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Society's Purpose

To encourage interest in and to disseminate knowledge about rhododendrons and azaleas. To provide a medium through which all persons interested in rhododendrons and azaleas may communicate and cooperate with others through education, meetings, publications, scientific studies, research, conservation and other similar activities.

Membership Benefits

- Annual convention and regional conferences
- Seed exchange
- Listing of registration of names and descriptions of new rhododendron hybrids published in the Journal
- Chapter affiliation with scheduled meetings
- Journal American Rhododendron Society published quarterly

To Join the Society

Membership categories:
(January 1 – December 31)

Student (include proof if over 18)	$10.00
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You can join the ARS through your local ARS chapter (check the website www.rhododendron.org for chapter contact info) or by sending a check or money order directly to the Office Administrator of the American Rhododendron Society at the above address. Checks must be in US funds. Make checks payable to the "American Rhododendron Society." Membership includes one year (4 issues) of the *Journal American Rhododendron Society* and affiliation with the chapter of your choice.**To receive the winter issue of the Journal, renewals must be postmarked no later than Dec. 1.**



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Features

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Society News

Cover Photo

R. ferrugineum, Tirol, Austria. Photo by Ole Jonny Larsen.

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From the President

Bob MacIntyre
Bandon, Oregon

This Spring has been rather different and somewhat unpredictable as far as the blooming of our rhododendrons. There was very early blooming on the West Coast, with some blooming a full four to six weeks early. In District #4 we had a very mild and wet winter and very little frost.

California finally got some of the rain they needed, and they too had an early blooming season. In contrast, the Midwest and East Coast seemed to have excessive rain with some harsh, later frosts.

A round of applause to all the people who stepped up and help make the joint ARS/ASA Annual Convention held in Williamsburg, VA, a success. I would like to thank Don Hyatt, David Banks and all those who volunteered for a job well done. For those of you who did not attend, you missed a good conference. In spite of the fact that the conference was held on the east coast, attendance from east coast members was on the light side.

The BOD meeting went very well and all items were dealt with in smooth fashion. Please read the report (p. 142) by the Transition Committee written by Ann Mangels, Eastern Regional Vice-President, for a comprehensive report of the changes that are taking place. My sincere thanks and appreciation to the Transition Team for a job also well done.

I would like to take this opportunity to say a personal Thank You to Laura Grant for her eleven years of faithful service as Executive Director. She has been a counselor, friend and supporter to many ARS Presidents. May she have an active and fulfilling retirement.

I must once again bring up an old topic—the encouragement of ARS members to participate/volunteer in our Society activities. We need people who can step up to fill positions such as Chapter officers, District officers and Executive officers. Please consider how you can contribute to the organization, as the “recycling” of current volunteering members that often occurs now cannot be sustained forever.

Our next two conferences will be held on the west coast. The ARS Fall Western Regional Conference will be held in Newport, OR, Sept. 30 – October 2. The ARS 2017 Annual Spring Convention will be held in Eureka, CA. I hope to see many of you there. In the meantime, Happy Gardening!!

ARS Board of Directors and Executive at ARS Annual Convention in Williamsburg, VA

ARS Board of Directors and Executive at the ARS Annual Convention in Williamsburg, Virginia: Left to right: Maria Stewart, Chris Hodgson, John Golab, Susan Garland, Linda Derkach, Tim Walsh, Bill Meyers, Bob Warren, Paul Anderson, Sam Burd, Glen Jamieson, Ann Mangels, Sandra McDonald, Richard Fairfield, Laura Grant, Bob Weissman, Bud Gehnrich, Bruce Feller, Gordon Wylie, Steve Henning, Bob MacIntyre, Lynne Melnyk, Marvin Fisher, Ken Webb. Photo by Bob Ramik.

R. hirsutum in flower along mountain paths.

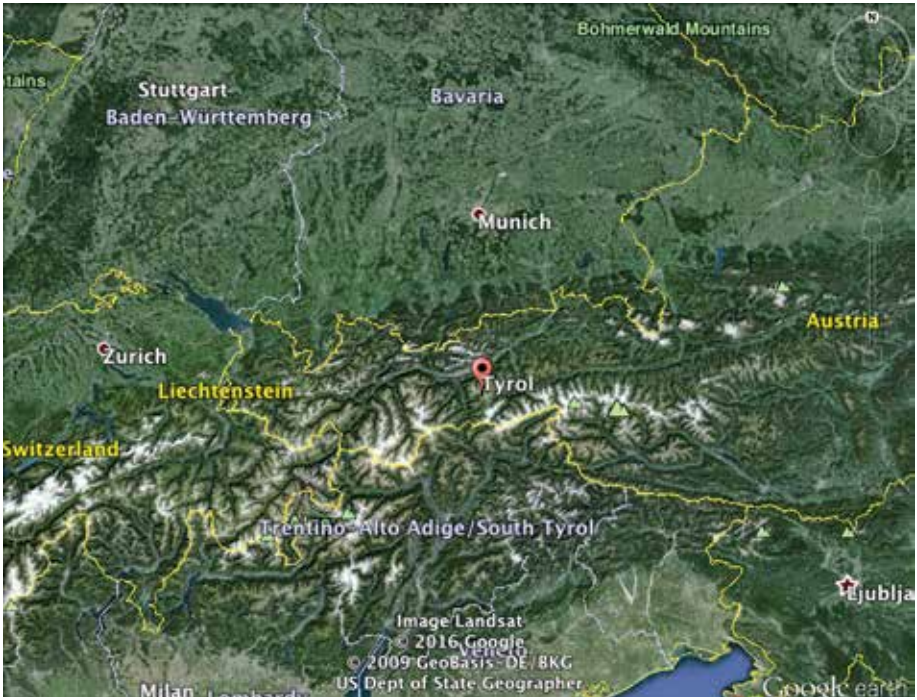
Rhododendron Tourism in Tirol, Austria

Ole Jonny Larsen
Ålesund, Norway

Photos by the author

After several years with holidays at the Mediterranean coasts, my wife and I were ready to make a change. We wanted something more challenging than sun bathing and swimming, and in addition, I thought of a holiday that combined relaxation with studying rhododendrons in the wild in Austria. Both parts of our holiday proved to be enjoyable.

Tirol (also spelled Tyrol) is in the westerly part of Austria, bordering Germany and Italy and is in a central part of the Alp region (see map on next page). Without too



The location of Tirol, a federal state (Bundesland) in western Austria.

much research, we chose a small village called Neustift in Stubeital, a valley south of the more famous town of Innsbruck. The place was beautiful, classic Tirolian houses in the Alp style with flowers in front of the windows, almost clichés. The women serving in restaurants were all dressed in traditional Austrian dresses with short arm sleeves and deep fronts, just as in the tourist brochures. The service was excellent, and everywhere it was clean and tidy. Finally, one does not need special equipment to walk in the Alps at height to see rhododendrons. Ordinary warm clothes, rain gear and good shoes will do. Walking sticks are fine, most hotels have them for rent (often free too) for their guests, and hotel staff and guides speak English very well. Beer and food is also very good!

From the bottom of the valley at 1000 m (3280 ft), there are gondola lifts, which take you up to 1800–2000 m (5900–6560 ft) in just a few minutes. In some valleys, you can have two or three lifts following each other and end up at 3000 m (9840 ft) or more—where you normally find a restaurant selling wiener schnitzel and beer. In Norway where we come from, 1800 m is a high mountain and it takes a long day's walk to reach the top. In Tirol, 1800 m is your starting point in the morning!

Being used to mountains, we found that nature in the Alps has some similarities to our own with steep mountainsides and sharp peaks, but trees growing up to 2000 m (6560 ft) is not something we see at home. One of my biggest wishes for the trip was

to see the alpine ibex (*Capra ibex*), a kind of wild goat where males have massive horns. We did see a few, but unfortunately, they were the much smaller females with kids. Nice, but not that impressive!

I also had two bird species to see on my wish list, alpine chough (*Pyrrochorax graculus*) and white-winged snowfinch (*Montifringilla nivalis*). Rhododendron people are often keen on birds—think of Peter Cox's large group of lepidote hybrids named after birds—and I am no exception. I was happy to see the snowfinch, but the chough was hiding itself this time, giving a good reason to go back.

Rhododendron Species

Goats and birds are OK, but nothing was higher on my wish list than to see the *Rhododendron* species of the Alps region. Since our holiday was in the second week of July, I was skeptical about seeing rhododendrons in flower, but there was no reason to worry. I found both species flowering on our first hike into the mountains. The iconic alpenrose (*R. ferrugineum*) was greeting us just after we left the gondola lift, and its cousin *R. hirsutum*, the hairy alpenrose, we found a little later the same day.

The two species grow in the same area but it is easy to tell them apart:.

R. ferrugineum has a brown lower leaf surface and no hair at the leaf edges while *R. hirsutum* has a green lower leaf surface and hairs along the edge of the leaves. With a little practice, it's easy to tell the species apart.

R. ferrugineum at 2050 m in Stubeital, Tirol.

Translation is “Shortcuts destroy vegetation. Please stay on the paths!”

A large plant of *R. hirsutum.*

R. × *intermedium*, a hybrid between the two species *R. ferrugineum* and *R. hirsutum* growing in nature in Tirol.

Both species were in flower, some even still with buds, especially on north facing slopes. In full sun, most plants had finished flowering. I believe one can see these flowering rhododendrons in Tirol through most of July, depending on exposure and altitude. These species also flower late in my garden at home, especially *R. hirsutum.*

Hybrids

Rhododendron ferrugineum and *R. hirsutum* hybridize quite freely, producing offspring named *R.* × *intermedium,* a very old name (1839). Due to the year of description, this may be one of the first natural rhododendron hybrids known to botanists. The hybrid can backcross with the parents and cross with itself too producing lots of variation from one species to the other. I found one obvious hybrid, easily recognized by having a green lower leaf surface and no hair on its leaf margins—one good diagnostic feature from each parent.

Flower Colour

All plants we saw of *R. ferrugineum* were more or less identical in flower colour, a good deep pink. *R. hirsutum*, on the other hand, had more variation. At home, I grow two forms, a pink and a white flowered one, the latter sometimes called *R. hirsutum* var. *albiflorum.* I used to think that my pink plants were typical in flower colour, but that proved incorrect. I saw *R. hirsutum* in a wide range of pink tones, from nearly white to

Colour variations within *R. hirsutum*.

almost red. I looked for a pure white forms, but in vain. I guess they are more common in gardens than in nature.

Diseases

One should normally not dig up plants in the wild to take home for the garden. It is illegal in Austria, and several countries like my own do not allow the importation of live plants without a phytosanitary health certificate. Signs along the mountains paths and information in hotels tell tourists and trekkers to take care of nature, and as a guest, of course you behave according to that. Small amounts of seeds can be picked though, but in July most of last year's seeds have blown away.

However, there are other good reasons for not taking plants and cuttings than those mentioned above. More or less every plant I saw was infected with some kind of fungal disease. Orange spots on a leaf's lower surface indicate a rust fungus, and a plant or a cutting taken from these plants might infect all susceptible plants in a collection.

Rhododendron-tourism

This may not be a word in traditional dictionaries, but it is a good name for a pleasant activity. There are at least two forms of rhodo-tourism. The easy one is visiting famous gardens and collections, and is literally a walk in the park. More challenging is to go out and

R. ferrugineum with a fungus infection. Note the brown leaf lower surfaces and non-hairy leaf margins.

see rhododendron species in the wild The ultimate rhodo-tourism experience is an expedition to the mountains of China or another Himalayan country, but this is not a trip for everyone. A holiday to Austria, Italy or Switzerland with walks in the Alps on the other hand is something that most people can do. Why not consider having a different holiday next year!

Ole Jonny Larsen is the chairman (president) of the Norwegian Rhododendron Society.

The Beginning of Vireya Culture in Europe with Special Consideration of James Veitch & Sons Nurseries in Chelsea - Part 1

Martin Monthofer
Bremen, Germany

Messers. James Veitch & Sons Nurseries in Chelsea, London, was the first nursery in the 19th century that brought vireyas successfully into cultivation. From a small number of species they grew a large number of hybrids. Their species were collected by the plant hunters Thomas Lobb and Charles Curtis, who worked for the Veitch nurseries. The following species were introduced into cultivation from 1822 in England: *Rhododendron brookeanum* (Fig. 1)*, R. javanicum, R. jasminiflorum, R. longifolium, R. malayanum, R. multicolour* (Fig. 2)*,* and *R. teysmannii* . With successful cultivation, the breeders recognised the potential of these plants and so they started a hybridisation programme. There are different records of the total number of hybrids produced, but it was suggested to be likely over 500. This magical number "500" has piqued my interest over the years, as I asked myself "How was it possible to produce this large amount of hybrids under the cultural conditions of the 19th century?" Was there a market for them and why are they now lost to culture? Only eight of their hybrids have survived through the years until today: 'Clorinda', 'Princess Alexandra', 'Princess Royal', 'Pink Delight' (Fig. 3), 'Sybil' (Fig. 4), 'Souvenir de J. H. Mangles' (Fig. 5), 'Taylori' and 'Triumphans'.

Vireyas were very popular in greenhouse culture at the end of the 19th century. However, at that time there were also newly discovered and cultivated orchid species and new orchid hybrids, and soon these became more popular for culture than vireyas. There were also newly introduced, hardy rhododendrons from the Himalayan regions that also had spectacular colours and leaves, so that there was then no need for all lovers of "exotic" plants to have a greenhouse.

Fig. 1. *R. brookeanum*. From *Bot. Mag. 82 (ser.3v.12)1856-Tab.4935.*

Chris Callard archived an article (Veitch 1906) on his web page (http://www.vireya.net/archive.htm) about the so called "Greenhouse Rhododendrons," "Indo-Javanicums," "Javanicums" or "Jasminiflorum-Javanicums," as vireyas were called at that time. That article listsed some hybrids with their parents, year of breeding and flower colour, which was a good starting point for my own inquiries about the Veitch nurseries and their rhododendrons.

Let me start with a short historical overview of the Veitch Nurseries' history, which began in 1771 and ended in 1914 in Chelsea, England. The last nursery propagation fields in Exeter and the last seed store in London were both closed in 1969.

1771: the 19-year-old Scottish gardener John Veitch moved to Devon on an assignment to plan a park at Killerton near Exeter, with the result that he became recognised as a dedicated gardener, and his subsequent work took him throughout England.

1800: Sir Thomas Acland encouraged John Veitch to open a nursery of his own,

which he did at Budlake, close to Killerton.

From 1830 on, the Veitch nurseries took part in flower shows, and in later times, these shows become a special part in the daily business of Veitch nurseries .

1832: John Veitch and his son James bought 2400 m^2 (0.6 acres) of land at Mt. Radford in Exeter, which became the location of several nurseries, plant and seed shops.

1836: They bought another 1400 m^2 (0.35 acres) of land.

1837: John Veitch gave the business to his son James, an enthusiastic "plantaholic" who was always looking for new plants for the British market. He was the first to send plant hunters out to bring back new and rare plants. These plant hunters were the heroes of their time, and almost 23 plant hunters worked for John Veitch over 72 years. Some names are well known like Thomas and William Lobb, Charles Maries, Richard Pierce, Ernest Wilson, Charles H. Curtis, and Frederick Burbidge. They found plants while risking their lives in some of the then most forgotten and unknown places in the world. The members of the Veitch family were also plant hunters, and there are several plants named after them, such as *Abies veitchii, Davallia veitchii, Nepenthes veitchii, and Rhododendron veitchianum.*

Fig. 2. *R. multicolor Curt. Bot. Mag.* 110 ser.3, vol. 40 t.6769 1884.

1838: They bought 1100 m^2 (0.27 acres) of land.

1839: They bought 3300 m^2 (0.82 acres) of land.

1853: James and his son James Jr. saw the need to expand, resulting in a nursery in Chelsea (Figs. 6-8), which was given to James Jr. for its daily business while his father worked in Exeter. The Chelsea nursery was very important in the new plant introductions of the Veitch Nurseries. It was also important for scientists like Charles Darwin, who studied orchids there.

1863: James Senior died, and the business was divided into two. James Jr. worked in Chelsea and ran the business under the name James Veitch & Sons Nurseries, while his younger brother Robert ran the business in Exeter. James Jr. was supported by his sons, John Gould and Harry James.

1868: James Herbert Veitch was the son of John Gould (1839-1870) and his wife Jane Hodge. His father died shortly after his birth, so the daily business was taken over by his uncle Harry. James attended Crawford College in Maidenhead and took special technical education in both Germany and France.

1880: Robert now ran the business with his son Peter C.M. in Exeter. Peter also received his horticultural education in both Germany and France.

1882: The Veitch Nurseries ran an advertisement that 16 of their "Javanicums" got First Class Certificates (FCCs) from the Royal Horticultural Society (RHS). Order waiting lists for these plants were extremely long.

1885: Robert died and Peter C.M. now ran the daily business in Exeter.

Fig. 3. 'Pink Delight'. Photo by Chris Callard.

Fig. 4. 'Sybil'. Photo by Martin Monthofer.

Fig. 5. 'Souvenir de J.H. Mangles. Photo by Richard Currie.

Fig. 6. Greenhouses at the Royal Exotic Nursery at Chelsea.

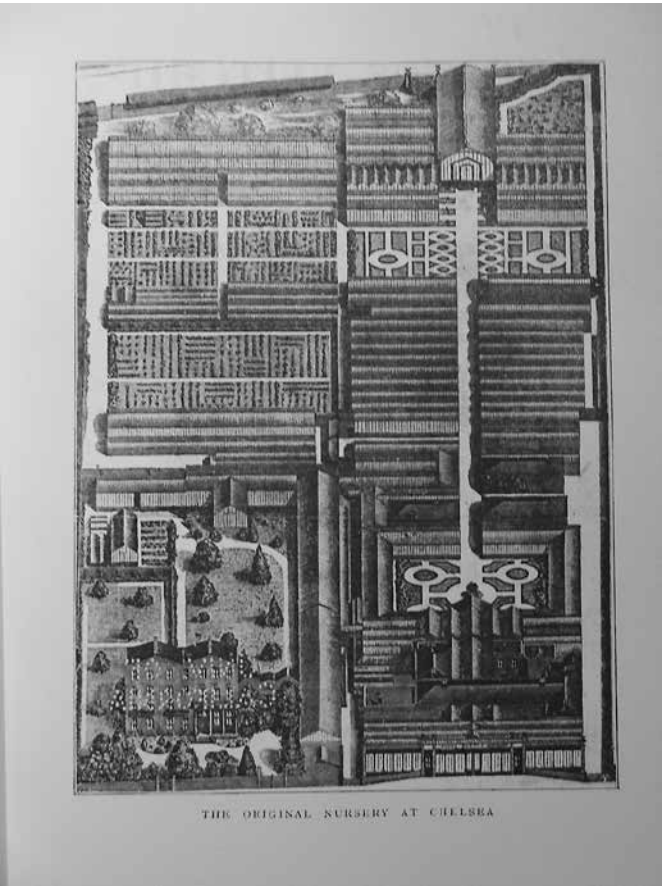


Fig. 7. An aerial view of the Royal Exotic Nursery at Chelsea.

James Herbert started work in Chelsea.

1889: James Herbert became a member of the Linnean Society.

1891: In October, James Herbert traveled to the greatest botanical gardens, parks and private horticultural institutions known to him in Calcutta, Ceylon, Penang, Singapore, Johore, Buitenzorg, Japan, Korea, Australia, and New Zealand to find new and rare plants worthy of culture for the Veitch Nurseries.

1893: James Herbert returned to England.

1897: The Veitch Nurseries were able to show plant species and hybrids in flower through the whole year. They were also able to show flowering "Javanicum Hybrids" at the monthly meetings of the RHS.

1898: The business James Veitch & Sons was organised into a limited company and James Herbert Veitch became a director.

1899: James Herbert sent Ernest Wilson to China to search for plants for British gardens, especially for seed of *Davidia*. During his travels he found many plants, including *Davidia,* and collected seed that was sent

to England. On his return, he found several thousands of his seedlings in the nursery at Coombe Wood.

The daily business became too hard for James Herbert, and he suffered a nervous breakdown and retired from business. He became eccentric, and offended some of the regular customers.

