 78 pts. Exhibitor: Naoki Kawamura; Photographer: Wes Newton. Florida North-Central Judging

[7] *Catasetum* Louise Clarke 'Corinne's Lovely Accent' AM/AOS (Susan Fuchs x Donna Wise) 86 pts. Exhibitor: Corinne Arnold; Photographer: Wes Newton. Florida North-Central Judging

[8] *Bulbophyllum claptonense* (Flavum) 'Crystelle' CHM-FCC/AOS 91-92 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[9] *Papilionanda* Siwalatri 'Krull's Julien' AM/AOS (Mimi Palmer x *Vanda merrillii*) 83 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[10] *Papilionanda* James Craig Adamson 'Michael D. Gibson' AM/AOS (Arjuna x *Vanda insignis*) 85 pts. Exhibitor: Naoki Kawamura; Photographer: Wes Newton. Florida North-Central Judging

[11] *Vandachostylis* Yellow Bird 'Thailand' AM/AOS (*Vanda* Memoria Thianchai x *Rhynchostylis coelestis*) 84 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[12] *Aranda* Prapin 'Angel Bop Girl' HCC/AOS (Christine x *Vanda* Rasri Gold) 75 pts. Exhibitor: Cheryle Daniel; Photographer: Wes Newton. Florida North-Central Judging

[13] *Vandachostylis* October Twenty Second 'AMO Astral Traveler' AM/AOS (*Vanda tessellata* x Pine Rivers) 85 pts. Exhibitor: Angie and Mike Pitiriciu; Photographer: Tom Kuligowski. West Palm Beach Judging

[14] *Aeridovanda* Susanna Coffey 'Krull-Smith' AM/AOS (*Aerides lawrenceae* x Vanda Fuchs Ruby) 82 pts. Exhibitor: Krull-Smith; Photographer: Wes Newton. Florida North-Central Judging

[15] *Brassolaeliocattleya* Petite Stars 'Nilva's Amorcito' HCC/AOS (*Brassocattleya* Richard Mueller x *Laelia rubescens*) 79 pts. Exhibitor: Bailey Santwire; Photographer: Charles Wilson. Atlanta Judging

[16] *Platanthera ciliaris* 'The Spirit of First Nations' AM/AOS 83 pts. Exhibitor: David Mellard; Photographer: Charles Wilson. Atlanta Judging

Odontoglossum or Oncidium?

The latest developments from the world of orchid nomenclature and taxonomy

With an introduction by the Chairman, Johan Hermans, Mark Chase explains the decision made by the RHS Orchid Hybrid Registration Advisory Group on one of the most controversial questions in all plant taxonomy.

Printed simultaneously with the September issue of *The Orchid Review*

SINCE THE SEPARATION of the genus *Paphiopedilum* from *Cypripedium* at the end of the 19th century, no other issue of classification has divided the orchid community so much as the inclusion of most species of *Odontoglossum* in the genus *Oncidium*. This change was first published in *Genera Orchidacearum* by Mark Chase and colleagues in 2009 and was based on extensive genetic and morphological research. The most unfortunate and upsetting change was in the horticulturally important cool-growing species of the *Odontoglossum crispum-O. alexandrae* group becoming *Oncidium*.