1901: In *The Gardener's Chronicle,* Jan. 5th, 1901, a summary of the previous century was published:

Fig. 8. The main entrance, depot and offices at the Royal Exotic Nursery at Chelsea.

> The introduction of the Rhododendron javanicums in 1847 gave the introducers Messrs. James Veitch & Sons an opportunity to employ it for the purposes of hybridisation and there has resulted a race of greenhouse Rhododendrons double and single-flowered, that bloom during the autumn and winter as well as in spring and summer, of brilliant and varied colours producing large bold trusses of bloom. They gleam forth amid the murky days of mid-winter with brilliance peculiarly their own.

1906: James Herbert and members of the family write the great book *Hortus Veitchii* about the history of the company, their plant hunters, and their introductions, with illustrated portraits, and also about the work of their nurseries in Exeter and Chelsea from 1840 until 1906. The botanical nomenclature was written by the Director of the Botanical Garden Kew, George Nicholson, and there were descriptions of nearly 1500 new introductions. These were limited editions that were not sold, but were rather given as presents to universities, bookstores, botanists and special private customers. These editions are very rare today, and if they are on the market, they command prices of about 1000 GBP ($US 1510).

1907: James Herbert died in November at 39. John, his brother, took over the business, but he was not successful and so Harry James came back to run the business.

1912: Harry became a Lord, Sir Harry James Veitch. The Veitch Nursery introduced around 1350 new or unknown plant species before the begining of WW I: 498 greenhouse plants; 232 orchids; 153 trees, shrubs and climbers; 122 perennials; 118 exotic ferns; 72 evergreens and climbers; 49 conifers; 37 bulbs; 24 fruit and 44 vegetable hybrids, excluding several begonia, *Hippeastrum* (incorrectly known as amaryllis, which was an older name), vireya and *Streptocarpus* hybrids.

1914: The nursery at Chelsea was closed, while the daily business in Exeter was still run by Peter C.M.and later by his daughter Mildred. John died in October at 45. Sir

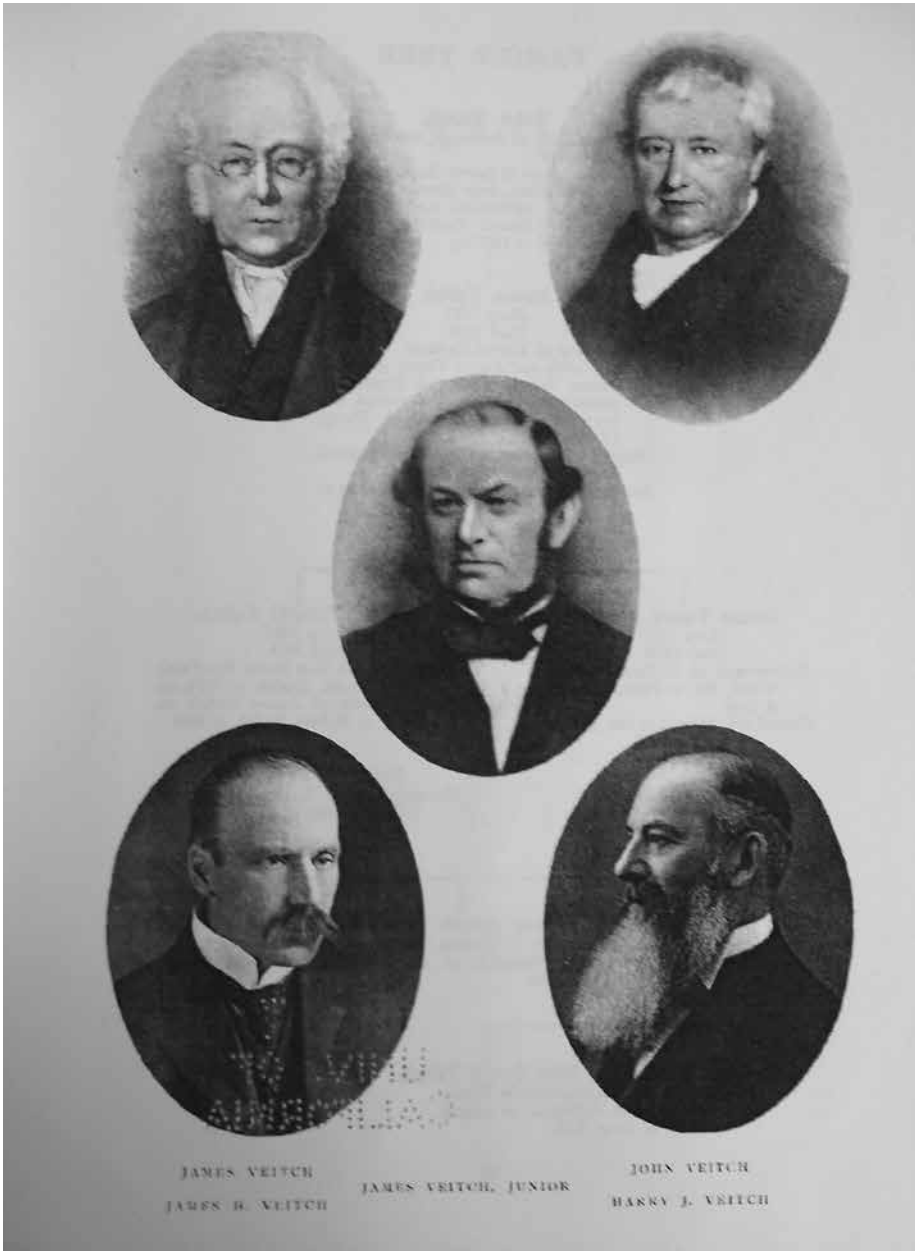


Fig. 9. The Veitchs.

Harry James closed the James Veitch & Sons Nursery in Chelsea and all plants were sold. Most of the rare trees and shrubs were planted at the Royal Botanic Garden Kew. Images of the Veitchs are shown in Fig. 9.

There was a great overview about the Veitch Nursery in Chelsea in *The Garden and Forest,* April 16th, 1890:

> The Chelsea Nursery is only five and a half acres in extent, but it is almost wholly covered by 110 glass houses, many of them large. The entrance is through a long, lofty glass corridor banked with Ferns, Palms and other foliage plants, the whole of the roof being covered with red and white Lapagerias. On the right is the suite of offices, where a staff of twenty clerks is employed. On the left of the corridor are the large seed and bulb warehouses, an enormous business being done in this department. The corridor is terminated by a high house in which a collection of Tree Ferns, Cycads and large Palms are kept. From this the visitor may turn to the left and walk through house after house filled with Araucaria excelsa, Ferns of every sort, large Todeas and other filmy froned kinds, big and little. Adeantums, Davallias, Aspleniums and in smaller houses all sorts of secrets in the shape of new kinds, which one may look at but not write about.
>
> There are 25 orchid houses. There are sixteen rows of four-inch pipes in these houses which are heated by a trentham-bioler. The Nepenthes house is fifty feet long and contains a magnificent display of pitchers, Messrs. Veitch having been exceptionally successful in the cultivation of these plants from the first. The specimen greenhouse Rhododendrons fill three houses, whilst in smaller and propagating houses there are hundreds of thousands of these plants, from the tiny seedlings just hatched to the latest flowered of the new hybrids. The first hybrids were raised at Exeter some thirty-five years ago, but the best of those now known have been obtained since 1877. Another propagating house is filled with seedlings of all kinds: Clivias, Streptocarpus, Begonias, Cacti, Rhododendrons, inclusive those wondereful Yunnan species. The introduction of which unless report and dried specimen speak falsely, is an event of more than ordinary importance.
>
> Hippeastrums filled a house 65 feet x 18 feet and the 2000 spikes they now bear present a wondrous array of brilliant colours and huge flowers. A pretty conservatory always filled with the flowers of the season is useful as a kind of sample-room. Parallel with it is a group of 10 houses placed side by side; opposite to them on the other side of the central path, being a similar group. Ten of these long, low houses are filled with healthy young stock of hard wooded plants such as boromias, Aphelexis, Eriostemones, ericas, correas, Epacris, climbers of all kinds, young Azaleas, and so on.
>
> The other ten of these useful structures contain stove plants of all kinds. A palm-house crammed with larger specimen kentias, cocoses and other decorative kinds, then follow three large houses of camellias; another is filled with specimen Aralias; five others are devoted to the growing pot-vines (they produce 4500 each year). A corridor leading to the high road contains magnificent specimen of Camellias, all in flower. The propagation houses full with myriads of baby plants of every kind. About a dozen long houses contain soft-wooded plants such as Bouvardias, pelargoniums, Fuchsias, Cyclamens, carnations, etc. Then there are frames innummerable, beds filled

with carnations, which grow well at Chelsea in spite of the poison of its fogs and smoke.

The keep of this nursery is most admirable: "a place for everything and everything in its place" is the motto here. Messrs. Veitch has also branch nurseries at Slough near Windsor, Fulham, Chiswick and Coombe.

As mentioned before, there were several plant hunters who worked for the Veitch Nurseries, but if you look only at vireyas, these were mostly found by Thomas Lobb (1818-1894) and Charles H. Curtis (1869-1958). Lobb collected material on several journeys tp Singapore, Java, India, Malaysia, Borneo, and the Philippines between 1843 and 1860. The following species were introduced by him: *R. brookeanum* (Fig. 1)*, R. jasminiflorum, R. javanicum* and *R. lobbii* (now recognised as *R. longiflorum* var. *longiflorum).* Curtis collected the following vireyas in Malaysia from 1882-1883; in Borneo together with David Burke, and in Sumatra, Java and the Moluccas between 1880 and 1884: *R. multicolour* (Fig. 2)*, R. multicolor* var. *curtisii* (now recognised *as R. multicolour)* and *R. teysmannii* (now recognised as *R. javanicum* var. *teysmannii*).

Here is a short description of the collected species, which can be called the parents of all the Veitchian hybrids:

1) *R. jasminiflorum Hook.*: First mentioned and illustrated in 1850 in *Bot. Mag.* T.4525. This species was cultivated from seed, which was collected by Thomas Lobb in 1845.

2) *R. javanicum (Blume) Benn.:* First described by Thomas Lobb in 1845. It was illustrated in the *Curtis Botanical Magazine* in 1847 and was marked as the most delicate introduced into gardens, because of its orange colour, which was a sensation at this time.

3) *R. javanicum* ssp. *brookeanum* (Low ex Lindl.) Argent (now recognised as *R. brookeanum* var. *brookeanum*): This was mentioned in the *Journal of the Horticultural Society* London in 1848 as *R. brookeanum*, but it first came into cultivation by Thomas Lobb in 1850. There was a flowering plant from the Veitch Nursery at an exhibition in London in 1855.

4) *R. javanicum* subsp. *gracile* (Lindl.) Argent (now recognised as *R. brookeanum* subsp. *gracile*): First described in the *Journal of the Royal Horticultural Society* London in 1848 as *R. gracile*. This subspecies comprises all small leaved forms of *R. javanicum,* some of which are possibly forms of *R. javanicum* subsp. *brookeanum.*

5) *R. javanicum* var. *teysmannii* (Miq.) Argent: First described in Fl. Ind. Bat. Suppl. as *R. teysmannii*. Charles H. Curtis collected it in 1880.

6) *R. multicolor* Miq.: First described in *Fl. Ind. Bat. Suppl.* in 1860. The form var. *curtisii* was described in Hort. Garden in 1884. Charles H. Curtis collected it in Sumatra and it first flowered at the nursery on November 2nd, 1883. This plant was taken to Kew, where it was illustrated in the *Curtis Botanical Magazine* (Hooker 1884).

7) *R. longiflorum* Lindl.: described as *R. tubiflorum* Low ex Lindl. in the *Journal of the Horticultural Society* London in 1848. Veitch listed this species as *R. lobbii* in his catalog

Fig. 10. 'Balsaminaeflorum Album'.

Fig. 11. 'Hippolyta', 'Virgil' and 'Rosy Morn'. *The Garden* 1892, Vol. 42 pp.164

in 1870. It was introduced into cultivation in 1860.

8) *R. malayanum Jack*: The first vireya described in *Mal. Misc.* in 1822.

The three Johns, John Dominy, John Seden and John Heal, were the most important plant breeders who worked for the Veitch Nurseries. George Taylor worked for Veitch until 1882 and was the one who started the so-called "Greenhouse Rhododendron" breeding programme and who raised several wonderful hybrids.

John Heal (1841-1925) continued the work of George Taylor after 1882. He came from Barnstaple and worked at Coombe Wood. He moved to Chelsea to take care of the fern collection, which was growing constantly because of new introductions sent by Thomas Lobb . Later, he also did fantastic work breeding bulb begonias and produced the hybrids 'Elatior', 'Emperor', and 'Queen of the Whites'. Heal also worked with the existing rhododendron breeding programme and produced a large range of excellent forms, which were spectacular in colour, form and flower size.

James Herbert Veitch wrote in the Hortus Veitchii:

> ...good work has also been done with the greenhouse Rhododendrons, the fine and modern varieties being derived from some seven species, natives of Java, Malaya and adjacent islands, most of them introduced through Messrs. Veitch's travellers Thomas Lobb and Curtis.

Fig. 12. 'Luteoroseum', 'Primrose' and 'Jasminiflorum Carminatum'. *The Garden* 1892, Vol. 42 pp.164

Fig. 13. 'Ne Plus Ultra'.

Heal received the Veitch Memorial Medal in 1892 and the Victoria Medal of Honour in 1897 for his breedings.

John Dominy moved from Luscombe, Pince & Co. to the Veitch Nursery in 1834, and worked there until he retired in 1880. He was an expert in special breeding techniques and orchids, and a magazine even claimed that he was more successful in pollination than insects.

John Seden came to Exeter because James Veitch needed a specialist for orchids, where he was trained by John Dominy. He came back to Chelsea in 1861 and worked there in the orchid breeding programme. When James Veitch Sr. died, John Dominy also came to Chelsea, where he worked with John Seden in plant breeding and greenhouse technology development. John Seden received the Victoria Medal of Honour in 1897.

The Victoria Medal of Honour is awarded to British horticulturists resident in the United Kingdom whom the Royal Horticultural Society Council considers deserving of special honour by the society, Other well known people who received this medal have been Isaac Bayley Balfour, Frederick William Burbidge, John Heal, Joseph Dalton Hooker, Gertrude Jekyll, and Frederick Sander. Other well known personalities who have received it were Harry Veitch, Peter Veitch, George Forrest, Queen Elizabeth the Queen Mother, Beth Chatto, Roy Lancaster, David Austin, Christopher Grey-Wilson,

and HRH the Prince of Wales.

The Veitch Memorial Medal was awarded to persons who had a special contribution to the scientific and practical forthcoming in horticulture, including Ernest Wilson, George Forrest, Frank Kingdon-Ward, and others.

The main results of my research on the Vetchian hybrids produced and raised indicate that the previous number of 200 or 500 is no longer tenable! Literature listings are vague, such as "a large number, many, or several." J. G. Millais (1917) wrote that "nearly 200" were known in 1917. The same number was reported by Bowers (1936). C. Bonstedt (1932) wrote in Allendorff's Kulturpraxis that there were nearly 200 hybrids known until 1927. The larger number of 500 was noted by Clyde Smith (1989). He also wrote that while the catalog of the Veitch Nursery listed 50 hybrids in 1893, there were actually only 42 hybrids listed. However, in the older catalogue, the names were printed in bold letters so species and hybrids looked the same; there were actually 42 hybrids and 8 species. From the main catalog, only *R. lobbii* was listed in 1870, with no hybrids. In 1880, there were the following new introductions listed: 'Duchess of Edinburgh', 'Duchess of Teck', 'Prince Leopold' and 'Taylori'. In 1888, there were seven hybrids listed, in 1890 26, in 1891 34, in 1893 42, in 1905 42 and in 1907, only two, the new introductions 'King Edward VII' and 'The Queen'. There were only hardy rhododendron species and hybrids listed in the 1913/14 catalog.

I found only 120 registered hybrids in my two years of searching, mainly in Leach (1961), which are listed below:

'Acidalia': 'Amabile' × *R. teysmannii* (1891), very pale primrose.

'Acis': 'Duchess of Edinburgh' × 'Princess Alexandra' (1891), salmon.

'Ajax': 'Crown Princess of Germany' × *R. javanicum* (1886, A.M. 1890), yellow to red orange.

'Amabile': *R. javanicum* × 'Princess Alexandra' (pre 1886), pink yellow to salmon.

'Ambient': R. javanicum × 'Princess Alexandra' (1891), pinkish yellow to salmon.

'Aphrodite': 'Princess Alexandra' × *R. javanicum* (1888), red to pink, flushed white.

'Apollo': 'Crown Princess of Germany' × *R. javanicum* (1885), strong orange red.

'Ariel': 'Lord Wolseley' × 'Indo-Javanicum' (A.M. 1893), clear yellow.

'Artemis': 'Ophelia' × *R. teysmannii* (1891), primrose yellow.

'Aspasia': 'Maiden's Blush' × *R. teysmannii* (A.M. 1889), pure yellow.

'Aurora': 'Crown Princess of Germany' × *R. javanicum* (1882), yellow to red and orange.

'Balsaminaeflorum Album': parentage unknown (pre1882, FCC 1882), white double flowers. (Fig. 10)

'Balsaminaeflorum Aureum': parentage unknown (pre 1882, FCC 1882), yellow double flowers.

'Balsaminaeflorum Carneum': parentage unknown (pre 1887, FCC 1887), pink double flowers.

'Balsaminaeflorum Rajah': parentage unknown (pre 1886, FCC 1886), yellow with pink double flowers.

'Balsaminaeflorum Roseum': parentage unknown (1893), rosepink double flowers.

'Baroness Henry Schroeder': *R. javanicum* × 'Princess Royal' (FCC 1883), white with strong rose pink.

'Boule d'Or': 'Lord Wolseley' × *R. teysmannii* (1891), yellow.

'Brilliant': 'Duchess of Edinburgh' × *R. javanicum* (FCC 1883), crimson.

'Brunette': *R. javanicum* × 'Princess Frederica' (1891), yellow to yellow-orange.

'Cardinale': 'Duchess of Edinburgh' × *R. javanicum* (FCC 1885), scarlet crimson.

'Ceres': *R. javanicum* × *R. teysmannii* (1888), bright tawny yellow.

×'Clorinda': 'Jasminiflorum Carminatum' × 'Minerva' (A.M. 1912), dull rose pink.

'Cloth of Gold': *R. teysmannii* × 'Lord Wolseley' (A.M. 1896), pale golden yellow.

'Conqueror': 'Duchess of Connaught' × *R. javanicum* (FCC 1884), vermillon red shaded orange.

'Crown Princess of Germany': *R. brookeanum* subsp. *gracile* × 'Princess Royal' (1891), yellow.

'Czarina': 'Princess Royal' × *R. teysmannii* (1891), pale pinky yellow to orange.

'Dante': 'Crown Princess of Germany' × *R. javanicum* (1891), yellow to red orange.

'Diadem': 'Duchess of Edinburgh' × *R. javanicum* (1883, FCC 1896), pink, dwarf, or scarlet crimson.

'Duchess of Connaught': *R. brookeanum* subsp. *gracile* × *R. lobbii* (FCC 1881), bright scarlet crimson.

'Duchess of Edinburgh': *R. brookeanum* subsp. *gracile* × *R. lobbii* (FCC 1874), light crimson, lighter center.

'Duchess of Fife': 'Princess Royal' × *R. teysmannii* (1889, A.M. 1889), large, cream colour with pale red flush.

'Duchess of Portland': *R. jasminiflorum* × 'Princess Royal' (1906), colour unknown.

'Duchess of Teck': 'Princess Royal' × *R. brookeanum* subsp. *gracile* (FCC 1879), primrose yellow to pale yellow tinted pink.

'Duke of Connaught': parentage unknown (1883), bright vermillion.

'Duke of Teck': *R. brookeanum* subsp. *gracile* × 'Princess Royal' (pre 1900), rosy lilac.

'Empress': 'Crown Princess of Germany' × *R. javanicum* (FCC 1884), yellow to red orange.

'Ensign': *R. multicolor* × unknown (1899), salmon red tinged scarlet.

'Eos': 'Monarch' × *R. malayanum* (1896), carmine to scarlet.

'E× celsior': *R. javanicum* × 'Princess Royal' (1888), salmon.

'Exquisite': *R. javanicum* × *R. teysmannii* (A.M. 1899), light fawn yellow with prominent tint? rose to pink center.

'Favourite': *R. javanicum* × 'Princess Alexandra' (FCC 1882), light satiny rose, white tube.

'Flame': *R. javanicum* × unknown (FCC 1931), bright orange scarlet.

'Garnet': 'Ne Plus Ultra' × 'Ruby' (A.M. 1925), blood red.

'Gloria Mundi': 'Crown Princess of Germany' × *R. javanicum* (1888), yellow to red orange.

'Hercules': *R. javanicum* × unknown (pre 1890), fawn yellow tinted with rose pink.

'Hippolyta': *R. multicolor* var. *curtisii* × 'Queen of the Yellows' (FCC 1888), scarlet. (Fig. 11)

'Imogene': 'Taylori' × *R. teysmannii* (FCC 1888), pale yellow.

'Incarnatum Floribundum': 'Maiden's Blush' × 'Prince Leopold' (FCC 1885), rosy salmon.

'Indian Yellow': 'Crown Princess of Germany' × *R. javanicum* (1885), orange red.

'Indicojavanicum': 'Lord Wolseley' × *R. simsii* 'Stella' (FCC 1889), orange red.

'Jasminiflorum Carminatum': *R. jasminiflorum* × *R. javanicum* (pre 1881, FCC 1886), strong red (Fig. 12).

'Jasminiflorum Superbum': *R. jasminiflorum* × *R. lobbii* (1862, FCC 1876), white.

'Juliet': 'Taylori' × *R. teysmannii* (1891), primrose yellow.

'King Edward VII': *R. javanicum* × *R. teysmannii* (A.M. 1901), strong yellow.

'La Belle': parentage unknown (1888), colour unknown.

'Latona': 'Princess Beatrice' × *R. multicolor* yellow form (pre 1897), pure creme yellow.

'Little Beauty': *R. malayanum* × 'Monarch' (A.M. 1896), strong red, cerise, or scarlet crimson.

'Lord Wolseley': 'Duchess of Teck' × *R. javanicum* (1886), red orange.

'Luteoroseum': *R. javanicum* × 'Princess Alexandra' (FCC 1886), satiny rose suffused with white, the center light yellow. (Fig. 12)

'Maiden's Blush': *R. brookeanum* subsp. *gracile* × 'Princess Alexandra' (FCC 1876), creme and pink.

'Militare': 'Duchess of Edinburgh' × *R. javanicum* (FCC 1885), scarlet to crimson.

'Minerva': *R. javanicum* × 'Princess Alexandra' (pre 1865, FCC 1885), light rose, spotted orange yellow.

'Monarch': 'Duchess of Edinburgh' × 'Princess Alexandra' (FCC 1882), yellow orange.

'Mrs Heal': *R. multicolor* × 'Princess Beatrice' (FCC 1894), white with a soft pinky flush.

'Ne Plus Ultra': *R. javanicum* × 'Duchess of Edinburgh' (1892, FCC 1923), crimson. (Fig. 13)

'Neptune': 'Minerva' × *R. multicolor* var. *curtisii* (pre 1891, FCC 1892), scarlet.

'Nestor': parentage unknown (year unknown), buff tinted rose.

'Nobilius': *R. javanicum* × *R. teysmannii* (A.M. 1896), strong golden yellow.

'Numa': *R. multicolor* × 'Indicojavanicum' (A.M. 1895), very strong orange.

'Nyssa': *R. multicolor* × unknown (year unknown), light orange yellow, flushed light rose with light yellow throat.

'Ophelia': *R. javanicum* × 'Princess Alexandra' (pre 1875), creme buff with light pink mauve.

'Pearl': 'Princess Royal' × *R. griffithianum* (FCC 1885), white.

'Pink Delight': parentage unknown (pre 1900), strong pink..

'Pink Perfection': 'Duchess of Edinburgh' × 'Princess Alexandra' (pre 1891), light pink.

'Pink Seedling': parentage unknown (pre 1900), soft pink.

'Portia': 'Taylori' × *R. teysmannii* (1891), primrose yellow.

'President': 'Crown Princess of Germany' × *R. javanicum* (FCC 1884, A.M. 1886), yellow buff flushed with rose.

'Primrose': *R. teysmannii* × 'Maiden's Blush' (1888), primrose yellow (Fig. 12).

'Prince Leopold': *R. brookeanum* subsp. *gracile* × *R. lobbii* (FCC 1876), red orange.

'Prince of Wales': 'Princess Royal' × *R. lobbii* (1875), crimson scarlet red.

'Princess Alexandra': *R. jasminiflorum* × 'Princess Royal' (FCC 1865), white fragrant.

'Princess Alice': parentage unknown (year unknown), white with pink shade, light sweetly scented.

'Princess Beatrice': 'Duchess of Edinburgh' × 'Princess Alexandra' (1884), light yellow flushed pink.

'Princess Christian': *R. javanicum* × 'Princess Frederica' (FCC 1883), yellow.

'Princess Frederica': *R. brookeanum* subsp. *gracile* × 'Princess Royal' (1891), yellow.

'Princess Helena': *R. jasminiflorum* × *R. javanicum* (FCC 1865), pink.

'Princess Royal': *R. jasminiflorum* × *R. javanicum* (1850), pale pink with yellow shading on the interior.

'Princess Tyra': 'Princess Helena' × *R. brookeanum* subsp. gracile (1875) pale rose

'Purity': 'Taylori' × *R. teysmannii* (FCC 1888) white

'Queen of Denmark': 'Princess Helena' × *R. brookeanum* subsp. *gracile* (1875), orange crimson with yellow throat.

'Queen of the Roses': *R. javanicum* × 'Princess Alexandra' (1891), pinkish yellow to salmon.

'Queen of the Yellows': *R. javanicum* × 'Princess Frederica' (FCC 1886), yellow to yellow orange.

'Queen of the Yellows': *R. multicolor* var. *curtisii* × *R. teysmannii* (1888), pale yellow.

'Queen Victoria': *R. brookeanum* subsp. *gracile* × *lobbii* (1891), yellow orange, primrose yellow to pale salmon.

'Queen': 'Amabile' × *R. teysmannii* (1891), very pale primrose yellow.

'Red Prince': parentage unknown (year unknown), strong clear pink.

'Relatant': 'Princess Alexandra' × *R. multicolor* var. *curtisii* (year unknown), strong red.

'Rose Perfection': *R. javanicum* × 'Princess Alexandra' (FCC 1886), rose pink.

'Rose': *R. javanicum* × 'Princess Alexandra' (1891), pinkish yellow to salmon.

'Rosy Morn': *R. multicolor* × unknown (pre 1891), soft rose pink (Fig. 11).

'Ruby': 'Jasminiflorum Carminatum' × *R. multicolor* var. *curtisii* (FCC 1888), dark coral red, crimson.

'Scarlet Crimson': parentage unknown (1888), orange scarlet.

'Scarlet Crown': 'Duchess of Edinburgh' × *R. javanicum* (FCC 1883), scarlet with strong red.

'Sir B. Seymour': parentage unknown (1882), colour unknown.

'Sir Garnet Wolseley': parentage unknown (1882), colour unknown.

'Sir George Holford': *R. javanicum* hybrid (A.M. 1930), orange yellow with red shadings on the lobes.

'Souvenir de J. H. Mangles': 'Crown Princess of Germany' × *R. javanicum* (FCC 1888), orange yellow suffused with rose pink. (Fig. 5)

'Star of India': 'Crown Princess of Germany' × *R. javanicum* (1891), yellow to red orange.

'Sybil': *R. javanicum* × unknown (pre 1894, exhibited by Rothschild in 1938), rose pink, suffused white. (Fig 4)

'Taylori': *R. brookeanum* subsp. *gracile* × 'Princess Alexandra' (pre 1877, FCC 1877), light pink with white throat.

'Thalia': *R. javanicum* × 'Princess Royal' (1891) yellow white changing into creme pink

'The Queen': 'Amabile' × *R. teysmannii* (pre 1891) clear white whith creme center

'Thetis': *R. javanicum* × 'Princess Frederica' (FCC 1887) yellow to yellow orange

'Thomas Moore': parentage unknown (1883) colour unknown

'Triton': *R. javanicum* × *R. multicolor* (A.M. 1900) salmon rose with yellow throat

'Triumphans': 'Duchess of Edinburgh' × *R. javanicum* (pre 1871) scarlet to crimson

'Virgil': 'Duchess of Edinburgh' × 'Princess Alexandra' (A.M. 1889) strong creme yellow (Fig. 11).

'Yellow Gem': 'Indicojavanicum' × unknown (A.M. 1893) strong yellow

'Yellow Perfection': 'Lord Wolseley' × *R. teysmannii* (FCC 1888) pure yellow

The hybrids listed above are the product of crosses and back-crosses to the fourth generation, which resulted in a variable mixture of their parent's characteristics. There is a rule that still applies today— you get more brillant colours in hybridisation when you include species from time to time.

The 'Balsaminaeflorum' varieties were produced by self-pollination of one flower with petaloid stamens. From this self-pollination came single, semi-double and double flowers, with the double-flowered varieties sterile.

From the above 120 hybrids, only eight are still cultivated: 'Clorinda', 'Ne Plus Ultra' (Fig. 13), 'Pink Delight' (Fig. 3)', 'Princess Alexandra', 'Souvenir de J. H. Mangles' (Fig. 5), 'Taylori' and 'Triumphans'. These hybrids are not very often used in hybridisation today, but they have been used as follows: 'Clorinda' 4x, 'Ne Plus Ultra' once, .'Pink Delight' 19x, 'Princess Alexandra' 6x, 'Souvenir de J. H. Mangles' 2x, 'Taylori' 3x, and 'Triumphans' 7x.

It is interessting to note that between 1851-1914, the active time of the Veitch Nurseries, 84 new *Rhododendron* species were found and described that were not used for hybridisation, because they didn't find their way into cultivation. Some of these were *R. hellwigii* 1892*, R. herzogii* 1892*, R. konori* 1878*, R. lowii* 1852*, R. macgregoriae* 1891, and *R. zoelleri* 1892. I don't believe Veitch cultivated these new described species, as there are no hybrids associated with these species from them.

The hybrids listed above drew interest on the European continent. A horticultural magazine in Austria, the *Wiener Illustrirte Garten-Zeitung,* stated in 1886 on p. 424 that "Rhododendron 'Lord Wolseley' is one of the most beautiful hybrids."

In its Aug.-Sept. issue of 1887, it stated:

> ...these wonderful and spectacular hybrids are not exhibited in German-speaking countries, they are more popular in England, Belgium and Austria" and "...it would be great if larger nurseries could bring these Rhododendron into cultivation, because they are only sold by the nursery James Veitch & Sons in Chelsea.

There were three nurseries in Belgium that exhibited the so-called "Greenhouse Rhododendrons" in 1888: Joseph Napoleon Baumann, Bernard Spae and Arthur de Smet. They were also known as Sweet-scented Rhododendrons in Belgium. They were cultivated together with *Rhododendron* section *Maddenia.* Two of these hybrids were 'Prince Leopold' and 'Princess Alexandra', along with the species *R. jasminiflorum.*

The earliest report of vireyas in Germany is from 1852.

> James Booth und Söhne of the Flottbeeker Baumschulen exhibited *R. javanicum* at the plant, flower and vegetable exhibition of the Garten- und Blumenbau- Verein für Hamburg, Altona und deren Umgegenden on June 28th and 29th, 1852.

T.J. Seidel wrote in March 1879:

> … an interesting new field of hybridisation are the crosses of the well-formed and large-flowered Himalayan Rhododendrons with their so-called hardy hybrids, which recently gain more interest in Belgium and England. The reason why these hybrids were not used very often before, might be […] that varieties not hardy enough without winter protection were not considered worthy of cultivation. The most common varieties of these species mostly originate from *Rhododendron Edgeworthii, jasminiflorum, Dalhousianum, Ginsoni* and *ciliatum*. Out of these came the following: 'Comet', 'Sesterianum', 'Suave', 'Princess Royal', 'Countess of

Haddington' and some others which are beautiful, but since they aren't crosses with hardy species they will not show their characteristics…

Rand (1876) wrote in the USA:

> ...this culture has as yet, however, received but little attention: we find few plants grown in greenhouses, but usually they are neglected and in bad condition. To grow Rhododendrons well, they should have a house to themselves; and with such culture the result would be the production of glorious masses of flowers during the early spring months: we know of no house of this kind, but one could be readily consructed at small expense.

He listed 'Prince of Wales and 'Princess Helena' as examples. These rhododendrons were more popular and widespread in England. There is an advertisement of E.G. HENDERSON & SON, PINE-APPLE NURSERY, London, in The Gardener's Chronicle of October 11th, 1886 on p. 452 of the following 'Javanicums': *Rhododendron jasminiflorum, Rhododendron* 'Princess Royal' and *Rhododendron* 'Princess Alexandra'.

The magazine *Garden and Forest* writes in its March 5th issue on p. 112:

> ...that the Royal Botanic Garden Kew has very success with the culture with this race of Rhododendrons. They are planted in the great conservatory as cold house plants at 8°C. They are planted in rich peaty soil and are watered regularly.

Garden and Forest writes on August 1st, 1888:

> ...the FISHER'S NURSERY in Handsworth cultivates this race of Rhododendron to perfection.

James Herbert Veitch wrote in his 1890 catalog, The Gardener's Chronicle:

> ...In the Rhododendron house at the Royal Exotic Nursery, an answer to the oft-repeated question "Where shall we go for flowers after the Chrysanthemums are over?" is indicated by the great display of rich colour given by over 300 trusses on plants of Messrs. Veitch's Javanico-Jasminiflorum strain, which when grown in quantity is perpetual flowering." The Garden wrote "...These Rhododendrons increase in number and beauty. We have in the more recent varieties a bolder truss, and larger individual flowers of greater substance.

The Gardener's Chronicle writes in the November 9th issue in 1907 on p. 331:

> ...a great thank you goes to Messrs. Veitch & Sons, who produced this large amount of hybrids, which found their way into culture.

It was the beginning of World War I that ended the cultivation of vireyas and marked the end of James Veitch & Sons Nursery in Chelsea. Heated greenhouses became more and more luxurious as the war began because of the low charcoal capacity and the loss of working men. Both charcoal and men where needed for the weapon industries and

in the trenches in Europe. Heated greenhouses only survived in Botanical Gardens or in rich private gardens, where maintenance was guaranteed. This is why only this small number of hybrids survive today, because there were some "rhodophiles" who saw the necessity to save the plants through these bad times, namely Lord Aberconway, Lionel Rothschild, Sir George Holford and Kew Gardens.

J.G. Millais (1917) wrote after the closing of the Veitch Nurseries in 1914:

> *...it is a great loss that Messrs. Veitch & Sons in Chelsea doesn't exist no longer, and it is to be hoped that that there is another nursery who makes it to their duty to save these wonderful plants.*

If you are interested in obtaining a list of the references that were used in the writing of this document, please contact Martin Monthofer at european-vireya-world.MM@web.de.

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Martin Monthofer is a member of the German Rhododendron Society

2016 ARS Photo Contest Instructions

The Contest is open only to ARS members in good standing as of the contest closing date. Judges and their immediate family (spouse, parents, siblings, and children) and household members are not eligible. By participating in the Contest, each entrant fully and unconditionally agrees to and accepts these Official Rules and the decisions of the Judges, which are final and binding in all matters related to the Contest. There are no prizes except bragging rights, and the Editor of *JARS* has the right to publish runner up and winning entries.

All photos submitted must have been taken between August 1, 2015, to July 31, 2016. Entries must be received by midnight PST, July 31, 2016. All entries should prominently feature either rhododendrons, azaleas and/or vireyas in the composition. Competition categories: 1) Flower, truss or spray; 2) Plant in bloom; 3) Landscape or plants in the wild or in gardens; 4) Foliage; 5) People, Insects, or Animals; and 6) Other, for creative or artistic effects of any kind that involves these plants. This could involve the use of software products like PhotoShop.

Photo Guidelines: 1) The Photo must be in .jpg, .jpeg, or .gif; 2) Images submitted should be sent by email and be of modest size, about 1024 to 1280 pixels in length and 480 to 768 in width, which would correspond to a dpi of at least 300 for a 3 x 5 in (7.6 x 12.7 cm) photo; 3) Cropping of digital images and minor adjustments to exposure and color balance is permitted for entries in all categories. Advanced image editing features available in software products like Photoshop should not be used except for entries in category six; 4) The Photo caption and/or description must not exceed 200 characters in length. Provision of some details about the camera and settings for each entry is also required, and for submissions in category 6, include a brief explanation of how the image was created; 5) The Photo cannot have been submitted previously in an ARS contest (chapter contest submissions are acceptable); and 6) The number of entries by any individual per category is restricted to two.

American Rhododendron Society bench in the Humboldt Botanical Garden.

The Humboldt Botanical Garden: An American Rhododendron Society Legacy

Bruce Palmer
Cutten, California

Photos by the author
unless otherwise noted

It's beautiful behind the "Redwood Curtain" in April and May. *Rhododendron occidentale* blooms in profusion in open forest areas and *R. macrophyllum* contrasts its trusses against redwood bark. When you attend the annual Spring Convention of the American Rhododendron Society (ARS) at the end of April, 2017, you won't want to miss viewing the Humboldt Botanical Garden (HBG). Located about five miles (8 km) south of Eureka, California, adjacent to the College of the Redwoods, HBG is a relatively new botanical garden, but it is rapidly becoming a world-class plant display site. The garden, among other features, boasts the Moss Family Temperate Woodland Garden with numerous unusual *Rhododendron* specimens, many donated by the Rhododendron Species Botanical Garden (RSBG) in Federal Way, Washington, and supported by the ARS Endowment Fund.

Humboldt Botanical Garden is a forty-four acre (17 hectare) site leased from the College of the Redwoods. The idea for a botanical garden in Humboldt County began in 1991 with a small group of people, including our own District 5 Director Tim Walsh. In 1992 the Humboldt Botanical Gardens Foundation (HBGF) was incorporated as a non-profit organization to pursue the dream. A lease for the property was finalized in 1995 and a Garden Master Plan by the San Francisco landscape architectural firm

Dedekam Ornamental Terrace Garden on right; Lost Coast Brewery Native Plant Garden on left.

Rhododendron occidentale in the Temperate Woodland Garden. Photo by June Walsh.

of Lutsko and Associates was unveiled in 1997. In 2002, Ron Lutsko redesigned the master plan and construction began.

A series of very dedicated presidents, boards and volunteers has kept the dream alive. Thanks to those folks and numerous donations and grants from local and national sources, including the ARS, the concept of a great garden has become a reality. The Dedekam Ornamental Terrace Garden displays plants with stems, leaves and flowers laid out in the colors of the rainbow. The Dr. Stan Baird Rose Garden echoes the colors in the Ornamental Terrace Garden. The Lost Coast Brewery Native Plant Garden contains representative specimens of native plant species from the Coast Ranges of Northern California and Southern Oregon. The Betty Kuhnel Heather Garden shows how well heathers can do in this mild coastal climate. Sara's Garden, recently completed, has a beautiful arbor that will display *Wisteria* and climbing roses. The Sun Valley Greenhouse, built and maintained by Sun Valley Floral Farms, the largest distributer of cut flowers in the United States, will become a tropical house when the adjacent Warmuth Family Propagation Area is completed. Several more gardens are planned or underway.