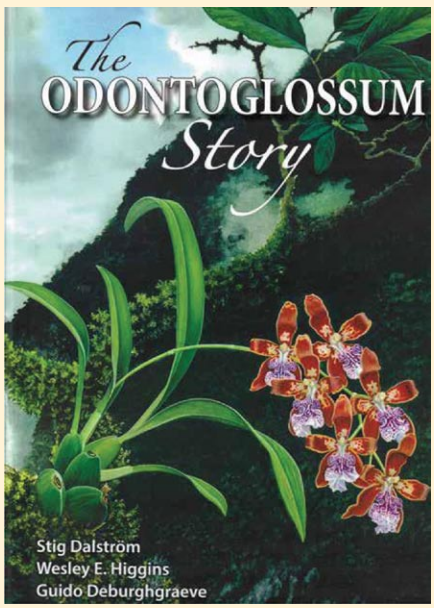
Orchid nomenclature is governed by internationally agreed codes, but their classification is open to debate. The World Checklist of Selected Plant Families, facilitated by Royal Botanic Gardens, Kew, is generally seen as the baseline for currently recognized genera and species. The RHS Orchid Hybrid Register, administered by Julian Shaw and colleagues, is the International Registration Authority for orchid hybrids. Both databases are advised by international panels, with the Orchid Hybrid Registration Advisory Group (OHRAG) advising the RHS and the Registrar on all things related to orchid nomenclature. OHRAG was formed in 1961 and consists of 12 members and seven corresponding members from Australia, China, Costa Rica, Germany, Jamaica, Japan, Singapore, the UK, and the US. OHRAG meets twice a year to consider, among other items, the impact and acceptability of any proposed changes in orchid nomenclature.

OHRAG was first made aware of the proposed changes in *Odontoglossum* and *Oncidium* in 2009, as part of the deliberations arising after the publication of each volume of *Genera Orchidacearum*. OHRAG was conscious of a potential conflict with work by Stig Dalström and others, and opposition from cool-growing *Odontoglossum* enthusiasts keen to retain a name widely used in horticulture. A deliberate decision was taken to introduce a cooling-off period to allow feedback, which was sought from individuals and special interest groups, including the International Odontoglossum Alliance. The RHS Nomenclature and Taxonomy Advisory Group (NATAG) was asked to independently investigate the issue and the German Orchid Society (DOG) sought advice from a taxonomist familiar with DNA phylogenetics.

Following this cooling-off period, discussion, and consideration of all evidence, taking into account the advice from NATAG and DOG, it was recommended in 2018 to accept the interpretation by Chase et al. The Orchid Hybrid Register would be adjusted accordingly, with the proviso that further discussion would be needed after publication of the long-awaited monograph on *Odontoglossum* by Dalström et al. It was also recommended that the Orchid Hybrid Register should include all the *Odontoglossum* hybrid names as a record.

In 2020 the detailed monograph, The *Odontoglossum Story*, by Dalström, Higgins, and Deburghgraeve was published, and OHRAG reconsidered all the evidence. This included a petition by the authors of the book, plus a number of other supporters, to accept *Odontoglossum* and *Sigmatostalix* as distinct genera. OHRAG met in May this year, with Dr. Higgins in attendance to present the petition. All members and guests declared any conflicting interests. They were then given the opportunity to present the case for or against accepting the interpretation by Dalström et al. or Chase et al. After careful consideration, an anonymous vote was held which, with the exception of three abstentions, resulted in unanimous support for the interpretation of Chase et al. and this is the view that will continue to be reflected in the Orchid Hybrid Register. However, it is anticipated that the records of *Odontoglossum* and its hybrids currently hidden in the Register will be made visible in future upgrades so that everyone can search for their favorite genus.

What follows is Mark Chase's case for an expanded *Oncidium* that OHRAG found convincing. It is published here in the interests of transparency and the desirability of establishing the prevalence of one view over another.

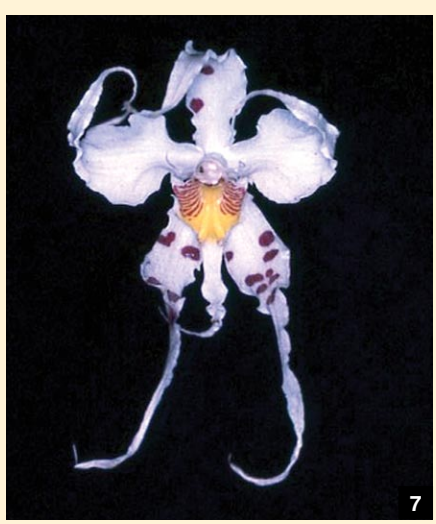


Views presented by the authors of *The Odontoglossum Story* (Koeltz, 2020) were considered by the Orchid Hybrid Registration Advisory Group.