The Wildberries Riparian Woodland area leads uphill through an allée of Big Leaf Maples (*Acer macrophyllum)* and Western Hemlock (*Tsuga heterophylla*) and on through

Earth sculpture called "All Happy Now." Created by the well-known artist Peter Santino. Photo by Peter Santino.

the Schmidbauer Temperate Allée of Yulan Magnolias (*Magnolia denudata*) bordering the Moss Family Temperate Woodland Garden. The dream of Larry Moss, a deceased former president of the HBGF and a Eureka Chapter member, and Eureka Chapter's Tim and June Walsh, the Temperate Woodland Garden is an impressive success. The Walshes and numerous other members of the Eureka Chapter and HBGF have brought this garden to its present state and continue to maintain it. June Walsh is the Curator of the Temperate Woodland Garden. This garden is truly a legacy of the ARS and the RSBG. ARS Endowment Grants, the Eureka Chapter and a number of its individual members have contributed thousands of dollars and countless hours of volunteer labor toward construction of the garden, installation of signage, for purchase of plants and of an engraving machine to help ensure that all plants in the garden are properly labeled. The Rhododendron Species Botanical Garden has contributed and continues to donate unique specimens of tender *Rhododendron* species and other companion plants, particularly those tender plants that the RSBG cannot grow outside, but must grow to maturity in its Rutherford Conservatory. In addition to rhododendron specimens, the Temperate Woodland Garden displays many other trees and shrubs from around the world. Among the more unusual plants are *Desfontania spinosa* (Chilean holly), *Schefflera hoi*, several Himalayan *Gaultheria* species, *Davidia involucrata* (Dove Tree or

Overview of the Walsh Family Gathering in the Temperate Woodland Garden. The large sign was funded by ARS Endowment funds.

Handkerchief Tree) and a wide variety of magnolias. There is also a good-sized collection of Stagecoach Hill *R. occidentale.* Probably the most unusual tree is a specimen of the recently discovered Australian member of the Southern Hemisphere conifer family Araucariaceae, *Wollemia nobilis*, the Wollemi pine (it is not actually a pine). Originally thought to be represented only in the fossil record, live specimens of the Wollemi pine were discovered in Australia's Wollemi National Park in 1994. Seeds and seedlings have since been distributed to a few botanical gardens around the world, including Inverewe Garden in Scotland and Humboldt Botanical Garden, with some limited distribution to the public.

When you have finished viewing the Moss Family Temperate Woodland Garden you might walk through undeveloped parts of the garden to the far end of the garden property. There you will find an impressive earth sculpture called "All Happy Now." Created by the well-known artist Peter Santino, it is a ziggurat/labyrinth laid out as a Fermat's Spiral. Walking the length of its path will give you an extra half-mile (0.8 km) of exercise as well as fabulous views of the surrounding countryside.

Humboldt Botanical Garden is young compared to most botanical gardens but the established sub-gardens are quite impressive, showing to great advantage the monetary and "sweat equity" investments of large numbers of businesses, organizations and

"Waking Up": Early season view of rhododendrons in bloom in the Temperate Woodland Garden. Photo by June Walsh.

individuals. Plan to come to the annual ARS Spring Convention in Eureka, California, April 27-30, 2017. While you are in Humboldt County enjoying the impressive redwood forests and seashores, don't forget to allot some time to visit an ARS legacy, the Humboldt Botanical Garden.

Bruce Palmer is a member of the Eureka Chapter and the writer of "The Word," a column in many JARS issues.

Microsporogenesis in *Rhododendron:* The Development of Pollen in Relation to Winter Dormancy and Bloom Time

Olga E. Mirgorodskaya, Nuria K. Koteyeva, Alexandra V. Volchanskaya and Evgeniy A. Miroslavov
Komarov Botanical Institute
St. Petersburg, Russia


O. Mirgorodskaya

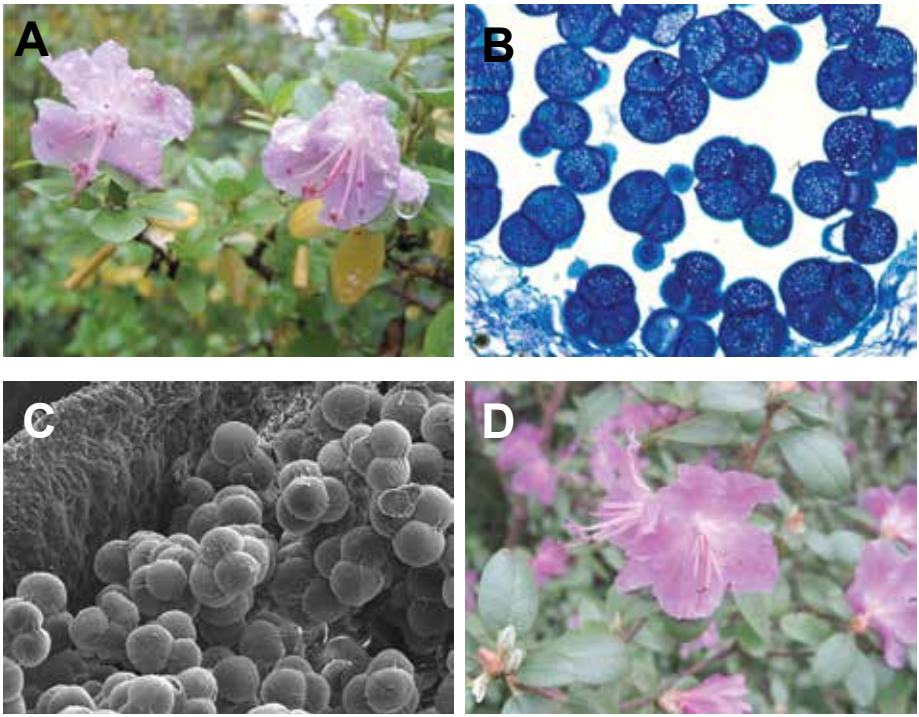

N. Koteyeva


A. Volchanskaya

In most *Rhododendron* species originating from temperate climates or high altitudes, flower differentiation occurs in the late summer followed by dormancy during the cold season. To overcome dormancy and for proper spring flowering they require a chilling period; at the same time they are sensitive to temperature fluctuations causing abnormal flowering due to unexpected warmth in autumn and/or cold damage to flower buds during the winter. Microsporogenesis (pollen development) is the first to react to temperature changes, and its failure leads to flower sterility or abortion. The purpose of present study was to characterize structurally the time scale of pollen development in relation to period of winter dormancy and bloom time in three *Rhododendron* species

differing in winter leaf drop and frequency of autumn flowering: semi-deciduous *R. ledebourii* which blooms at fall, deciduous *R. luteum*, and evergreen *R. catawbiense*, all growing in Botanical Garden of Komarov Botanical Institute (St. Petersburg, Russia). The flower initiation and all stages of pollen development were studied using light and electron (transmission and scanning) microscopy; the pollen viability was tested as a percentage of pollen grain germination.

It was shown that development of generative organs starts in June in *R. ledebourii* and in July in *R. luteum* and *R. catawbiense* and completes about 11 months later. Pollen



Rhododendron ledebourii flowering branches and pollen tetrads in the fall and spring.

A. Fall bloom (October), with only apical flower buds able to break dormancy and bloom during warm autumns.
B. Anther cross-section with almost mature bicellular pollen grains during the winter dormancy period (November - April). Scale bar: 50 μm
C. Mature pollen grains during the spring bloom under the scanning electron microscope. Note developed viscin threads, which hold large numbers of tetrads together and which will serve as an adhesive during pollination (May). Scale bar: 100 μm
D. Spring bloom (May).

development in three species includes similar 6 stages: I - Sporogenous tissue, II – Meiosis and tetrads of microsporocytes, III - Early vacuolization, IV - Late vacuolization, V – Mitosis and bicellular pollen grains, VI –Mature pollen grains; however, the time scale of each stage and their durations and winter resting stage vary in *R. catawbiense* and *R. luteum* versus *R. ledebourii. R. luteum* and *R. catawbiense* microspores undergo meiosis at the end of the August, and spend winter at the non-mature vacuolization stage. Maturation of pollen in these two species completes in middle of May just before blooming. Surprisingly *R. ledebourii* develops two types of flowers which differ in the timing of pollen maturation. The first type is characterized by early microspore meiosis and mitosis leading to development of almost mature bicellular pollen grains by the end of August; these flowers are typically larger and apically positioned on shoot axis. Only these apical flower buds with pollen grains at an advanced stage of development are prone to fall blooming during warm autumn temperatures, meaning either that a relatively short chilling period is required to break dormancy or that developmental regulation of blooming is independent of dormancy status. Viability of pollens and percent of germination do not differ in autumn and spring blooming flowers; however, not one event of successful pollination was recorded in autumn under conditions studied. Microspores of the second flower type of *R. ledebourii* have a more prolonged vacuolization stage with mitosis and subsequent bicellular pollen grains occurring in November. So, by winter, flower buds in *R. ledebourii* are more advanced developmentally than in *R. catawbiense* and *R. luteum*, and bloom about one month earlier.

In summary, the different strategies of pollen development identified both within and between three *Rhododendron* species were recognized which are not associated with leaf drop during winter but appear to be related to the time of spring flowering and the frequency of autumn flowering. More *Rhododendron* species needs to be studied to understand the advantages of each strategy and their evolution in relation with species origin/distribution, and to predict the species reaction to introduction as ornamental plants or to recent climate changes.

This study was supported by the Research Foundation of American Rhododendron Society (grant #133), and results were published in: Olga E. Mirgorodskaya, Nuria K. Koteyeva, Alexandra V. Volchanskaya, Evgeny A. Miroslavov. Pollen development in *Rhododendron* in relation to winter dormancy and bloom time. Protoplasma. 2015. 252: 1313-1323. DOI 10.1007/s00709-015-0764-y.

This study is a part of Olga Mirgorodskaya's PhD thesis entitled "Male gametophyte development in representative angiosperm woody plants of the temperate climate." She is doing her research at the Komarov Botanical Institute (St. Petersburg, Russia), with her defense scheduled for the next fall. Following the death of her supervisor Evgeny Miroslavov, Nuria Koteyeva is now partly advising Olga as a team leader in this area.

Society News

Awards

ARS Gold Medal: Norman Beaudry

You are a skilled scientist who accepts and excels at daunting challenges. Your management of the ARS Seed Exchange is exemplary. You drastically reduced costs, increased efficiency, and expanded its scope. The Seed Exchange enables hybridizers to share genetic resources worldwide, helping them develop new forms and improve hardiness. Without your leadership, this vital activity could have been lost. Your efforts have helped fund seed collection trips to remote Asian locations which has enhanced genetic diversity and introduced new species.

Your kind and honorable nature has built a global network of trusted friends which has helped preserve and distribute rare plant materials. You have participated as a faithful member of the Research Committee in evaluating and recommending funding for research that reflects the international character and interests of the ARS.

For you many outstanding achievements, the American Rhododendron Society is proud to award the Gold Medal to Norman Beaudry. April 23, 2016, Williamsburg, Virginia.

Ann Mangels, Eastern Vice President; Bob MacIntyre, President; Norman Beaudry; Don Hyatt. Photo by Glen Jamieson.

Awards continued

Gold Medal: William A. Mangels

You have provided the American Rhododendron Society with exemplary leadership and fiduciary responsibility for almost 30 years. You served as President, Vice-President, Program Chair, Awards Committee Chair, and Treasurer of the Mason Dixon Chapter. You served the overall Society as Director of District 9, and as a member of the ARS Executive Committee.

You were the ARS Treasurer from 2005-2014 and have been the Endowment Fund Chair since 2002. In these roles you provided excellent direction and discretion to the Society's investment strategy, dealt judiciously with budget and investment issues and helped distribute countless grants to disseminate information and educate the public on the genus *Rhododendron.*

For your many contributions and outstanding service, the American Rhododendron Society is pleased to award the Gold Medal to William A Mangels. April 26, 2016. Williamsburg, Virginia.

Bob MacIntyre, President; Bill Meyers, District 9 Director; and Bill Mangels. Photo by Glen Jamieson

Awards continued

Ann Mangels, Eastern Vice President (center), and Bob MacIntyre, President (right), presented retiring Executive Director Laura Grant (left) with an engraved award. Photo by Glen Jamieson.

Susan Garland of the Midwestern Chapter (second left) presented Laura Grant, retiring Executive Director (third left), with a crystal vase from Tiffany. Ann Mangels, Eastern Vice President (left) and Bob MacIntyre, President (right). Photo by Glen Jamieson.

EUREKA CHAPTER

Bronze Medal: Mary Marking

You joined the Eureka Chapter, ARS, more than six years ago. In 2012 you were asked to chair the Annual Flower Show. You accepted, and since that time you have worked tirelessly to ensure that the show is a success. Without your long-term committed efforts the show would not be the great event that it is. Your enthusiasm and ability to work with a diversity of members, businesses and the public are especially noteworthy. The Eureka Chapter of the American Rhododendron Society is proud to present the Bronze Medal to Mary Marking, 24 March 2016.

Bronze Medal: Tom Marking

You have been a member of the Eureka Chapter, ARS, for more than six years. In 2012 you accpeted chairmanship of the Annual Flower Show. Since that time you have worked tirelessly to ensure that the show is a success every year. Without your long-term committed efforts the show would not have succeeded. Your mechanical know-how has been especially helpful, resulting in major improvements in storage and flower displays. The Eureka Chapter of the American Rhododendron Society is proud to present the Bronze Medal to Tom Marking, 24 March 2016.

Awards continued

NANAIMO CHAPTER
Bronze Medal: Glenda Barr

Glenda has been an active member of the Nanaimo Rhododendron Society since its inception in 1992. She has contributed to our Society through her active participation on our executive board for many years, providing her ideas and perspective and sharing her home and the fruits of her garden when she hosted meetings. Glenda was our program chair for several years and through her contacts with the Fruit Testers Association of BC and her involvement in the Horticultural Society of Nanaimo, Glenda brought interesting and valuable presentations to our general meetings. Glenda has also contributed her time and expertise at our annual truss show and sale by supporting and working with the judges during the truss show for many years. It is with great pleasure that we acknowledge her contributions to the NRS with this, our highest award.

Thank you, Glenda.

NORTH ISLAND CHAPTER
Bronze Medal: Ann Chevrier

It was with great pleasure that President Jake Ellis presented the American Rhododendron Society Bronze Medal to Ann Chevrier on May 12th, 2015. The ARS Bronze Medal is awarded for outstanding contributions to a chapter and is the highest commendation awarded by a local chapter in the Society. Ann has been an active member of the NIRS for over 25 years, serving on the Executive as Ways and Means Director and most recently assisting at our Revenue Table.

Ann has been one of the fundraising Garden Tour Coordinators, taken on a lead role in the organization of the Companion Plant area of our Rhodo Show and Sale, spent many hours working at our public Rhododendron Garden, and participates fully in club activities. Ann has opened her beautiful garden to the public for our Garden Tour and hosted our members on many, many occasions.

We congratulate Ann on being awarded the ARS Bronze Medal by the North Island Rhododendron Society. The Bronze Medal was presented as part of a framed certificate stating: “The American Rhododendron Society North Island Chapter Recognizes Ann Chevrier for the Bronze Medal Award for her many years of service and continued dedication to the Society. May 2015. ”

Society News

In Memoriam
Edward "Ed" Cole

On November 17, 2015, the ARS lost a giant among rhody enthusiasts. Born 84 years ago in St. Louis, MO, Ed grew up to become an inquisitive, brilliant student both academically and of the natural world. Over the course of 30 years, Ed has left a distinguished legacy, particularly in the realm of rhododendrons.

Ed's fascination with plants began at early age but intensified following the completion of his new Empire, Michigan, home in 1969. Early on, rhododendrons captured his fancy particularly because of the cultivation challenge they presented and systematically, Ed overcame all of the hostile obstacles to growing rhododendrons on his property in basically what was a "sandbox"!

By 1999, his dazzling blooms could no longer escape public notice. Ed achieved notoriety when Traverse Magazine ran a pictorial essay entitled "Rhododendrons in the Mist," a reference to his misting of rhododendrons with aerial spinners mounted on bamboo stakes. Ed relished the challenge of engineering the soil pH and fertility to match the preferences of ericaceous plants. He excelled at composing leaf textures and blooms that screamed sheer "artistry." Ed loved to test and evaluate the hardiness of many species and hybrids particularly those thought to be too tender for his 45º N latitude. Overall his pragmatic approach was rewarded with pleasing results—an inspiration to many.

Ed loved his conifers and rhododendrons so much that he took to planting them himself upon neighboring parcels, even along the public roadways of Empire itself. He was so enthusiastic that it never occurred to him to request permission first—shades of "Johnny Appleseed" perhaps? Remnants of his botanic pursuit still persist to this day. Like most ARS enthusiast, he was most generous with both plants and knowledge.

Roger Dunlap, Midwest Chapter

Rhododendron Calendar

2016	ARS Fall Conference, Newport, Oregon. Board Meeting. Sept. 30–Oct. 2.
2017	ARS Annual Convention, Eureka, California. Board Meeting. April 27–30.
2018	ARS Annual Convention, Germany (decision pending)
2019	ARS Annual Convention, Philadelphia, Pennsylvania. Board Meeting. Dates to be announced.
2020	ARS 75th Anniversary Convention, Portland, Oregon. Board Meeting. Dates to be announced.

Society News

ARS Board of Directors Meeting, Williamsburg, VA, April 20, 2016: *A Brief Summary of Decisions Taken*

1. Welcome
President Bob MacIntyre welcomed 25 Board members, two staff and four guests.

2. Minutes
Motion #1: Moved by Marvin Fisher and seconded by Bruce Feller that the minutes of October 16, 2015 be approved as circulated. **Carried**

3. New Treasurer
Bruce Feller announced the appointment of Dave Banks to the position of Treasurer with the resignation of Sam Burd.

4. Report of the Bylaws and Policies Committee – Gordon Wylie, Bud Gehnrich
Motion #2:
Moved by Marvin Fisher and seconded by Ann Mangels that the second paragraph of POB 2.2.4.5 be modified to "Dues: SINGLE LIFE MEMBERSHIP $1,000, FAMILY LIFE MEMBERSHIP $1,500; a single membership shall be issued in the name of one person only and a family membership in the name of two persons at the same address." **Carried**

Motion #3:
Moved by Ann Mangels and seconded by Tim Walsh that the Journal or any other publication of the ARS listing officers, directors, committee chairs or other person providing services to members, include email contact information for all the individuals thus named. **Carried**

5. Report of the Budget and Finance Committee – Dave Banks
Motion #4:
Moved by BJ Patterson and seconded by Steve Henning that the budget for the year 2016-2017 as previously circulated be accepted. **Carried**

6. Editorial Committee Report – Sandra McDonald
Flower show lists will no longer be in JARS as they are better contained in local chapters' newsletters and websites.

7. Research Foundation Report – Karel Bernady
Motion #5:
Moved by Dave Banks and seconded by Hale Booth that the following appointments of two trustees to the Research Foundation be made:
•Harold Sweetman, Chairman of the Research Committee for term ending May 2019
•Bud Gehnrich for term ending May 2019. **Carried**

8. ARS Store – Steve Henning
Motion #6:
Moved by Marvin Fisher and seconded by Tim Walsh that the ARSStore.org Committee be allowed to send periodic direct email to ARS members, not to exceed one per month, with the option for each member to opt out of the mailings. **Carried**

Board minutes continued

9. Report of Eastern Vice President – Ann Mangels

Ann gave a brief overview of the process that was followed to seek an Office Administrator for the ARS with the retirement of Laura Grant. Dave Banks will take over banking. Sonja Nelson will take on some additional JARS duties. Dee Daneri will handle medals. The main duties of the new Office Administrator, Katherine Sterner, will be membership services along with taking care of mail/phone/and legal requirements. All will be done from her home office on Long Island.

Motion #7:

Moved by Dave Banks and seconded by Bruce Feller that we accept the appointment of Katherine Sterner to the position of Office Administrator effective April 23, 2016.

Carried

10. Report of the Treasurer – Sam Burd

Sam noted that our finances are in good shape now that the Transition Team has completed its work.

11. Endowment Fund Report – Bill Mangels

Motion #8:

Moved by Ken Webb and seconded by Tim Walsh that $3,000 US ($4,000 CDN) be provided from the Endowment Fund to the five chapters of District 1 located on Vancouver Island to acquire plants from the RSF for the new species garden at Milner Gardens and Woodland in Qualicum Beach, BC. **Carried**

12. Report of JARS Editor – Glen Jamieson

A new journal has been created— *Rhododendrons International*—an online journal with contributions from all the rhododendron societies worldwide.

Motion #9:

Moved by Hale Booth and seconded by Bruce Feller that we post issues of *Rhododendrons International* on the public side of the ARS website when it is released.

Carried

13. ARS Bylaw Amendment – Gordon Wylie and Bud Gehnrich

Motion # 10:

Moved by Marvin Fisher and seconded by Ann Mangels that the following changes to Article V, Section I. be approved:

Section I. Office Administrator

The board of Directors may employ an Office Administrator who shall under the direction of the Board administer the daily and general activities of the Society, manage the office/headquarters of the Society, and be responsible for other duties as assigned by the Board. **Carried**

Note: This motion will also need to be voted on at the next meeting of the board.

14. Plant Societies and Declining Membership

Retaining members and attracting new was raised as a major concern for most chapters of the ARS. While some societies are growing, most others are struggling with

Board minutes continued

rising costs, declining membership, attrition of older members and fewer new members joining. The ARS website contains ideas for retaining and attracting members.

15. ARS/ASA Cooperation

Hale Booth raised the issue of the overlaps between the ARS and the ASA, and asked that the two organizations begin a dialogue on possible joint ventures.

Linda Derkach, ARS Secretary

How a Transition/Search Committee became the Nominating Committee

Ann Mangels, Eastern Vice President
Baltimore, Maryland

At the 2015 Fall Board of Directors (BOD) meeting in Islandia, Long Island, NY, a Transition/Search Committee was established. Its function was to begin the planning for change in leadership from Executive Director (ED) Laura Grant, to what we determined best for the future of the ARS, both from the budget and membership points of view. We hoped to have an Agreement with a proposed candidate before the Williamsburg Convention.

David Banks, District 9 Director; Linda Derkach, ARS Secretary; Bruce Feller, Immediate Past President; Ken Webb, Western Vice President; and Ann Mangels, Eastern Vice President were asked to serve as members of the new group. The ARS By Laws spelled out the formation of Committee members, and that the vice president who would be incoming president shall chair the Committee.

We had our first committee meeting at the hotel in NY and asked Laura Grant to give us a first-hand view of the position she had held for twelve years and from which she would be retiring after the Spring Convention in Williamsburg. Hearing her thoughts as to how extensive the transition might be after she stepped down guided us in forging ahead. We made sure we were in compliance with Oregon law (since the ARS is incorporated there) and also that whatever decisions we made were transparent to anyone. We knew an easy telecommunication tool was necessary to facilitate our meetings, and found a service which we utilized often, at least three or four times a month for many hours.

Needless to say many of the routine duties of ED were unknown to us, and we realized that the “new” position would need to be considerably cut back and less time consuming. Bob Weissman provided information regarding support he had given Laura with database website management. Dave Banks and Sam Burd had presented a very streamlined budget at the Islandia meeting that was necessary for us to follow to be successful as a Committee. Reducing costs and planning for a balanced ARS budget was the essential element. Membership services (providing support for our world-wide membership) and General Administrative Services (internal BOD/ARS responsibilities, including handling USPS, email, telephone contact points, maintaining

Transition/Search continued

legal requirements and other general office tasks) were considered the primary duties for our new position. It would also be necessary to ask for volunteers to assume other tasks.

The Committee also spent some time in considering how to manage Laura's final months as ED. We asked her to provide a list of materials she had accumulated over time, plus office supplies, books, historical documents, etc. She labeled all boxes to be shipped to new homes where the contents would be evaluated. Many historic items were sent to the UVA library or VA Tech for electronic preservation. Her duties would then be divided among the ARS treasurer; Sonja Nelson, JARS liaison for communications as well as having other JARS duties; Dee Daneri, Chapter medals responsibilities, as well as handling Honors Committee awards; and Laura's replacement.

We investigated how to approach other sources for finding the best candidates to fulfill our mission. We looked into CAPS, a consortium of garden related organizations, possibly to join together to share office space/personnel with them; held extended dialog with the RSF concerning areas where we might be able to work together either now or in the future; and even communicated with a professional management company which could provide access for us to recruit from their sources. At the end of the day, we realized that our best source for searching for a replacement was from the ARS membership itself. Accordingly, Dave, with input from the Committee, developed a Request for Proposals (RFP) which, after review by Gordon Wylie and Bud Gehnrich, was used by the Committee for advertising the need for an ARS Office Administrator.

In early January, 2016, E-mailed RFPs were sent to every District Director and Chapter President with the request that they disseminate them to every member. The guidelines for RFPs were also placed on *RhodoNotes.* By advertising the RFPs as thoroughly as possible, our due diligence was completed. Evaluation forms and interview questions were developed, and we set up a time line for accepting, reviewing and scheduling interviews with prospective candidates. Our date to finalize the Agreement with our selected candidate was set for March 15-30, 2016.

We were pleased to hear from six very competent applicants; two from Canada, three from Washington, and one from New York. After interviews, checking references, and many telephone conferences, we all agreed that Katherine Sterner was our recommended candidate for the new position of Office Administrator. She accepted our proposal, pending the approval of the BOD, and was firmly welcomed into our midst on Wednesday, April 20, 2016, by unanimous consent. Many of you may have had an opportunity to meet her during some of the tours and meetings while we were at the Convention. Katherine's first day of employment was April 23, 2016; however, Laura will be staying on to follow up on some last minute matters until mid-May.

Bob Weissman, Dave Banks, and Katherine have spent many hours going over our computer programs, some of which are unique to the ARS. We knew the learning curve would be stressful and time consuming, especially since so many of the office tasks have changed. Access to Katherine's address, e-mail information and telephone accessibility information is located on the back of the cover of this JARS. Her E-mail address is: member@arsoffice.org.

Society News

ARS 2016 Endowment Grant Award

One of the actions taken by the ARS board at its meeting in Williamsburg Virginia was to award a grant of $3,000 (US) to Milner Gardens and Woodland (MGW), part of Vancouver Island University (VIU), located in Qualicum Beach on Vancouver Island, British Columbia.

The five Vancouver Island chapters of District 1 submitted an application to assist in the establishment of a rhododendron species garden at Milner Gardens and Woodlands (MGW). The species garden is a partnership between MGW and the five chapters. The purpose of the species garden is both to provide an educational location to advance knowledge of the genus *Rhododendron* and a location for cultivation of endangered

District 1 ARS members attending an Open House event at the Rhododendron Species Garden being established with Endowment Fund support at the MGW on May 17. The purpose of the Open House was to show progress so far in preparing the area prior to detailed construction of the garden and to describe to ARS members the coming activities leading to an opening and ribbon cutting targeted for 2017. Photo by Craig Clark.

Endowment Grant continued

rhododendron species. The five chapters have initially donated in excess of $20,000 with matching funds from VIU. Approximately half of these funds have been spent on garden design and the clearing of forest trees. Further funding is being solicited from organizations, District 1 chapters, individual members and the general public.

The next steps in garden construction include preparing the ground, marking out pathways, installing an irrigation system, constructing hardscape and acquiring plant stock.

Money from this award will go towards the acquisition of plants from the Rhododendron Species Foundation in Federal Way, Washington.

The Endowment Fund Committee Board felt the MGW application was well-done with the spelling out of the purpose, how the project will be undertaken and what is specifically to be accomplished with the requested funding, i.e., the purchasing of plants. The objective of having another species garden is highly desirable as a back-up to the Rhododendron Species Foundation garden to ensure the conservation of rhododendron species in case of loss there, and it will certainly assist in educating and promoting rhododendrons and the ARS in Canada.

Bill Mangels, Chairman

Create a Legacy with the ARS Endowment Fund

You have great opportunity to give back to the rhododendron community and be part of the incredible difference that can be made through your support! A tax deductible gift will help strengthen the society by increasing the financial capacity of the Endowment Fund to support projects that broaden the interests, curiosity and knowledge of future generations attracted to rhododendrons and azaleas.

It is the income and growth from the Endowment Fund that provide grants to worthwhile projects and funds special activities in accordance with the Society's mission. With your endowment gift you can honor a special person or event or memorialize a friend or loved one. By combining your respect for that special person with your passion for rhododendrons you can enhance your legacy and help the Society at the same time. Whether you make your gift now or as part of your estate, you are helping the Society share its mission now and in the future.

A donation to the Endowment Fund can make that happen and help the Society. Please mail your gift to: ARS Endowment Fund. P.O. Box 214, Great River NY 11739.

Society News

Research Foundation Update

The Research Foundation announces changes in its Board of Trustees.

At its meeting on April 20, 2016 in Williamsburg, Virginia the Board of Directors of the ARS approved the reappointment of Harold Sweetman, Chairman of the Research Committee, and H.C. (Bud) Gehnrich, for terms ending May 2019.

With these appointments the Board of Trustees will be constituted as follows:

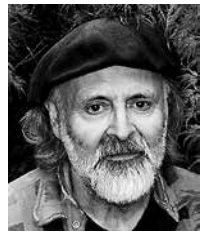
1. Mike Stewart, for term ending May 2017
2. Karel F. Bernady, Chairman, for term ending May 2017
3. Perc (Percival) Moser, Treasurer of the Research Foundation, for the term ending May 2018
4. Harold Greer, for term ending May 2018
5. Harold Sweetman, Chairman of the Research Committee, for term ending May 2019
6. H.C. (Bud) Gehnrich, for term ending May 2019
7. Bob MacIntyre, President of ARS, *ex officio*, for term ending 2017

We welcome to the Board our two returning members.

Karel F. Bernady, Chairman, May 20, 2016

Going with the Flow

Peter Lewis
Duncan, BC,
Canada



To write an article on water in the garden, the writer in my opinion has to have a direct experience in working with water, as then it becomes knowledge. Water in most gardens are water features, i.e., fountains, pools and ponds, while a small percentage of large gardens have lakes, waterfalls and streams.

There is a certain "fear factor" about bringing water into the garden, such as worrying about the initial cost, the maintenance bill, finding a water source, or getting the right contractor. However, for those that proceed, it eventually comes down to simply wanting a water garden.

I can trace my love of water to jars of tadpoles and the tickling of trout in my

Fig. 1. The Olympic Fountain in London.

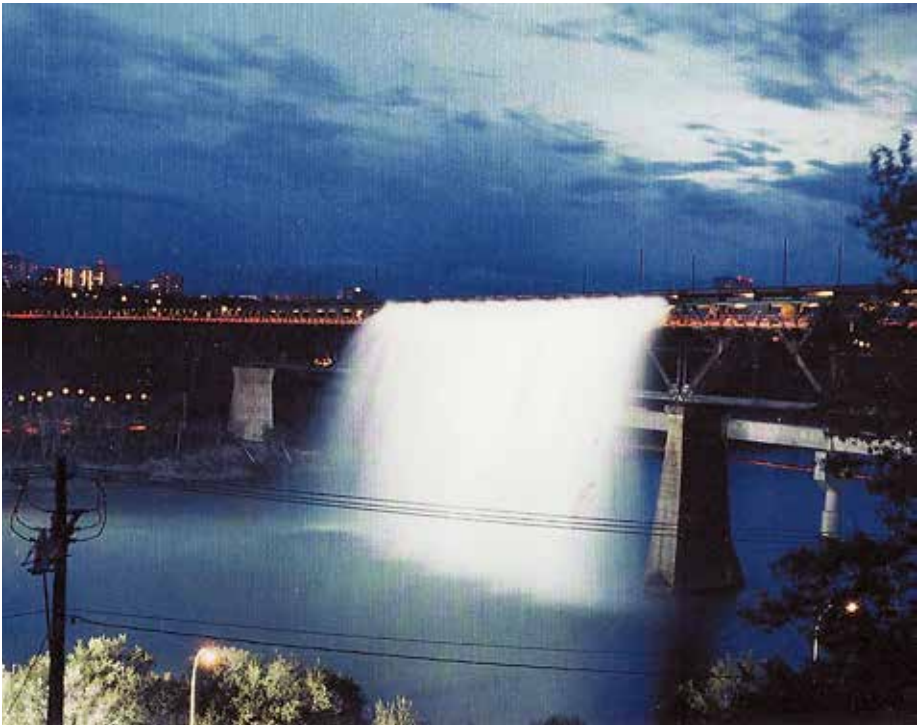


Fig. 2. The Great Divide Waterfall, North Saskatchewan River.

beloved Llynfi River in Wales, building dams of clodges on the Sychpant stream, and racing matchsticks in the flooded gutters of River Street in the town of Maesteg. I was brought up there in green valleys with lakes that were bordered by massive groves of *Rhododendron ponticum*.

From there, I went as a student to London and discovered water in the city. Hyde Park and the Serpentine Lake became my picnic table, whilst the gardens at Kew with their vast collection of tender vireyas nestled in large glass houses became my shelter of choice during those cold damp days of the English winter. Later, in 2012, I returned to London and created the Olympic Fountain (Fig. 1).

On immigrating to Edmonton, Alberta, Canada, with my wife and baby boy, I found the city and the river valley there to be my new water garden. My creation there was The Great Divide Waterfall, 2.4 m (eight feet) higher than Niagara Falls (57 m (188 feet)), 122 m (400 feet) long and with a flow of 100 m^3 (22,000 gallons) per minute flowing over the North Saskatchewan River (Fig. 2). It was completed in 1980 for the 75th Anniversary of the province.

A few years later I was commissioned to create a large fountain for the 1986 World Expo in Vancouver, BC, Canada, to be situated on a water plaza. The city, well known

for its high rainfall, inspired me to develop a large 15 m (50 foot) high transparent umbrella that rained water on demand (Fig. 3). Buttons installed on the handle gave variable effects from drizzle to downpour to hurricane.

Children soon had it stuck on the latter! It was at this time that I purchased a four ha (ten acre) parcel of land with a modest home on Vancouver Island, BC, Canada, bordered by the Koksilah River. The most important facet of the property to me was water, more so than the construction of a deer fence. The existing surface well had a high coliform bacteria count, coupled with a large iron deposit, so a new water source had to be found. Being a member of the Canadian Questors Society (the Canadian Chapter of the American Society of Dowsers), I set about and located an underground stream at a depth of 17 m (55 feet) through rock yielding 0.25 m^3 (55 gallons) per minute, the equivalent of 55 household taps running continuously which was truly, an embarrassment of riches.

The location of the principal water feature, a lake to be excavated, was next chosen. Then the 10 acres were split into water zones. Five cm (two inch) pipe from the well source was buried 0.6 m (two feet) below ground, each connected to a water hydrant with respective shut off valves and micro filters. From these hydrants, hundreds of metres (yards) of black polypipe run across the surface of the garden with smaller lines

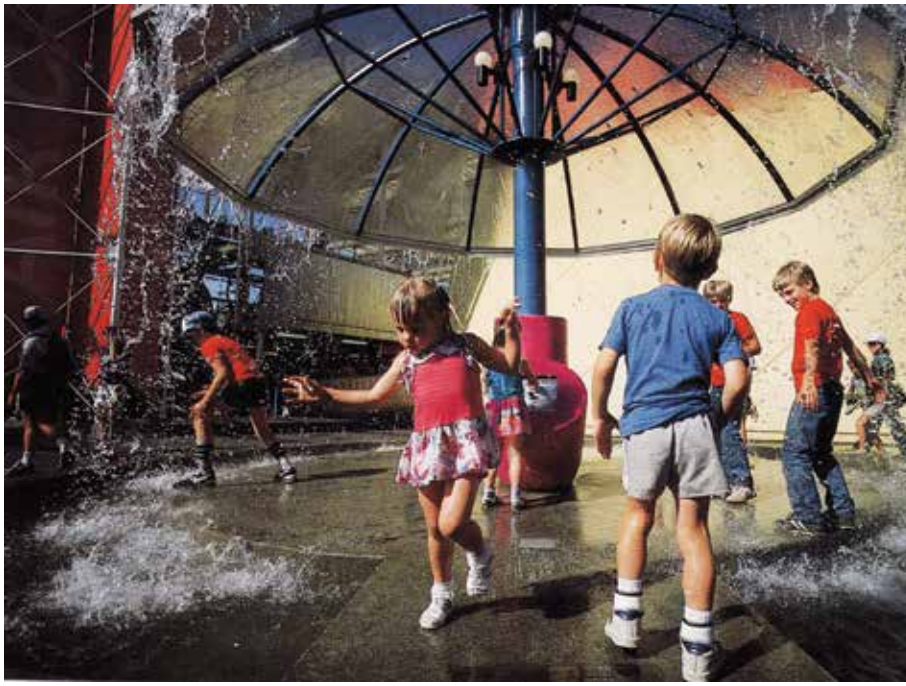


Fig. 3. A fountain for the 1986 World Expo in Vancouver, BC, Canada.

Fig. 4. Excavation at the author's home on Vancouver Island, BC.

and smaller diameter pipes branching off like a giant central nervous system. Each emitter slowly releasing between 9-14 l (two to three gallons) of water per hour to each plant. The larger the shrub, the more emitters near it. The pipes are covered by each year's mulch as each season progresses. I particularly like this system as with our mild climate, I don't have to blow air through the pipes in the fall to prevent freezing and pipes bursting, giving me zero maintenance.

Having now established a practical solution to water distribution to the home and garden, I set out to determine the lake size and general layout. The house faced the forest with little view, so a vista was created by the removal of 0.4 ha (one acre) of large Douglas-firs and the excavation of 34,405 m^3 (45 thousand yards) of dirt (two large dump trucks running continuously for ten days) to accommodate a lake in the shape of an artist's palette (Fig. 4).

From my perspective, a water garden is a central focus. The positioning of the water body should move you around a garden like a tour guide. Once you have decided on the layout of your water body, the next important task is to get water to it as the majority of gardens don't have a natural water source in them. Therefore, in the case of a lake. pond or stream, a reservoir has to be created with a filtration system, so that the water in it can be recirculated. There are many "how to" books available on this subject. A lake or pond whose water edge is set at grade to gradually increase to a greater depth

is a prudent way to prevent accidental mishaps like falling in and drowning. Another desirable element for a lake or pond is a sump cavity located at the deepest level of the pond, a box excavated in the ground that is used primarily to house a sump pump to drain the pond. An alternate method is to have a pipe within the sump box running the full length of the pond and beyond downstream on a gradient, with a gate valve (gravity drain) attached. Finally, the water body should have a point/location where it naturally flows out, which will set the water level of the pond/lake. Depending on the elevations you are working with, you may be able to create a waterfall at this location. Electrical power availability is another element to be considered, as many water features need pumps and thus electrical outlets. Most homes have an adequate 200 amp service. It is important at this stage to position the desired electrical wiring at the exact location of the water feature, in concert with your contractor and electrician.

Summer is a good time to start and finish the construction of your project as the natural water table will then be at its lowest. When fall arrives with its rains, you can evaluate your work as water always finds its own level. The first sign of spring in your water garden is often frog songs. The number of melodies made by them will depend on the quality of your water, as they are often the first responders to a new water body. The next cue, a visual one, in the middle of March in coastal BC is the arrival of tree swallows, which play a critical role in my water garden as they nest in quadrants around the lake. Their aerial ballet is a delight to watch as they vacuum clean the air of flying insects over the green, glassy water expanse. The joy of planting hundreds of rhododendrons and other companion plants and trees around a body of water is much like doubling down, as now we are in the realm of reflection to transport our outer world inwardly. The experience leads me at least from concentration to contemplation and puts me temporarily in a state of meditation or bliss. We become conscious that water responds to the degree of thirst of our friends, the rhododendrons, the kings and queens of shrubs. We are brought back to a different reality on how our subjects transport the water they need to great heights and then distribute the mixture evenly to every leaf. There is no mechanical suction pump in modern technology that can duplicate this sublime feat.

The necessity of water and the most effective means of its transportation were the main influences of the first Egyptian Gardens. 300 years B.C. The Well Sweep or Shadouff is still used today to distribute and transport water to almost all gardens in Egypt. [The term, "sweep" refers to the long pole which is lowered until the bucket on the end goes down into a well and fills with water. Because the pole is anchored in the middle on another pole, creating a fulcrum, it can be counter balanced, thus making it easy to raise the pole, and lift the bucket from the well.]