Unless compelling new evidence is published, OHRAG will not consider this issue again, and the hope is that the members of the International Odontoglossum Alliance and other growers and breeders will embrace the larger genus *Oncidium*. But, as it says on the back cover of the book, '*The Odontoglossum Story* … never ends…'.

SETTING THE SCENE

In *The Odontoglossum Story* by Dalström et al. (2020) the authors summarize their position with the following statement: "In conclusion, it is evident that the arguments presented by Chase et al. for transferring *Cochlioda*, *Collare-stuartense*, *Solenidiopsis*, *Symphyglossum,* and *Sigmatostalix* into *Oncidium* are not only weak but also misleading and unconvincing. We, therefore, argue that a taxonomic restoration of the genus



Floral diversity in the proposed expansion of Odontoglossum favored by Dalström et al. (2020). The names provided reflect their generic placement prior to the DNA studies: [1] *Odontoglossum crinitum*; [2] *Symphyglossum sanguineum*; [3] *Odontoglossum obryzatum*; [4] *Oncidium obryzatoides*; [5] *Cochlioda noezliana*; [6] *Odontoglossum cristatum*; [7] *Odontoglossum cirrhosum*.

Odontoglossum in a slightly extended form is necessary and presents a more accurate and user-friendly classification."

In this article, I will address their accusation of misleading and unconvincing arguments, and assess their claim that their treatment of *Odontoglossum* is better because it is more accurate and user-friendly.

To set the timeframe over which this controversy has continued, the classification of subtribe Oncidiinae (*Oncidium*/*Odontoglossum*, *Cyrtochilum*, *Brassia*, *Gomesa*, *Miltoniopsis*, *Miltonia,* etc.) was presented in full in volume 5 of *Genera Orchidacearum* by Chase (2009). The formal taxonomic changes were published in *Orchids* (Chase et al. 2008, Chase et al. 2009a), with the expansions of *Gomesa* published by Chase et al. (2009b) and *Brassia* and *Pachyphyllum* by Chase & Whitten (2011). Earlier molecular (DNA) research included higher-level studies of tribe Cymbidieae (including *Oncidiinae*) (Whitten et al. 2000), expansion of *Cyrtochilum* to include several groups of *Odontoglossum* sensu Bockemuhl (Williams et al. 2001a, b) and chromosome number and genome size of Oncidiinae (Chase et al. 2005). The large-

Variants of the horticulturally important *Oncidium alexandrae* (syn. *Odontoglossum crispum*) originally described as different taxa. Illustrations from the public domain.

scale molecular analysis was published by Neubig et al. (2012), but many of the earlier studies cited here included DNA analyses, so the nature of the changes likely to be proposed in *Genera Orchidacearum* was known from the early 2000s.

PURPOSE AND PRINCIPLES

From the start of this controversy, Dalström and his supporters have stated that their goal was the preservation of their "pet" (favorite) genus. My colleagues and I started with no *a priori* preferences, except to have as workable a system as possible. We believe that although you can evaluate the relationships of species and genera with DNA, taxonomy must be based on morphological characters so that you can recognize the genus to which a species belongs. If you encounter a species that you have never seen before, it is undesirable to have to sequence its DNA before you can assign it to a genus. Dalström et al. (2020) also agreed with this position.

Evolution presents us with complex scenarios that are wonderful subjects to study from a genetic standpoint but a nightmare from the taxonomic perspective. Floral morphology in subtribe Oncidiinae is clearly unreliable. "*Oncidium*" (yellow flowers with a lumpy lip callus) has evolved independently more than a dozen times (Papadopulos et al. 2013). Vegetative features fare much better — for example, in the two largest genera in subtribe Oncidiinae, *Cyrtochilum* has pseudobulbs round in cross-section, versus *Oncidium* sensu Chase et al. which are laterally flattened. If we emphasize vegetative features and largely ignore floral morphology, then we conclude that *Odontoglossum* is the same as *Oncidium* and the two should be merged.

Unfortunately, *Oncidium* is the older name, so it must be used for the combined genus. I suspect that if *Odontoglossum* were the older name, we would not be having this disagreement. This would mean that no one, including Dalström et al., opposes expansion of the genus, but rather it is the loss of a favorite name, *Odontoglossum*, that creates the problem. The international nomenclature committee that rules on taxonomic matters will not agree to conserve *Odontoglossum* because it is by far the smaller genus; more name changes are needed to move *Oncidium* into *Odontoglossum* than vice versa.

CUTTING UP A TREE

My statements about the number of genera to be recognized were claimed to be "misleading" by Dalström et al. (2020). Their broadened circumscription of *Odontoglossum* indeed requires only a few new genera be recognized (*Heteranthocidium* and perhaps a couple of other smaller genera to be erected). However, this smaller number of changes than put forward by me is because they "cut the DNA tree" far below the *Odontoglossum crispum*-type group — those species that most people identify as the core group of *Odontoglossum*. I was assuming that when Dalström said he wanted to keep *Odontoglossum* he meant just this core group. However, to keep *Odontoglossum* in this sense (*Odontoglossum* subgenus *Odontoglossum* sensu Bockemuhl [1989]) you would need to recognize several more genera, for example, the *Odontoglossum astranthum*, *Symphyglossum sanguineum*, *Cochlioda rosea*, *Odontoglossum tigroides*, *Odontoglossum povedanum*, *Odontoglossum chrysomorphum* and

Odontoglossum pictum clades (the last two with classic *Oncidium*-type flowers).

The Dalström et al. (2020) solution to the erection of many new genera is to include most of these morphologically different groups in *Odontoglossum*, making it much more diverse in terms of floral morphology than the remainder of *Oncidium*. This makes *Odontoglossum* sensu Dalström et al. a genus that is undiagnosable in floral and vegetative morphology (see further discussion below). My version of *Oncidium* is easily diagnosed: disregard (largely) the flowers and look at the pseudobulbs: they are members of Oncidiinae with laterally flattened pseudobulbs. There are exceptions (*Cischweinfia* and some species of *Brassia*, *Miltonia*, *Miltoniopsis* and *Systeloglossum*), all of which differ in their floral morphology from any species in *Oncidium* sensu Chase, making them relatively easy to identify. I believe the statement of Dalström et al. (2020) that my opinion about more genera being required is taken out of the framework in which it was proposed: an assumption that *Odontoglossum* sensu Dalström et al. would be likely to include just the species of *Odontoglossum crispum* group. I had never considered that to "save" the name *Odontoglossum*, Dalström et al. (2020) would include species with typical *Oncidium* morphology and a morphologically more diverse set of species than those in the remainder of *Oncidium*.

The claim that arguments for recognizing *Oncidium* sensu Chase are "unconvincing" is based on the *a priori* belief that the name *Odontoglossum* must be saved. If you begin from this premise, then, of course, you will be unconvinced by my reasons for a broad concept of *Oncidium*. Dalström et al. (2020) are clearly happy to include species with *Oncidium* morphology in their circumscription of *Odontoglossum*, but not the type species of *Oncidium* because that would set in motion the inclusion of *Odontoglossum* in *Oncidium*.

FRIENDLY TO WHOM?

Dalström et al. (2020) have claimed that their treatment of Odontoglossum is more "accurate and user-friendly." Did Dalström et al. (2020) provide any morphological distinctions in the section on how to distinguish *Oncidium* and *Odontoglossum*? Dalström et al. (2020) do not mention a single character that consistently differs in the species they wish to circumscribe as *Odontoglossum* from those in *Oncidium*. They mention many features (e.g. lip-column angles, purple-spotting, glossy pseudobulbs, shape of pollinaria) that distinguish groups within *Odontoglossum* sensu Dalström et al., but if you go through that section carefully, it is full of generalities and many exceptions. In *Odontoglossum* sensu Dalström et al. there is greater morphological diversity than in the remainder of *Oncidium* that they exclude. *Odontoglossum* sensu Dalström et al. is a morphological hodge-podge no less diverse than *Oncidium* sensu Chase et al. Furthermore, *Odontoglossum* sensu Dalström et al. is neither clearly defined nor morphologically consistent, and they cannot tell a novice how to tell these two genera apart.