For the extreme water garden enthusiast with a continuous flowing stream nearby, there is a pump called an hydraulic ram pump, invented by John Whitehurst in 1772 in Cheshire, England, which is a perpetual water pump that runs 24 hours a day, seven

days a week and 365 days a year. It requires no electricity, has very little maintenance and you can build it yourself. However, it does require a reasonable amount of water that will drop at least 1-1.5 m (3-5 feet). The level that the pump can raise water to depends on the water's head (total drop the water will make). Not all gardens have streams, so most pumps that are used in water garden applications are submersible ones, which are usually built out of cast iron or bronze, which makes them extremely durable. and which work well with underwater sealed light units.

Fig. 5. Grotto at Stourhead Garden in Wiltshire, England.

Fig. 6. A water room on the surface of the lake in the author's garden.

On the lighter side of water gardening, you can create whimsical or joke fountains, first introduced into Renaissance gardens in Italy. One of my favourites is the Willow Tree fountain that sprays unassuming visitors as they walk the garden at Chatsworth in England. It is intricately made out of copper pipe and stands 4.6 m (15 feet) high. Above ground fountains use a jet pump application [a Venturi effect is created by use of a converging-diverging nozzle to convert the pressure energy of a motive fluid to velocity energy which creates a low pressure zone that draws in and entrains a suction fluid] or some utilize the normal house water pressure from a house water system.

Some gardens are broken down into series of "rooms." If you are ambitious and have

the space, an underground room in the form of a grotto can be created. I particularly like the one at Stourhead Garden in Wiltshire, England. The only view out is like looking through a telescope (Fig. 5), giving a view similar to seeing what the gardener had planned 400 years earlier. I have embraced this creative concept in my own garden by constructing a water room on the surface of the lake (Fig. 6), the location being the "hole in the artist's palette," which is accessed by a causeway. Once across this walkway the viewer encounters a structure some 12 m (40 feet) high, a circular design of steel, polycarbonate tiles and illuminated glass blocks (Fig. 7). A spiral staircase takes you up through the roof. The water delivery system is hidden within the staircase riser and creates an umbrella of water of 360 degrees, which cascades down the roof and into the lake, making a perfect lake aeration system. There is seating for up to 60 people and I provide umbrellas to pass through the waterfall for those seeking respite on a hot summer's day (Fig. 8). Fountains in large cast iron urns dot are also placed in the palette/lake, their lit waters at night creating sounds of merriment (Fig. 6)! Finally, I have created fountains in and beside walkways that provide additional scenic views (Figs. 9, 10).

Fig. 7. A 40-foot circular structure in the water room.

Fig. 8. Umbrellas offered for visitors to the water room.

There are also many spectacular water gardens that have no flowing water features. Two that I describe here are Claude Monet's garden at Giverny, France, where the careful

positioning of a bridge becomes the central focus of the water garden, along with the planting of his famous waterlilies (Fig. 11). In the Musee d l'Orangerie in Paris, you not only see Les Nympheas but are surrounded by them, and are taken back to the experience in Monet's garden in a metaphysical way.

The Garden at Bodnant in Tal Y Cafn in North Wales is arguably the finest rhododendron garden in the world and oozes pure love from its creators (Fig. 12). The garden was founded in 1874 by Henry Pochin who planted the many existing cedars and conifers. Then it was developed by three generations of Aberconway's, coupled with three generations of head gardeners, the Puddles, resulting in a collective vision of unity through time, its culmination being the magical dell where streams, rhododendrons and waterfalls all abound, not only to your sight but inwardly to your soul.

Fig. 9. View in autumn in the author's garden.

Fig. 10. A view in May in the author's garden.

By creating a water garden, there comes a realization that we are one with nature. Our similar vascular system of transportation of water to that present in trees and shrubs is the common denominator. The quality of water in your garden, i.e., its purity and cleanliness, will determine the life forces that occupy it. My love of water and its relationship to rhododendrons and azaleas was cemented when I became a member of the Cowichan Valley Chapter of the American Rhododendron Society. I felt a true

Fig. 11. Claude Monet's garden at Giverny, France.

Fig. 12. The garden at Bodnant in Tal Y Cafn in North Wales.

sense of security that everything I planted would be fine, as there were so many knowledgeable folks to help me along my journey.

Peter Lewis' garden was one of the tour garden's at the 2015 ARS spring convention in Sidney, BC. Peter is still an active international water feature designer, and a Cowichan Valley Chapter member.

Are Our Deciduous Azaleas Really Different Species?

Ron Miller
Pensacola, Florida

Summary

As species, the American deciduous azaleas leave much to be desired. Often, except in bloom, and in cases even then, they are nearly impossible to tell apart. In broad areas, the azaleas are represented by swarms of unclassifiable plants. Perhaps the labeling of each of the recognized types as a discrete species, with all the historical baggage attending that title, has been a mistake. In many close-knit plant groups, speciation is not a fixed, objective element. It is a bookkeeping device carried over by analogy from our everyday experience with higher animals. This strained comparison, applied to angiosperms with their very different and quite promiscuous reproductive strategies, imposes a one-size-fits-all approach upon what are often elusive, fuzzy-bordered modules of irregular kinds.

The azaleas make up what is called a "syngameon," an association of organisms that is the most inclusive population within which natural gamete exchange takes place. Except for two incompatible types that probably do not belong in the Pentanthera at all and a western azalea isolated by the rise of recent mountains, the North American azaleas, including vast arrays of unclassifiable plants, can be conceived as an enduring collective species--an inclusive reproductive confederation that would in and of itself be a species according to the strict biological species concept.

As for the so-called hybrids, there is something seriously amiss with any approach, model, or paradigm that treats so striking and numerous a part of the biota as a nullity, accident, or footnote. In fact, clear and reliable lines often cannot be drawn to separate the variations within our azalea types from the surrounding matrix of intermediates. By considering the evolutionary dynamics within the most intensely studied of all syngameons, Darwin's finches of the Galapagos Islands, we can, however, construct an alternative model for the azaleas of eastern North America as a portfolio of fungible genetic investments serving as hedges against the repeated habitat dislocations of the

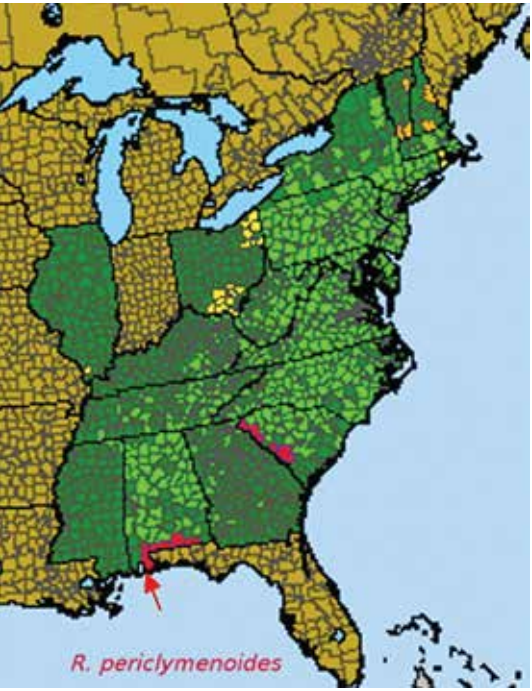


Fig. 1. Range of *R. periclymenoides.*

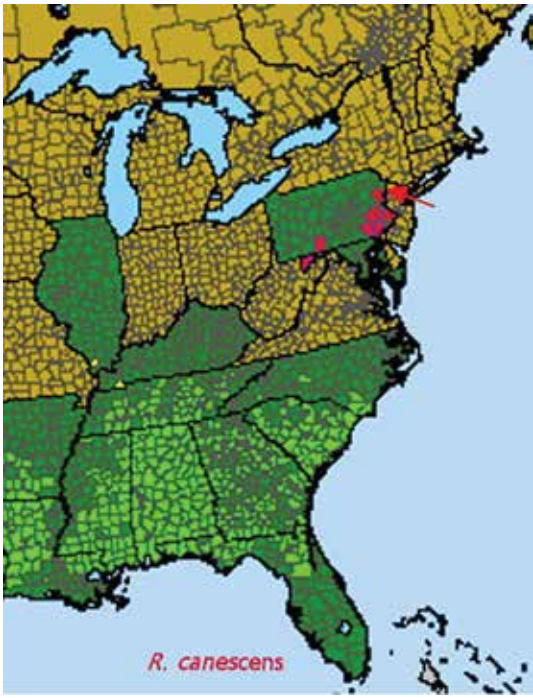


Fig. 2. Range of *R. canescens.*

Pleistocene Era. The intermediates and ambiguities within the Southeastern azaleas are not taxonomic bugs but transient features of a protean and interwoven evolutionary whole. Rethinking the azaleas holistically offers insight into the roles played by polyploidy and gene exchange in angiosperm evolution.

Species and Syngameons

A few years ago I submitted a paper to *The Azalean* entitled "Is *Rhododendron austrinum* Always Yellow?" (Miller, 2011). The subject: a group of previously unrecognized pink tetraploids closely allied to, and in places intermixed with, yellow *R. austrinum*. I was told that one pre-publication reader expressed reservations because my title posed a question without the body providing an answer. How could I? Who can foresee whether *R. austrinum* will be redefined or whether, upon further study, the find will be declared a new azalea? For all I know, taxonomists do not read that periodical, nor many this one, so my words may well have been a violin in a void. The editor indulgently let my question stand.

But even if you grant that my pink tetraploids are something new, how could anyone falsify, rather than simply reject or ignore, an assertion that the pinks are "really another species"? No one has ever succeeded in presenting a generally accepted definition for a

species, though many have tried (Mallet, 2007). The reason seems obvious: whatever the pertinence might be of after-the-fact concepts such as cladistics, monophyly, tokogeny, autapomorphy, and the like (Nixon and Wheeler, 1990), a species in actual practice is not an intrinsic natural phenomenon whose formal representation can be confirmed, disconfirmed (i.e., falsified), or reformulated. Instead, a species is a highly regulated bookkeeping device, a coinage seeking acceptance rather than a conjecture offering a concrete, experimentally falsifiable claim for being true (see Popper, 1968, on the role of disconfirmation in science). Out of complex historical and social imperatives, species are constructed from among the genuinely objective though far from coequal and often indistinct or composite condensations of traits that inheritance, natural selection, and chance have fashioned in living things.

We can confidently list the first seventeen chemical elements or prime numbers because they directly mirror the way the universe is made. Martians would come up with the same items, though not the same names. On the other hand, by fits and starts, flips and flops, additions and subtractions, we have settled on our preferred pigeonholes for the azaleas. If the exploration of our flora had begun not from the Atlantic but from the Gulf of Mexico coast or if the azaleas were not so attractive to our highly visual species, other choices would surely have prevailed. Imagine how a race of intelligent dogs, with their overwhelmingly olfactory world view, might classify the azaleas. In what way would their classification by odors be more arbitrary than ours by colors and shapes?

Though this may all seem academic and even postmodern in the dreariest sense of those dreary words, the conflict between vague, irregular, and affectively determined plant groupings and the predetermined rungs of the Linnaean ladder cannot be ignored while trying to keep our heads straight while identifying azaleas and members of other plant associations called "syngameons." Ugly word, useful concept. Directly or indirectly, the members of a syngameon exchange gametes naturally with their fellow members. Think of humankind, which can be subdivided into vague races or "demes" that ordinarily inbreed but are gleefully willing when occasions arise to share gametes across the board. Yet we call our primate patchwork the single species *Homo sapiens*. What then should we call the Southeastern Pentanthera, no less a collection of fuzzy patches that normally inbreed but rather spectacularly interbreed when given half a chance?

By consigning each of the recognized azalea kinds into an undefined, one-size-fits-all, culturally freighted category, a "species," we obscure the great differences between a highly variable reproductive swinger such as *R. canescens* and a closed, stable, and effectively homogenized breeding system such as *R. canadense*. Verbal leveling invites category errors because our expectations for a species derive from observations of the relatively clear and distinct divisions among familiar higher animals. Consider the experience of the first taxonomist, Adam:

> And out of the ground the Lord God formed every beast of the field, and every fowl of the air; and brought them unto Adam to see what he would call them: and whatsoever Adam called every living creature, that was the name thereof.
> (Genesis 2:19, KJV)

It would be hard to overstate the impact of this brief narrative-of-origins that neatly portrays the complementary roles of nature and language in the establishment of species. One unfortunate result has been the denunciation that Darwin's name even today provokes among naive literalists who do not know how to read literary texts, however inspired. Another effect, more sophisticated and therefore more insidious, is that the honorific title "species" implies to professional and amateur alike traits routinely (though not always) found in the birds of the air and the beasts of the field: (a) a closed reproductive system and (b) yea-or-nay membership in the group or set. I take some comfort in the fact that Genesis offers no account of Adam's naming plants.

Azaleas without Borders

In interbreeding plant groups such as the deciduous azaleas, the hawthorns, the blackberries, the blueberries, and some of the oaks, the naming of species is to a degree a market-driven activity. Just how many oaks--exactly--can be found in the eastern US? How many hawthorns? What is the tally for the Asiatic lepidotes or elepidotes or for the Malesian vireyas? Such puzzles resemble asking how many colors can be seen in the rainbow. As many as we decide that we need names for. We recite that roses are red and violets are blue not because those frequency intervals are self-evident—anthropologists tell us that other cultures partition the spectrum differently—but because the handy tags "red" and "blue" aid communication and organize experience, albeit vaguely. So then, where does *R. canescens* end and *R. periclymenoides* begin? Where does orange change over into yellow?

Since these two azaleas illustrate the pitfalls of what might be called "taxonomic fundamentalism," let us begin with this pair, the azalean Tweedledum and Tweedledee. In general, northern plants differ from southern, being less glandular, more rhizomatous, and often bluish of corolla. Giving separate names to the two provides us with a useful shorthand, a tool. Unfortunately, broad differences do not necessarily generate clear distinctions, as we discover from the two range maps on the Biota of North America Program (BONAP) website for rhodies (Figs. 1 and 2; http://bonap.net/NAPA/TaxonMaps/Genus/County/Rhododendron). Consider for a moment these digests of locations from institutional vouchers not as guides for azalea tourists but as exhibits in an *experimentum crucis,* a test for the hypothesis that these are two distinct species. If species exist by practice, then by practice they must be tried.

Northern *R. periclymenoides* is shown to go all the way down to an Alabama county smack dab on the Gulf of Mexico (Fig. 1, red arrow). Along the way, the northern azalea halts abruptly in counties stacked along the South Carolina-Georgia and the

Alabama-Florida lines (counties in red). Lysenko will need to come back from the dead to explain how political boundaries became encoded into azalea genomes. Southern *R. canescens* (Fig. 2) skips almost all of western North Carolina, the whole of Virginia and West Virginia, only to pop up again in western, not coastal, Maryland. Then it spreads out into chilly, hilly eastern Pennsylvania, never into lowland New Jersey (red arrow), where many Dixie plants reach their northern limits.

Discounting the delightful possibility that speciation is a matter of states' rights, we can reconstruct what must have happened. Botanical keys pronounce the southern azalea to have glandular hairs on its outer corolla tubes, the northern, eglandular hairs. This handy rule of thumb is everybody's first resort in deciding which is which. It certainly is mine. Unfortunately, aberrant glandular and eglandular plants can be found at the oddest of latitudes. Workers in some states, but not in others, proceeded robotically. Did it occur to no one in Alabama, for instance, that in order to avoid dissolving into the surrounding sea of Gulf Coast *R. canescens, R. periclymenoides* would need to cordon itself off with a formidable reproductive barrier? A numerous inbreeding colony would be a must, joined with one or more of the following: (a) a strong preference for its own pollen, (b) a separate pollinator, (c) a radically different bloom time, or (d) a different habitat. Considering the mix of glandular and eglandular forms that I have seen in transitional zones farther north, it seems unlikely that such barriers exist.

A recently revised Flora of Alabama map (http://www.floraofalabama.org/Plant.aspx?id=1761) walks back many earlier claims, though not all. Such prudence avoids having to confront directly the likelihood that the two-species solution will not bear too much looking into. Surely that azalea in southernmost Alabama that would pass on a herbarium sheet or in a collection for *R. periclymenoides* nonetheless shares pollen with the standard *R. canescens* blooming at the same time in its neighborhood. Is an azalea really *R. periclymenoides* because it is glandularly challenged? Would a mule be really a horse if it lacked long ears?

The crucial issue for both the two pinks and the two austrinums seems simple enough, and it has nothing to do with whether they are labeled species. Are these two populations becoming one or one becoming two? Addressing such matters with statistical methods or thermodynamics might tell us something useful about the evolutionary trajectories of the azaleas. Instead, with verbal gymnastics, we draw precise borders that may not exist, obscuring the inherent uncertainties in nature by wiredrawn legalisms built out of Latinate adjectives and musty priorities. In spite of living a century and a half after Darwin's masterwork, we continue to treat heuristic labels as Platonic Ideas or (better) as clear, distinct, and parallel intentions in the Divine Mind. Our guidelines for publication, with their liturgical solemnities in, until recently, a dead language, convey an aura of certainty and assure the reader that an inventory of species is as free from ambiguity as a list of canned goods in a sack.

Whatever the reliability of species assignments among the common birds and

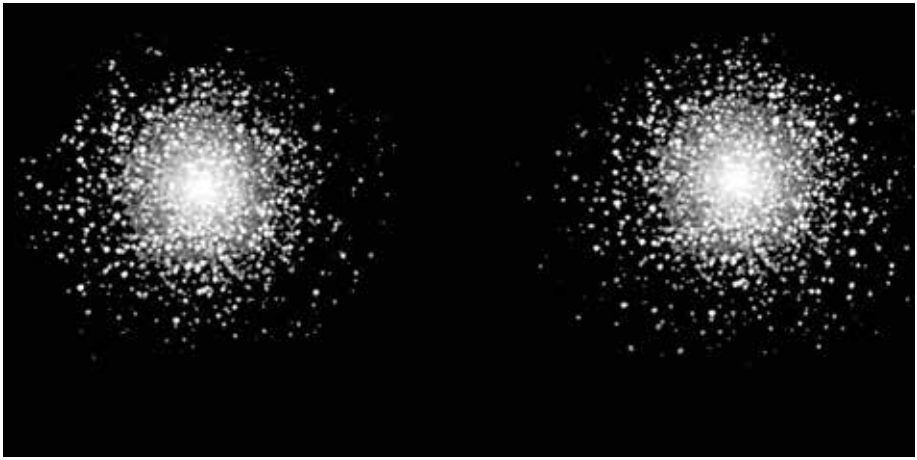


Fig. 3. Visualization of two discrete species.

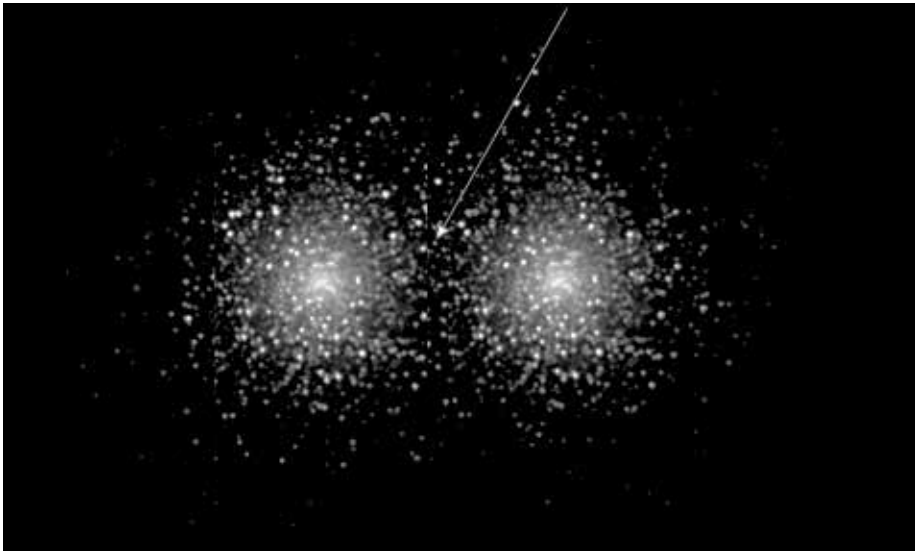


Fig. 4. Visualization of intergraded species.

mammals in Adam's pre-sorted taxonomic parade, indeterminacy is the hallmark of azalea study. I could prolong this essay tediously by conjecturing how various complications have led to placing *R. calendulaceum* in Alabama, *R. prinophyllu*m in Texas, *R. atlanticum* both in south-central Georgia and in upland Pennsylvania, *R. arborescens* on the coastal plain of Mississippi and even in southeastern Louisiana, and on and on. Then there are the *R. canescens/periclymenoides* ambiguities detailed above and others like unto them, the countless hybrids that we all invoke as an escape clause

in the field, and overall, the uncomfortable fact that a high percentage of the accepted species of azaleas were debatable enough to have been codified only post 1900.