Dalström et al. (2020) stated that once you know the group well, you can tell which species belong to *Oncidium* and which to *Odontoglossum*. If an unknown plant turns up on the show bench, how would Dalström et al. decide whether it is a species of *Oncidium* or *Odontoglossum*? First, they determine which species it is (and Dalström knows the species very well), and then they know if it is an *Oncidium* sensu Dalström et al. or *Odontoglossum* sensu Dalström et al. As they stated, if you know the group well enough, you can figure out in which genus a known species belongs, but how would they figure out in which genus should go a new species with floral morphology like those in *Heteranthocidium*? It would be impossible without doing DNA work. If we are to have messy genera, then fewer, larger messy genera are preferable to many smaller, messy genera. Actually, *Oncidium* sensu Chase et al. is not so messy, and it is identifiable based on its habit (single-noded, ancipitous pseudobulbs).

I have consistently favored broader generic circumscriptions: *Cyrtochilum* (which Dalström happily supported), *Brassia*, *Calanthe*, *Cattleya*, *Coelogyne*, *Comparettia*, *Gomesa*, *Maxillaria* and *Miltonia*, and others have proposed broadly circumscribed *Epidendrum*, *Phalaenopsis* and *Vanda* etc. Dalström et al. appear to think that if they produce a book laying out this version of *Odontoglossum*, then it makes it convincing. However, when I look at what they have done, which is a great contribution at the species level, *The Odontoglossum Story* demonstrates clearly why this approach is such a failure. You can keep the name *Odontoglossum*, but this circumscription of the genus is so diverse that there is no way to morphologically separate it from the rest of the *Oncidium* species Dalström et al. artificially exclude.

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—Johan Hermans is Chairman of the RHS Orchid Hybrid Registration Advisory Group (orchids1@btinternet.com). Mark Chase was formerly head of the Molecular Systematics Section and Keeper of the Jodrell Laboratory at the Royal Botanic Garden, Kew. He is now retired but continues to work on several research projects as an Honorary Research Associate at RBG, Kew (m.chase@rbg.kew).

SEPTEMBER

16–18—Alabama Orchid Society's 38th Show & Sale, Birmingham Botanical Gardens, 2612 Lane Park Rd, Mountain Brook, AL; Contact: Beverly VonDer Pool, 205–821–0689; bvonderpool@yahoo.com

17–18—Wisconsin Orchid Society's "Fall in Love with Orchids," Mitchell Park Horticultural Conservatory, 524 S Layton Blvd, Milwaukee, WI; Contact: Richard Odders and Bil Nelson, 262–632–3008 and 414–467–6642; odders2445@gmail.com and qorchids@att.net

17–18—Ridge Orchid Society's Diamond Jubilee "60 Years of Orchids," WH Stuart Center, 1702 US Hwy 17 S, Bartow, FL; Contact: Keith Emig, 863–412–4762; dkemig@gmail.com

17–18—Foothills Orchid Society "Orchids For Everyone," Deerfoot Inn & Casino, 11500 35 St SE #1000, Calgary, AB, Canada; Contact: Marguerite Salsberry, 403–973–2687; msalsberry@telus.net

19–26—Asociacion Bogotana de Orquideologia's "XIX Exposicion Nacional de Orquideas," Calle 134 #55–66, Bogota, Colombia; Contact: Julie Jordan, 54–310–227–9696; julie.jordan@grchia.com

22—Desert Valley Orchid Society Outreach Judging, Prince of Peace Luthern Church, 3641 N 56 St, Phoenix, AZ; Contact: Bev Tall, 602–463–7352; bevtall@gmail.com

23–24—Great Divide Orchid Society Show and Sale, Wingate of Helena, 2007 N Oakes, Helena, MT; Contact: Nancy Horn & Cheri Bergeron, 406–459–9252; nancylhorn@outlook.com

24–25—Triangle Orchid Society "Fall for Orchids," JC Raulston Arboretum – NC State University, 4415 Beryl Road, Raleigh NC; Contact: Ralph Belk III, 704–619–7152; shows@triangleorchidsociety.org

24–25—Oregon Orchid Society Show and Sale, Aquinas Hall, 340 NE Clackamas St, Portland, OR; Contact: Greg Stanley, 626–818–2806; gregstanley78@gmail.com

30–1—Tampa Orchid Club Expo, USF Botanical Gardens, 4202 E Fowler Ave, Tampa, FL; Contact: Cheryl Crilly, 813–244–7564; cents4me@aol.com

30–2—Kentucky Orchid Society Show, St Mathews Episcopal Church, 330 N Hubbards Lane, Louisville, KY; Contact: Jan Smith & Stephen Benjamin, 502–893–0500 & 502–348–1787; jansmithroberts@gmail.com & stephenb@oakknob.com

OCTOBER

1–2—Central New York Orchid Society's Fall Show and Sale, Beaver Lake Nature Center, 8477 East Mud Lake Rd, Baldwinsville, NY; Contact: Susan & Jerry Finger, 315–247–8980; jandsfinger@aol.com

1–2—Riverside/San Bernardino Counties Orchid Society's "2022 Morongo Basin Orchid Festival," Gubler Orchids, 2200 Belfield Blvd, Landers, CA; Contact: Ronald Lang, 951–663–5237; rflangx25@gmail.com

5–16—The Big Fresno Fair, 1121 South Chance Ave, Fresno, CA; Contact: Gordon Wolf, 209–999–0181; gwsangca@yahoo.com

7–9—Redland International Orchid Festival, Redland Fruit and Spice Park, 24801 SW 187th Ave, Redland, FL; Contact: Martin Motes, 305–247–4398; martinmotes@gmail.com

14–16—Atlanta Orchid Society Show and Sale, Atlanta Botanical Garden Day Hall, 1345 Piedmont Ave, Atlanta, GA; Contact: Danny Lentz, 770–362–0575; dblgongora@bellsouth.net

15–16—Denver Orchid Society's "Orchid Renaissance," Denver Botanic Gardens, 1005 York St, Denver, CO; Contact: Marion Allen, 303–987–3005; orkdlvr@comcast.net

17–23—Kenya Orchid Society "Orchid Manyatta," Loita Hall, Sarit Expo Centre, Karuma Road, Westlands, Nairobi, Kenya; Contact: Alexandra Kontos, +254–733–616–135; akontos@walkerkontos.com

22–23—Gainesville Orchid Society's "Orchids in the Garden," Kanapaha Botanical Gardens, 4700 SW 58th Dr, Gainesville, FL; Contact: Ghislaine Carr, 305–804–9495; Ghislainecarr@yahoo.com

22–23—Eastern Iowa Orchid Society's Orchid Show and Sale "Orchids are a Scream," Elks Lodge Hall, 801 3rd Ave SW, Cedar Rapids, IA; Contact: Andy Coghill–Behrends, 319–512–8076; mistercoghill@hotmail.com

NOVEMBER

4–6—Tampa Bay Orchid Society's "The Second International Vanda & Slipper Orchid Symposium," Judging at Hilton Garden Inn, 580 E Main St, Apopka, FL (Sales at Krull–Smith Nursery, 2800 West Ponkan Rd, Apopka, FL); Contact: Julio Hector (Judging) and Krull–Smith (Sales), 813–765–9271/407–886–4134; j.hector@verizon.net/orchids@krullsmith.com

13—East Everglades Orchid Society Show, R.F. Orchids (in the Banyon Pavilion), 28100 SW 182 Ave, Homestead, FL; Contact: Tere Camacho, 305–401–8807; tere@bellsouth.net

18–20—Asociacion Vallecaucana de Orquideologia "Caliorquideas 2022," Orquideorama, Avenida 2N #48–10, Cali, Colombia; Contact: Andrea Niessen, 57–315–572–2914; andreaniessen@orquivalle.com