This is not to say that the azalea species are outright deceptions. Spring and summer are handy names because they communicate common experience, though it is impossible to state precisely in terms of the weather where one begins and the other ends or to demonstrate why it was *a priori* necessary that there be four declared seasons rather than six or two. It is highly misleading, however, when a diagram indicates an azalea species by a dimensionless point at the tip of a one-dimensional line. Such symbolism implies a precision that the azaleas do not exhibit in the material world.

Symbols are not just conventions. They are what we think with; they are the shadows on the wall of Plato's Cave, the screens upon which we project what we take to be reality. Two distinct species could be depicted more candidly by the two scatter graphs (actually photos of a stellar cluster) in Fig. 3. The Venn-style diagram of Fig. 4 could represent an intersecting pair such as *R. canescens* and *R. perclymenoides* or the pink and yellow tetraploids on the Gulf Coast.

To which cluster should the dot-organism indicated by the arrow in Fig. 4 be assigned? What would result if such an ambivalent azalea bush is used to represent one of the two declared species in a molecular study? How can researchers who do not have direct field experience with the species protect themselves from doing just that? An associate of mine tells of remarking to Arnold Arboretum staff that some specimens labeled "*Rhododendron calendulaceum*" seemed atypical, only to be dismissed because the professionals there had keyed them out with certainty to be that species, a tetraploid, When tested by flow cytometry, the plants turned out to be triploids, 2x X 4x hybrids. Other friends tell tales of ordering some desired azalea from the Rhododendron Species Foundation and receiving something quite different instead. I submit that anyone who accepts at face value the tags on azaleas from collections or nurseries is too trusting to buy a used car.

Of Time, Chance, and Speciation

If our recognized azalea species are often conveniences masquerading as facts, what is their actual biological status? Let us start with the simple observation that natural selection pulls life into condensations in attribute space the way gravity pulls matter together into sundry clumps in physical space. The mere fact that we recognize and label organisms and star clusters with names is a sign that something centripetal is at work. Indeed, every range-limited plant population with a closed reproductive system does apparently converge toward uniformity--uniformity in adaptive traits, by natural selection and genetic diffusion; uniformity in accidental traits, by diffusion alone. In the long run--supposing there is one—entropy will have its way, the major wrinkles will average out, and the whole will to a degree be buffered against change until extinction (Rieseberg and Willis, 2007). Reproductive barriers that were once

geographical or environmental become, through genetic drift, physiological or innate. Stephen J. Gould labels such a genetically isolated and stable end-state an "equilibrated" species. His and Niles Eldredge's concept of "punctuated equilibrium" (Gould, 2002) has so much entered common lore that I have seen it mentioned on a bumper sticker. That's one step shy of *Saturday Night Live*.

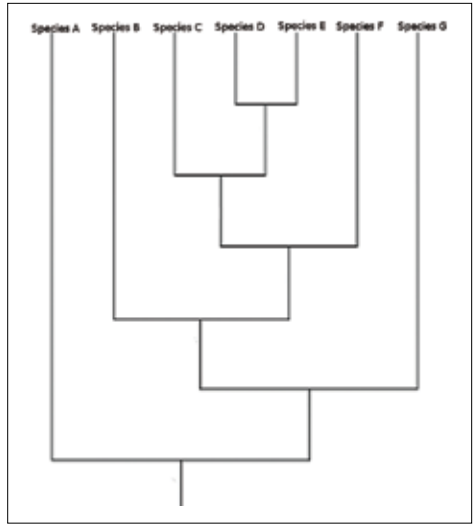


Fig. 5. Typical phylogenetic tree.

Gould bases his model for speciation upon the ornithologist Ernst Mayr's conjecture that new species arise from "peripatric" branching, i.e., by isolation of fragments from a single parental species followed by adaptive divergence or drift away from its origin (Mayr, 1976). The punctuated equilibrium hypothesis adds that species, once initiated, develop rapidly and achieve homeostasis (a self-restoring final state) characterized by minor fluctuations around unchanging norms. This model is epitomized in phylogenetic trees consisting of divergent, singly connected branches, as in Fig. 5. Mayr and Gould, like Darwin before them, discount hybridization as something that successful species must avoid in order to maintain their identities. As Robert Frost's New England farmer insists, "Good fences make good neighbors."

Perhaps not always. No doubt these zoologists are broadly correct about fauna and their fossil records. However, two of the most startling discoveries in plant evolution during the last twenty years have been (a) that all angiosperms (all!) have polyploidy and most likely hybridization in their ancestry and (b) that reticulated species (species originating in hybrids) arise from replicated, parallel, genetically non-identical hybrid events at various locations, sometimes two or three, sometimes as many as 20 (Soltis and Soltis, 1999). Evolutionary orthodoxy of the middle of the previous century conceded that hybrids occur, but with the proviso that they are always unfit "dead ends." If so, our azaleas exhibit suicidal tendencies, though as we shall see in the next section, what is dysfunctional for individual species might be a boon for associations of them functioning in concert.

One conclusion seems unavoidable: that our interbreeding azaleas have been hybridizing since their inceptions, to the extent that it often seems arbitrary to pronounce whether an obviously heterogeneous population is a species-in-progress or whether it is just a swarm, or in a colleague's nice turn of phrase describing *R. calendulaceum*,

whether it is "not a species but a syndrome." Among the azaleas, lack of equilibration is strongly suggested by geographical variants: (a) spotty stipitate glandularity in *R. canescens*, (b) eglandular western colonies of *R. austrinum*, (c) bloom time and color patchworks in *R. colemanii*, (d) plentiful white and dwarf *R. prinophyllum* in Arkansas, (e) the tetraploid Choptank *R. atlanticum* in Delaware, (f) radically divergent bloom times in populations in *R. cumberlandense* and *arborescens.* (g) tall and non-running southwestern *R. alabamense,* and (h) the varied behaviors and morphologies in plants now lumped into the catchall *R. viscosum*. These are not the random small order fluctuations found in all equilibria, genetic equivalents of Brownian motion, but signs of divergence or incomplete mixing that provide dilemmas for professionals hammering real-world square pegs into man-made round holes. Where then do these fuzzy species and their hybrids stop and other species begin? When does dawn turn into morning?

Hybridization and introgression bespeak geologically recent common origins. Long separated and stabilized species do not cross (Levin, 2013), as with, for instance, our two incompatible but superficially rather similar eastern hemlock species. Just how old are the recognized azalea types anyhow? Much speculation has been directed toward the wholesale transformation of the biota after the bolide collision at the end of the Cretaceous, both for the demise of the dinosaurs and for the explosive proliferation of the angiosperms. Far less has been made of the fact that the present is fewer than 15,000 years after the end of the latest glaciation. With their motility and their selective mating, animal species are ordinarily well suited to persist across climate crises. In Europe, however, plant relocations southward led to wholesale extinctions of the old Tertiary flora on the ramparts of the Pyrenees and the Alps; in North America, to incestuous family reunions near the Gulf of Mexico.

Can anyone actually imagine *R. flammeum* and *cumberlandense, eastmanii* and *alabamense,* much less *canescens* and *periclymenoides* or *austrinum* and *colemanii*, trooping down 18 times or so during a Pleistocene chill to environmentally alien refugia along with the marmots and the mammoths and the hemlocks, there to snuggle with their "kissin' cousins" for 20,000 to 30,000 years or more before returning intact to their summer haunts of old? The fact that the species of the American megafauna survived repeated glacial episodes tells us little about the fates of members of plant syngameons huddled together in southern refugee camps.

The once-orthodox discounting of hybrids as evolutionary dead ends presupposes established parents, occupied niches, and stable conditions, none of which the labile azalea populations confronted after the climate discontinuity of the most recent post-glacial warm up. The azaleas' return northward or upward in North America most likely resembled the wholesale occupation of niches when volcanic islands become available for colonization, a process now known to lead to the proliferation of species in general and of polyploids in particular, as in the Hawaiian flora (Soltis et al., 2009).

Though reproductively isolated species like *R. canadense* and *vaseyi* may well predate

the Pleistocene, as must other closed species such as the tulip tree and the mountain laurel, our present list of diploid and tetraploid azalea species is surely a temporal provincialism. Had the members of the Azalea Chat Room been living during the previous (and warmer) Sangamon or Eemian Interglacial, they might have bragged about having all 22, or all ten or five, of the Pentanthera growing in their gardens. If we could turn the clock back to Jamestown and let the uncertainties of history unfold themselves by rolls of the dice again, how many states would end up in the USA? Surely not exactly fifty, nor with their present shapes. Pascal said it best: "Cleopatra's nose, had it been shorter, the whole face of the world would have been changed."

Evolution is a crapshoot, as are the outcomes of all highly complex, interactive, and metastable systems. Every *Jurassic Park* moviegoer has heard the mind bender that a butterfly flapping its wings near Shanghai might alter the weather on our East Coast in the weeks ahead. From what I know of pollinators in Georgia, there is no hard-wired reason why the azalea that adapted to the niche now occupied by *R. flammeum* might not during another cycle have been a fragrant pink or a tetraploid, or why there might not have been two species in sub-niches or a single *R. flammeolandense* across the South. In stochastic or randomized systems, the race is not necessarily to the swift, nor the battle to the strong. Time and chance happeneth to them all.

Gould, writing prior to the recent avalanche of evidence for the ever-present if not dominant roles of hybridization and polyploid creation in angiosperm proliferation, surely underestimated the number of current embryonic species. Gould's favorite mantra was that the "punctuational stage" of a species, like the infancy of a human, is relatively brief compared with its overall lifespan. Therefore, he concluded, observers will see developmental stages rarely if at all. With his zoological perspective, he never pursued the implications of the promiscuous-pollen reproductive strategies of plants that might result in neotenic (as the song goes, "forever young") plant populations, though he did grant in an aside that the "Linnaean logic" of clearly nested taxonomic elements "cannot apply to groups that do show massive mixture, as in some families of plants with extensive hybridization" (Gould, 2002). Widespread introgression within our azaleas suggests that gene migration continues to complicate equilibration, as do the presently disconnected ranges of individual species. Infancy in taxa arising from multiple hybrid origins will be more prolonged than in taxa with peripatric beginnings and thus with hand-me-down reproductive defenses.

Most disruptive of all to equilibration is the continuing climate roller coaster. Extraordinary discontinuities have characterized the centuries since the post-Wisconsin warm-up: the cataclysmic Younger Dryas setback, the Holocene maximum about 8000 BP, the Roman warm period, the sudden late Roman chill, the medieval maximum, the Little Ice Age, our post-industrial warming--any one of which may well have shifted the optimal ranges for and consequent interactions between azalea species by hundreds of kilometers. More recently, mankind, by clearing the land and the importing invasive

plants, insects, and pathogens, has continually moved the goalposts by altering the niches to which our azaleas are still adapting.

As someone who has doggedly retraced the tracks of Skinner, I have been continually dismayed by how many niches congenial to azaleas in the 1950s have vanished because of clear-cut silviculture, suburban sprawl, herbicides, right-of-way widening, and Chinese privet. Consider how much the chestnut blight must have revised the business plan for our eastern oaks a mere century ago. And if anthropogenic CO_2 buildup is half so dire as celebrities insist--well, back we shall all go to the static and largely tropical paradise of the Eocene (Prothero, 1994). Unlike the trilobites and ammonites and dinosaurs, we polar bears, latter-day apes, and deciduous azaleas dwell under a mighty curse. We live in interesting times.

In all cases, the length of a generation limits the pace of adaptation. We are not talking here about a container of an ideal gas or a population of wide-ranging birds for which an input at one point will be propagated quickly throughout. Nor are the azaleas annuals, whose genetic smoothing can be advanced incrementally year by year. Though azalea bushes usually become overmature at 30 years or so, a senescent azalea most often sends out offsets or its crown re-sprouts to continue the genotype through many cycles. It would not be surprising if the lifespan of azalea clones in protected settings can be many hundreds, maybe thousands, of years. My own work with the relictual tetraploid azaleas along the lower Gulf Coast rivers suggests just that (Miller, 2011). How much time will equilibration take when retarded by such unreconstructed holdovers from the past? After all, the oldest living things are not, as once believed, sequoias or bristlecone pines, but rhizomatous plants like trembling aspen (https://en.wikipedia.org/wiki/List_of_oldest_trees).

E pluribus unum. Of course, anomalies, ambiguities, and enigmas within azalea populations have been noted many times before, perhaps never so engagingly as by David Leach in this journal back in 1958, in an account of his visit to the wilds of western North Carolina:

> The traveling enthusiast might just as well leave his botanical keys at home. They are useless in any attempt to identify species in countless hybrid swarms which are encountered at every hand. Our first day in the field we inspected the azaleas atop Peachtree Knob, near Maggie, N.C. Here almost the entire plant population consists of yellow or orange-red flowered intermediates between *calendulaceum* and *bakeri*, with the addition of long corolla tubes both with and without hairs and glands, in about a third of the scarlet flowered plants. The long, hairy non-glandular tube is normally diagnostic for *speciosum* and is, in fact, the principal botanical means of distinguishing this species from *calendulaceum*. Yet the nearest *speciosum* is almost a hundred and fifty miles to the South, in central Georgia. The influence of its characteristics has apparently been transmitted through gene exchange originating at that distance

and being passed on progressively farther north into the heart of the North Carolina mountains. (Leach, 1958)

Yet even so liberated an observer as Leach assumes, quite conventionally, that all materials in a swarm must derive from discrete species growing elsewhere. At the heart of his approach is the old biblical scenario that makes species prior to hybrids in the same way that chemical elements are prior to compounds. This model works well enough for interactions between homogeneous, clearly delineated plant species with occasional intermediates here and there. It works for large land animals. It remains the credo of the Linnaean succession. However, was there ever a time before hybridization when the various azalea kinds stood alone, newly minted and untainted by neighbors? Leach, a Special Creationist unaware, is forced by the loaded word "hybrid" to postulate an underground genetic railroad to explain disjunctive traits.

It would have been simpler to suppose that those unexpected "speciosum" (*R. flammeum*) genes come not from some enclave far away but from latencies within the gene pool itself, perhaps from a genetic stew such as the one from which the Georgia azalea itself emerged. The azaleas, especially the tetraploids, have big genomes with a cornucopia of unexpressed potential created by millennia of gene transpositioning and neofunctioning that have been shared by inter- and intra-ploidal give and take. Large areas of unclassifiable azaleas full of novelties are to be found everywhere in the Southeast: on Leach's Peachtree Knob, in vast regions sketched by Skinner, on Gregory Bald, along rivers in Florida, and indeed, at edges of otherwise "pure" colonies from the Carolinas west. Surely these numerous and unpredictable populations are as much a part of the azaleas as the keyable populations are. Anyone who maintains that the so-called azalea hybrids are a marginal phenomena has read too many books with photos in them and has spent too little time in the field.

Think of these unclassifiable plants as business venture startups. As with companies, the vast majority fail, but now and then, when opportunities arise and the creative rearrangements and novelties made possible by "genomic shock" appear (McClintock, 1984), a botanical Facebook or Apple can emerge. Swarms are not patches of passive futility but hotbeds of trial and error, the likes of which have probably been around longer than those present stretches of less interesting uniformity that we have, willy-nilly, labeled species.

There is something seriously amiss with any approach, any model, any paradigm that treats so numerous and fecund a part of the biota as a nullity, accident, or footnote. Again, consider economics. The creative destruction by entrepreneurs is just as essential a part of the economy as the Fortune 500 are. The ongoing exchange between iPhone and Galaxy represents the technological equivalent of introgression or hybridization. What is a gene but information about a transferable feature? What is the consumer electronics sector itself but an inorganic syngameon?

It is not so much one smartphone or another that independently evolves by branching away from the group, but the smartphone sector itself that collectively adapts and evolves by ongoing lateral interchange. No one would diagram the history of smartphones by drawing a singly connected tree showing the various brands perched at the spreading branch tips like lonely birds. Similarly, the Pentanthera sector can be understood not as a list of independent and divergent species but as an inclusive, multiploidal, highly diversified collective species--an internally interactive system displaying a blurred modular substructure held together by exchanged and emergent genes.

Imagine the azaleas as a wide scattergraph with unevenly shaped and spaced condensations, a spattered background, and a few blank spaces. Something like one of the Hubble Telescope galactic cluster photos would do. The entire constellation of dot-organisms, rather than any single region of high density within, is the reproductively isolated population required by the biological species concept. The biological distinction between the one and the many is not so obvious as superficial impressions suggest. Is the primary Darwinian competitor the ant colony in your lawn or the lone six-legged arthropod? Is it the Portuguese man-o'-war washed up on the beach or each of its specialized zooids? Popular culture has even given us the Borg, which *Star Trek: The Next Generation* presented as a single, menacingly competitive entity. The Gaia Hypothesis (that the earth is itself a homeostatic megasystem) merely carries holism to a giddy extreme. Conceived as a whole, the Southeastern azaleas, I submit, constitute a confederation that maximizes its genetic flexibility by maintaining specialized though interacting populations in varied niches, much as your own specialized but interacting cell types are localized in various niches within your metazoan body.

Viewed holistically, the *R. canescens/periclymenoides* anomalies detailed above and the showy hybrid swarms need no longer be swept under the rug but can be seen to be clues indicating how interbreeding systems work. I am not, please understand, a lumper, nor am I appealing to the nearly meaningless distinction between species and varieties within a syngameon. Indeed, my experience in the field suggests that we need more names and certainly more subtle distinctions, not fewer, to describe the relationships among the azaleas.

Though science prefers on principle the simplest of explanations, sometimes nature does not cooperate. The Newtonian version of a single moving body matches commonsense world of billiard balls. Try applying that to an electron going through two slits. The inverse square law for gravitation is simple and elegant. The equations of General Relativity are not, but if you wish to understand fine points of the orbit of Mercury, you must wrestle with the latter. A list of azalea species is easily memorized, down to the keys; but if you wish to engage the azaleas in the field--as they are, warts and all, and not as we might wish them to be--something less immediately satisfying is required.

A classic Darwinian struggle between organisms of course takes place among the

named types. Drive up Wayah Bald in North Carolina to see *R. calendulaceum* and *R. arborescens* plants vying for nesting sites in the patchy, open wooded landscape. In the Red Hills of Alabama, *R. colemanii* and *R. alabamense* square off in intergrading moist and dry habitats. But a "higher" struggle also occurs between the Pentanthera and other taxonomic confederations. On Gregory Bald in the Smokies, the azalea model, perfected for open, disturbed, often transient conditions, is challenged by a blanket of rhizomatous *Vaccinium,* whose scat-scattered seeds do not demand the bare soil or mossy patches required by the azaleas. The blueberries will in turn yield to a canopy of oaks now that a cycle punctuated by burning has been halted.

Such a wholesale succession reflects competition not between individual manifestations but between overall economies or designs, just as when the agriculture-based ox cart, the mule wagon, and the coach-and-four were collectively displaced by the interwoven proliferation of vehicles based on the internal combustion engine. For similar reasons, the standard model of discrete species with split-the-difference hybrids is radically reductive when used to describe an integrated and evolving genetic system as complex and creative as the January-to-May saltwater-tolerant tetraploid swarm in western Florida (Miller, 2011) or the diploid milieu on Gregory (Shearer et al., 2012).