26–27—Fort Pierce Orchid Society Show and Sale, River Walk Center, 600 N Indian River Dr, Fort Pierce, FL; Contact: Rita Zeblin, 772–418–7426 (text only); rita2zfpos@gmail.com

26–27—Saginaw Valley Orchid Society Show and Sale, Kochville Veterans Hall, 3265 Kochville Rd, Saginaw, MI; Contact: Tim Hueston, 989–837–0947; thueston@chartermi.net

JANUARY

12—*Boca Raton Orchid Society Outreach Judging, Safe Schools Institute, 1790 NW Spanish River Blvd, Boca Raton, FL; Contact: Kathy Kersey, 954–802–3575; kathykbros@gmail.com

FEBRUARY

4–5—Venice Area Orchid Society

Show and Sale, Venice Community Center, 326 S Nokomis Ave, Venice, FL; Contact: Carol Wood & Judy Loeffler, 941–497–4995; showchair@vaos.org

11–12—Boca Raton Orchid Society's "In Love With…Orchids," Safe Schools Institute, 1790 NW Spanish River Blvd, Boca Raton, FL; Contact: Kathy Kersey, 954–802–3575; kathykbros@gmail.com

MARCH

3–4—Englewood Area Orchid Society "Bewitched by Orchids," Ann & Chuck Dever Regional Park, 6961 San Casa Drive, Englewood, FL; Contact: Mary Ann DiGrazia, 941–697–9237; tommaryanne@centurylink.net

4–5—Tampa Bay Orchid Society's "For the Love of Orchids," Sons of Italy Hall, 3315 W Lemon St, Tampa, FL; Contact: Pat Solakian, 203–214–7042; tampabayorchidsociety@yahoo.com

18–19—Jacksonville Orchid Society Show, Mandarin Garden Club, 2892 Loretto Road, Jacksonville, FL; Contact: Lorraine Conover, 561–302–6010; lorrainesorchids@gmail.com

18–19—Nature Coast Orchid Society Spring Show, VFW Post 8681, 18940 Drayton St, Spring Hill, FL; Contact: Matt Riesz, 732–687–2407; mrfishnj@gmail.com

25–26—Orchid Society of Highlands County's "Art in Bloom," Agri–Civic Center, 4509 George Blvd, Sebring, FL; Contact: Marlen Martinez, 863–446–0189; cmghmartinez@gmail.com

APRIL

1–2—Port St. Lucie Orchid Society's "Hoot Loves Orchids," Port St. Lucie Polish American Club,343 NW Prima Vista Blvd, Port St. Lucie, FL; Contact: Andrea Heitfeld; tazzette55@gmail.com

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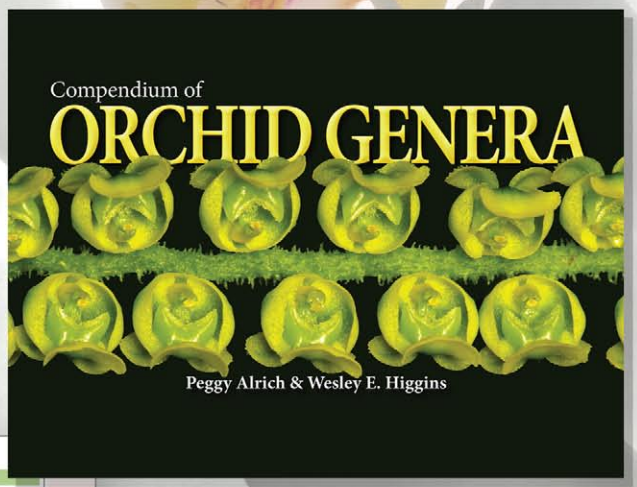

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AD INDEX

Submission of articles for *ORCHIDS* magazine

The AOS welcomes the submission of manuscripts for publication in *Orchids* magazine from members and non-members alike. Articles should be about orchids or related topics and cultural articles are always especially welcome. These can run the gamut from major feature-length articles on such topics as growing under lights, windowsills and thorough discussions of a species, genus or habitat to shorter, focused articles on a single species or hybrid to run under the Collector's Item banner. The AOS follows the World Checklist of Selected Plant Families with respect to species nomenclature and the Royal Horticultural Society Orchid Hybrid Register for questions of hybrid nomenclature. The AOS style guide and usage guides can be downloaded from http://www.aos.org/about-us/article-submissions/style-guide-for-aos-publications.aspx

Articles as well as inquiries regarding suitability of proposed articles should be sent to jean.ikeson@gmail.com or the editor at rmchatton@aos.org.

The American Orchid Society, in congruence with its stated conservation aims and with the full approval of the AOS Trustees, prohibits advertisements for wild-collected orchids and orchid-collecting tours in the pages of *Orchids*. By submitting advertisements for orchid species, vendors are thereby asserting that plants advertised are either artificially propagated (from seed or meristem) or are nursery-grown divisions of legally acquired stock. While *Orchids* endeavors to assure the reliability of its advertising, neither *Orchids* nor the American Orchid Society, Inc., can assume responsibility for any transactions between our advertisers and our readers.

Rhyncholaeliocattleya Jill Biden

by Arthur E. Chadwick

First Lady Jill Biden receives her namesake orchid

Arthur E. Chadwick poses with Dr. Jill Biden and two seedlings of her namesake orchid — *Rlc.* Jill Biden. Photocredit: Erin Scott, Official White House Photographer

FIRST LADY JILL Biden was presented with her namesake orchid in a ceremony at The White House on Tuesday, July 19, 2022. Grower Art Chadwick of Chadwick & Son Orchids in Powhatan, Virginia displayed two examples of the Biden orchid, which blooms every July with large yellowish green flowers. The hybrid is officially registered with the Royal Horticultural Society.

Also attending the event was White House Chief Floral Designer, Hedieh Ghaffarian, who uses orchids regularly throughout the executive mansion.

Dr. Biden wore a blue floral dress and yellow high heels — the colors of Ukraine — having just come from a meeting with the First Lady of Ukraine, Olena Zelenska.

The event took place in the Vermeil Room of the East Wing and was arranged by Virginia Congresswoman Abigail Spanberger. Portraits of former first ladies, Lady Bird Johnson, Jacqueline Kennedy, Pat Nixon, Mamie Eisenhower, and Lou Hoover adorned the walls and provided the backdrop for the presentation.

"We are thrilled to personally present the First Lady with her namesake orchid. The Biden hybrid is unique in both its color and blooming time," said Art Chadwick. Botanically her namesake is *Rhyncholaeliocattleya* Jill Biden (Goldenzelle × Sea Swirl), registered by The Orchid Trail of Morrisville, North Carolina and is of the corsage type that was popular from the 1930s to the 1960s.

Following the presentation, Dr. Biden requested that one of the plants sit on her desk and the other sit on her husband's desk in the Oval Office.

Dr. Biden is the 19th consecutive U.S. First Lady to have a namesake cattleya orchid. The tradition dates to Woodrow Wilson's wife, Edith, and the entire orchid collection resides at the Smithsonian Gardens in Washington, DC.

— Arthur E. Chadwick is a coauthor of The Classic Cattleyas, now in its second printing, that describes the large-flowered species that make up today's hybrids. He is president of Chadwick & Son Orchids, which operates 11 greenhouses in Powhatan County, two retail stores in Richmond, Virginia and boards over 13,000 orchids for local clients (email art@chadwickorchids.com; Website www.chadwickorchids.com).

Catasetum **Dentigrianum 'Memoria Amedeo Turina' AM/AOS (***denticulatum* **×** *tigrinum***) awarded on July 23, 2022 with 23 flowers on one inflorescence at the West Palm Beach Judging Center's monthly meeting. The plant was grown and exhibited by Olivier Turina and expertly photographed by Tom Kuligowski.**

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