In the future, when multi-gene DNA studies based on exhaustive field-source sampling become as cheap and easy as flow cytometry is today, technology will most likely chart the coherence and origins of each of the current azalea taxa, diagramming in space and time the genetic web interweaving them all. Then we will move from an impressionistic to a dynamic ordering and be able to do more than speculate about how natural selection works within an inter- and intra-ploidal system of exchange. Perhaps we can even surmise then what the azaleas looked like before the Wisconsin glaciation. Today, we can scarcely guess what they looked like before Columbus.

Though at present we lack wide-ranging molecular data to put to the test the communal-species concept for the azaleas, the phenomenon itself can be observed today in what is the most intensely studied syngameon of all, Darwin's famous Galapagos finches. The ground finches *Geospiza* are a very closely related, fitfully interbreeding group that have specialized to make their livings in six or so niches within their droughty volcanic island homeland. Their response to occasional radical shifts in rainfall patterns is marked by changes in their famous beaks, which vary in shape and size during different moisture regimes. By minute study over many years, a husband and wife team named Grant has charted the counts and the fates of the finches and their hybrids on a single island (Weiner, 1994).

The Grants' most noteworthy discovery has been the birds' extraordinarily rapid adaptations during the coming and going of El Niño events. Finch species wax and wane and hybridize, bringing forth new members in response to suddenly altered vegetation. Rare rainy spells favor small-seeded vegetation and consequently finches with nimble beaks; drought (the norm) favors hard-seeded vegetation and finches

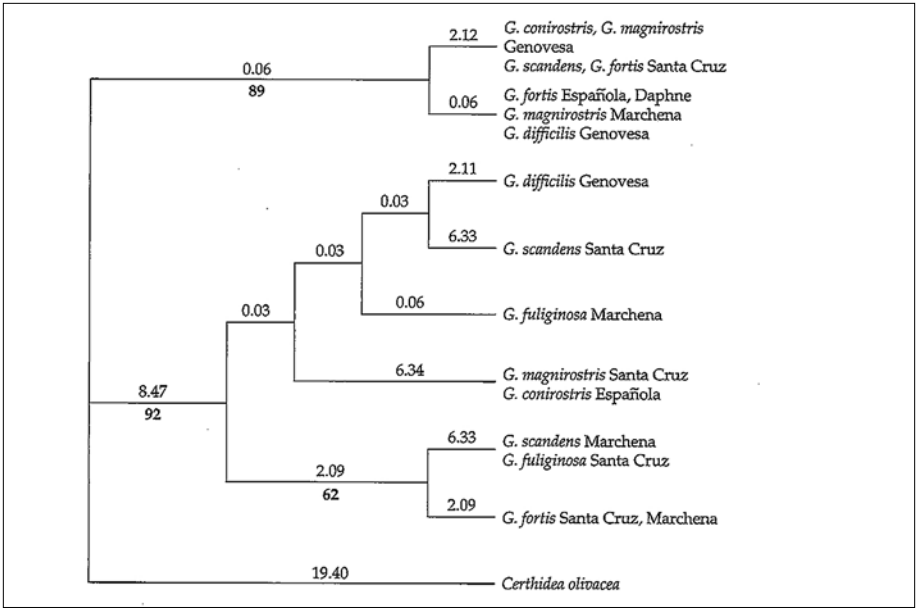


Fig. 6. Phylogenetic tree for *Geospiza* from Arnold, 2006.

with sturdy "nutcracker" beaks. Hybrids unfit in the dry flourish and reproduce with superior fitness during damp El Niños.

The wets in the Galapagos last one or two years. What is in effect reticulate evolution, or at least evolution-in-waiting, takes place at rates undreamed of by Darwin. Trapped on their oceanic islands, the finches are unable to migrate to new, congenial habitats, perhaps the most common way continental species maintain their steady states when confronted with habitat change. *Geospiza*, however, has another trick up its feathers. If some sudden long-lasting or secular transformation were to make wet conditions the norm and the dry the aberration, the wet cohort would as usual appear in a flash; but in that case, they would persist. Hybridization among the finches floats trial balloons continuously. Only at times of environmental discontinuity do some fly.

The ground finches as a whole function much like an investor with a diversified financial portfolio in cash, gold, equity stocks, bonds, commodities, real estate, and so forth. The recognized species with their permeable reproductive barriers are fungible hedges against climate change. The basic biological entity responding to the rainfall cycles is not any one of the six recognized finches but the overarching entirety *Geospiza* with its resources divvied out into half a dozen genetic investments. The finches would be collectively far less fit if merged into a single generalized species in the manner of an investor who imprudently stakes his life savings on a single commodity or stock.

Fig. 6 shows a published phylogenetic tree of *Geospiza.* Note that the same species are repeated on different branches because they pop up on different islands from different

populations (Arnold, 2006). These multiple origins betray how radically reticulated the genus is and how misleading tree diagrams can be. In the finches, species emerge from the genetic matrix when a suitable niche opens up on an island. Darwin himself observed an additional ground finch, a super-beaked subspecies of *G. magnirostris* that is no longer seen but might reappear if conditions were to favor it. Though it is tempting in such a tangle to bypass the organisms and to follow Dawkins (1990) in declaring the genes themselves and not their expressions to be the competitive units, to be significant the genes must be realized in birds.

Further support for the hybrids-in-waiting paradigm is provided by the American hawthorns, which seem to have responded to altered patterns in agriculture during the last century with new and vanished taxa (Lance, 2014). The sunflowers have generated novel species by reticulation quite recently, at least three from hybridization between a single pair of diploids (Rieseberg, 1991). By most accounts, our domesticated wheats (some hexaploid) had their origins in natural crosses within mixes of fitfully compatible Middle Eastern grains (https://en.wikipedia.org/wiki/Wheat). The rowan trees (*Sorbus*) in the Avon gorge in England show patterns of interbreeding and "mini-species" formation in an exceedingly complex diploid and polyploid syngameon (Robertson et al. 2010). And animals other than finches apparently practice syngameon-based proliferation. Thousands of declared species of cichlid fish have appeared in the African Rift lakes during the last tens of thousands of years (Arnold, 2006). Surely our species-overrich azaleas should by all rights be added to this list.

What's in a Name?

For syngameons such as the cichlids, the hawthorns, and the azaleas, Darwin's grand vision of speciation as a slow, continuous, and divergent unwinding of distinct strands in deep time could scarcely be farther from the truth. To match nature's communal modes of sudden diversification, we need a terminology reflecting the multilayeredness of syngameon evolution and its profligate creativity. Unfortunately, in spite of the revolutionary results of ongoing genetic and genomic research, a recognized species in a syngameon remains as it was at the time of Linnaeus, little more than a recognizable appearance, a sight that Adam himself, if asked, might have named. The Latin root *spec-*, referring to a look or a glance, suggests precisely that.

Admittedly, catchall nomenclature causes no problems when we engage in informal exchanges. Who would correct a friend who speaks of both clams and lobsters as "shellfish" or who refers to all small, pesky arthropods as "bugs"? Problems arise only when experimental research treats bookkeeping tags as though they were reliably clear and distinct phenomena upon which to base quantitative analysis. Alchemy became chemistry only when the nebulous idea of mysterious substances was deflated into a concrete and testable terminology that distinguishes elements from compounds, acids from bases, organics from inorganics, alkanes from alkenes, and so on. Is our idea of a

species any less of a will-o'-the-wisp than that of a substance? Just how could a sequencer select proper samples to represent *R. viscosum* unless he/she determines by hard science what *R. viscosum in sensu lato* is, rather than just accepting on faith what the "species" has been declared to be? Thanks to the good fortune of a comfortable retirement, a tolerant wife, Google searches, emails, interstate highways, GPS, and modern digital mapping displays, I have probably visited more plants in the wild that one might call "*R. viscosum*" than anyone ever has; and the only thing they have in common of which I am truly confident is that they are all diploids.

The practice of taxonomy can best be compared to that of medical psychology, another behavioral science that is at least as much prescriptive as descriptive. Psychological states have much the same fuzzy consensual reality that the azalea species possess. Their scientific pretensions are best revealed by the politicized changes over time in what is or is not voted to be a mental illness. Labels-of-thumb are often rhetorically and even forensically useful terms that have acquired a scientific patina by repetition and by virtue of the jargon employed in their declarations. Even confusing or opaque descriptions seem objective when mere adjectives are elevated ("hypostatized" is the philosophical term) into the apparent solidity of what are called "mass nouns." Azaleas are certainly beautiful, but I have seen "Beauty" mostly in philosophical treatises and in poems. In many a bog and seepage slope, I have found long-tubed, sticky, white-flowered azalea bushes of varied bloom times, hairiness, habits, and habitats; but I have seen *R. vicosum* only in print. And as Mark Twain wryly noted about the German language, nouns become all the more imposing when they are capitalized.

All in all, botany would do well to forgo the rhetorical and cultural baggage of the word "species" and develop analytical terms that wear their assumptions on their sleeves. Implicit in the seemingly innocent word "species" are prejudgments about the nature of azaleas and other syngameons that will not survive a long day in the woods. As any feminist will tell you, however, longstanding verbal habits that perpetuate biases die hard indeed. Perhaps the best we can do is to demystify the unkillable term "species" by rethinking in the finches what a species is and what a hybrid, with an eye to groups like the azaleas.

If we declare some finches to be species and consequently demote their crosses to the lowly rank of hybrids, we fail to see that the wet and the dry manifestations are two sides of a single coin. From a dry point of view, the privileged units are the declared species. Their intermediates are thus hybrids. From a wet perspective, some of these hybrids are "really" species; and handy-dandy, the named species become hybrids. Such a mirror symmetry or complementarity, to which modern physics has become accustomed, goes unremarked because of the present dominance of dry conditions and because of the Platonism and Biblical fundamentalism built into the origins of taxonomy itself. Since we exist in but one of a long series of fleeting warm interludes within the Pleistocene glacial regime, this bias in the way the finches are conceived is likely to be reversed by

shifts in ocean currents. We can only hope that our own somewhat equilibrated species will be around in some form or another to notice.

Replace the decadal rhythms of El Niño with the 100,000 year Milankovitch climate cycles of the later Pleistocene and replace the finches with the Pentanthera, and you obtain my conjecture about our deciduous azaleas, which seem to be a collective species hedged not against El Niño but against La Glaciación. For the azaleas and other syngameons, memberships could be made explicit, perhaps with an asterisk, to warn researchers to be wary whenever they accept labels on plants or treat declared species in overpopulated genera as though they are all of a sort like peas in a pod. Awareness of the collectivism of syngameons might keep our phylogenetic diagrams better attuned to the recent discoveries of the roles of polyploidy and gene exchange in the plant proliferation. Syngameons, especially those comprising various ploidy levels, are likely to be the primary sources of those genetic revolutions that characterize the creative exuberance of angiosperm evolution.

The most persistent motif running through my fieldwork during the last decade has been the observation that whenever we put a name on something, we abandon all further seeing and thinking. Once white *R. colemanii* was called "alabamense," expert fieldmen failed to notice that it grows in the wrong place, blooms at the wrong time, and displays the wrong growth habit. Call the multitudes of early pinks along the Yellow River in Florida "canescens," and the obvious traits that cry out "austrinum" simply fade into a familiar pink blur at a distance. Variations within *R. viscosum* and *R. canescens* that are likely to be crucial for understanding their origins and natures have been papered over by pettifogging *or*'s in taxonomic diagnoses.

Such complications do not concern herbarium or laboratory workers because for them, the names are the realities and the living plants are vague suppositions. We outdoor types at least have the chance amid unlabeled nature to rethink our own all-too-comfortable habits. Too often, our outings are little more than a binomial version of the old TV game show *Name That Tune.* The best questions resist answering because they lead not to a complacent sense of closure but to a heightened awareness of the distance between our everyday ways of thinking and the inexhaustible complexity and wonder of things. One of my favorite cartoons of all time was of a discreetly naked Adam chatting with an equally discreet Eve standing beside a large mammal. He: "Oh, I don't know. It just looked like a hippopotamus."

Ron Miller is a full time chaser of wild azaleas and a some time reader in the History of Ideas and in the philosophy of science. He wishes to thank John Perkins for the exchange of ideas and for sharing many links to pertinent articles from the technical journals.

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Rhododendron, Camellia, and Magnolia Group's "Top 100 Rhododendrons," 2016

Sally Hayward
Canterbury, Kent, England

Here is the final list by the UK's Royal Horticultural Society (RHS) Rhododendron, Camellia, and Magnolia Group (RCMG) of the "Top 100 Rhododendrons," the result of combining all the lists of "10 favourite rhododendrons" submitted by 258 RCMG members from around the world. Together we have created a marker in time for the end of our first one hundred years that we can be proud of, and something that will stand up to the scrutiny of those that follow us in the years to come.

The whole process was entirely democratic and the end results extremely close. The front runners were neck-and-neck for most of the time but in the end the number one choice was *Rhododendron degronianum* subsp. *yakushimanum,* and we can confirm that it received global support. We are extremely fortunate that our top choice was a rhododendron that is naturally in bloom at the time of both the Centenary Event at Wisley and also for our exhibit at the Chelsea Flower Show, which should enable us to showcase an actual plant in full bloom on both occasions. My thanks to everyone who contributed to this project.

Sally Hayward

Top 100 Rhododendrons

1 *R. degronianum* subsp. *yakushimanum* 'Koichiro Wada' AGM 1993
2 *R. macabeanum* AGM 1993
3 'Loderi King George' AGM 1993
4 *R. augustinii* AGM 1993
5 *R. falconeri* AGM 1993
6 *R. cinnabarinum* subsp. *cinnabarinum*
7 *R. bureavii* AGM 1993
8 *R. arboreum*
9 *R. pachysanthum* AGM 1993
10 *R. sinogrande* AGM 1993
11 *R. edgeworthii* AGM 1993
12 *R. schlippenbachii* FCC 1944
13 'Polar Bear'
14 *R. calophytum* AGM 1993
15 *R. thomsonii* AM 1973
16 *R. auriculatum* AM 1922
17 'Fragrantissimum' AGM 1993
18 *R. williamsianum* AGM 1993
19 *R. maddenii* subsp. *crassum*
20 *R. mallotum* AM 1973
21 *R. luteum* AGM 1993
22 *R. niveum* AGM 1993
23 *R. barbatum* AM 1954
24 *R. lindleyi*
25 *R. roxieanum*

26 'Sir Charles Lemon' AGM 1993
27 *R. yunnanense*
28 *R. fortunei* AGM 2012
29 *R. rex* AGM 2012
30 *R. decorum* AGM 2002
31 *R. campylogynum*
32 *R. nuttalii*
33 *R. dalhousieae* AM 1930
34 *R. hodgsonii*
35 *R. wardii*
36 'Nancy Evans' AGM 2002
37 *R. sinofalconeri*
38 *R. orbiculare* AGM 2002
39 *R. kesangiae*
40 *R. souliei* FCC 1909
41 'Rubicon'
42 *R. trichostomum* FCC 1976
43 *R. lacteum* FCC 1926
44 'Taurus' AGM 1993
45 'Loderi Venus' AGM 1993
46 'Lady Alice Fitzwilliam' AGM 1993
47 *R. quinquefolium* AM 1931
48 'Alison Johnstone' AM 1945
49 *R. keysii*
50 *R. griffithianum* FCC 1866
51 *R. vaseyi* AGM 1993
52 *R. pseudochrysanthum* AGM 1993
53 *R. yuefengense*
54 *R. campanulatum*
55 *R. oreodoxa*
56 *R. griersonianum* FCC 1924
57 'Sappho' AM 1974
58 'Lem's Cameo' AGM 1993
59 *R. lutescens*
60 *R. montroseanum*
61 'Lem's Monarch' AGM 1993
62 *R. argyrophyllum*
63 'Lady Chamberlain' FCC 1931
64 *R. cerasinum* AM 1938
65 *R. viscosum* AGM 1993
66 *R. dauricum*
67 *R. calostrotum*
68 'Crest' FCC 1953
69 'Elizabeth' FCC 1943
70 *R. grande* FCC 1901
71 'Phyllis Korn'
72 *R. davidsonianum* AGM 1993
73 *R. irroratum* 'Polka Dot' AM 1957
74 'Mi Amor' AM 1975
75 'Hotei' AM 1974
76 'Hydon Velvet'
77 'Yellow Hammer' AGM 1993
78 *R. platypodum*
79 *R. protistum*
80 *R. excellens*
81 *R. oreotrephes* AGM 2012
82 *R. mucronulatum*
83 'Cilpinense' AGM 1993
84 'Point Defiance' AM 1992
85 'Queen of Hearts' FCC 1986
86 'Horizon Monarch' AGM 2002
87 'Teddy Bear'
88 'Fortune' FCC 1938
89 *R. fulvum* AM 1933
90 *R. elliottii* FCC 1937
91 'Cornish Cross'
92 'Markeeta's Prize' AGM 1993
93 'Countess of Haddington' FCC 1862
94 'Matador' FCC 1946
95 'Loder's White' AGM 1993
96 'Seta' FCC 1960
97 *R. sutchuenense*
98 *R. neriiflorum*
99 'Nobleanum'
100 *R. recurvoides* AM 1941

Editor's note: Species names and format have in some cases been modified to meet the publication protocols of JARS. As an observation, this listing reflects opinions of RHS RCMG members, who being really keen rhododendron "aficionados" have shown their preference for rhododendron species versus hybrids. It would be interesting to determine what the "Top 100 Rhododendrons of ARS members" are! Pictures of the Top 20 start on p. 161.

Top 20 of the Top 100

1. *R. degronianum* subsp. *yakushimanum* 'Koichiro Wada'. Photo by Garth Wedemire.

2. *R. macabeanum*. Photo by Garth Wedemire.

3. 'Loderi King George'. Photo by Garth Wedemire.

4. *R. augustinii*. Photo by Garth Wedemire.

5. *R. falconeri*. Photo by Garth Wedemire.

Top 20 of the Top 100

6. *R. cinnabarinum* subsp. *cinnabarinum* var. *roylei.* Photo by Garth Wedemire.

7. *R. bureavii*. Photo by Garth Wedemire.

8. *R. arboreum.* Photo by Garth Wedemire.

9. *R. pachysanthum*. Photo by Garth Wedemire.

Top 20 of the Top 100

10. *R. sinogrande*. Photo by Garth Wedemire.

11. *R. edgeworthii*. Photo by Garth Wedemire.

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12. *R. schlippenbachii*. Photo by Garth Wedemire.

13. 'Polar Bear'. Photo courtesy of Hirsutum.

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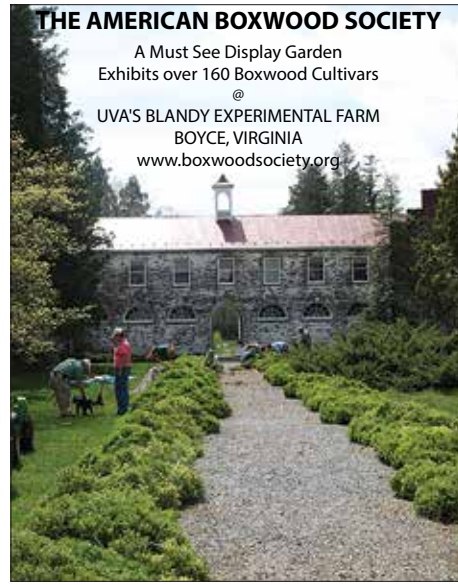
Top 20 of the Top 100

14. *R. calophytum*. Photo by Garth Wedemire.

15. *R. thomsonii*. Photo by Garth Wedemire.



Top 20 of the Top 100

16. *R. auriculatum*. Photo courtesy of Hirsutum.

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17. 'Fragrantissimum' AGM 1993. Photo courtesy of Hirsutum.

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18. *R. williamsianum*. Photo by Garth Wedemire.

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19. *R. maddenii* subsp. *crassum.* Photo courtesty of Hirsutum.

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Top 20 of the Top 100

20. *R. mallotum*. Photo by Garth Wedemire.

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Errata

In the article on page 84 on the Western Fall Regional Conference by Harold Greer in the Spring 2016 issue, his address was incorrectly listed as Salem, Oregon, when in fact he lives in Eugene, Oregon. We regret the error!

Fig. 11b on page 68 in the Spring issue was incorrectly labeled *R. wightii*; it is *R. lanatum.*

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