

## Rediscovering Rhododendron Dell, Part 2

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**“They [hoodlums] deliberately twist off the metal labels from trees and shrubs, so that valuable information is sometimes lost forever and the yearly replacement bill is terrific. They break hundreds of unopened flower buds off the Rhododendrons in the early spring.”**

**—Edgar Anderson, Arnold Arboretum arborist, June 4, 1932**

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Planted in close proximity to one another, *Rhododendron* ‘Old Port’ 990-56-B (a *catawbiense* hybrid with “vinous crimson” flowers, seen here) was incorrectly labeled as *R.* ‘Red Head’ 329-91-A (with “orient red” flowers). A description published by the Royal Horticultural Society was used to verify the only remaining plant as ‘Old Port’; a lack of indumentum on the undersides of the leaves distinguishes it from ‘Red Head’.

The Arboretum’s plant records attest to episodes of vandalism, arson, theft, and other willful shenanigans that have occurred in the living collections over the years. In 2010, a pile of plant record labels was found in Rhododendron Dell. This intentional—and completely unsanctioned—removal of labels from numerous specimens by an anonymous person(s) can certainly be considered a major transgression. But, to quote Albert Einstein, “In the middle of difficulty lies opportunity,” and this act of vandalism initiated an unplanned

curatorial review that has advanced our understanding of the rhododendron collection and further fostered its use.

In response to the identity crises in Rhododendron Dell, a multi-year collection review was conceived. Identity verification and field work (e.g., labeling, photographing) was timed to coincide with peak flowering. Winter months were dedicated to auditing and digesting the raft of secondary documentation (e.g., records, articles, herbarium specimens, images) amassed over the collection’s 141-year history. Through

each of these periods, real-time observations about the collection were recorded in curatorial databases.

The initial assessment of the collection was sobering. Many labels were missing and others had been haphazardly rehung by non-Arboretum staff. Since it was the dead of winter when the errant labels were found, the rhododendron flowers—the hallmark structures used to verify these cultivars—were months away from opening. Partial identities were confirmed using the leaf characteristics of a few scattered lepidote rhododendrons and some elepidotes with indumentum. But without flowers, determinations and label hanging had to wait until spring.

## FLOWERING FACILITATES FIELD WORK

### *Imaging*

The window of opportunity to study flowers in *Rhododendron* Dell is finite. Depending on weather conditions, flowers can remain for days

or wither soon after opening. To overcome the challenges of flower senescence, we used digital cameras to capture thousands of new diagnostic images over the past three years. This provided the first comprehensive image archive of the collection. Paired with in-field observations, the images have helped us positively identify specimens and will eventually become a valuable online resource. We will continue to add rhododendron images to the archive over time.

### *Inventory field checks*

Persistent field observations render the best results. Over the past three growing seasons, detailed observations of *Rhododendron* Dell plants have been catalogued in curatorial databases. Prior to these efforts, the last major curatorial review was undertaken in 1990. Regular, systematic review of collections and their secondary documentation (e.g., maps) will likely reduce the need for time-consuming curatorial inputs in the future.

## Lepidopteran on an Elepidote

**FOR IDENTIFICATION purposes, rhododendrons can be divided into two broad groups, lepidotes and elepidotes. Lepidote rhododendrons have small scales on the undersides of their leaves (“lepid” is the Greek root word for “scale”). They also typically have small leaves and grow as small shrubs. Elepidote rhododendrons do not have leaf scales, usually have large leaves, and grow quite large. Some elepidotes have indumentum (dense, felted hairs) on the leaf undersides; color and density of the indumentum can be a key to identification.**



**Seen here, an eastern tiger swallowtail butterfly (*Papilio glaucus*) rests on an elepidote rhododendron. Butterflies and moths are in the insect order Lepidoptera, which references the tiny scales that cover their wings (and bodies).**



The gorgeous cultivar 'Brookville' was introduced in 1959 by the Westbury Rose Company based in Long Island, New York.



On larger specimens, new record labels have been attached to lower trunks with screws.

### **Labeling**

Following the imaging and field checks, hundreds of new anodized aluminum records labels were embossed and placed in Rhododendron Dell. Many are mounted on three-inch stainless steel screws at the base of large stems. Additional records labels have been hung on branches for easy retrieval. In addition to these, prototypes of larger photo-anodized aluminum display labels were tested over the peak flowering periods. Feedback regarding these labels has been overwhelming positive and the roll-out of permanent signage is expected in 2014.

### **Mapping**

The current maps of Rhododendron Dell are being revised. Vector data (e.g., points, lines, and polygons) representing plants and hard-scape features are being re-collected using global positioning system (GPS) equipment. These technologies allow for decimeter-accurate field mapping and update the triangulation and submeter-accurate data collection of the past. Note that interactive maps of Arboretum collections are available at <http://arboretum.harvard.edu/plants/collection-researcher/>

## **WINTER AUDITS AND RECORDS REVIEW**

### ***Nomenclatural review***

In advance of label production, we undertook a comprehensive review of rhododendron nomenclature. A total of 103 cultivar names were standardized following *The International Rhododendron Register and Checklist* (Royal Horticultural Society 2004). This effort revealed inaccuracies in spelling, punctuation, and use of synonymy for 20 elepidote cultivars. In addition to these edits, the name records in BG-BASE (collections management software) were appended with hybridizer, introducer, parentage, awards, descriptions, and common name as found in the aforementioned resource. We have used this information to create new display labels and have updated online resources.

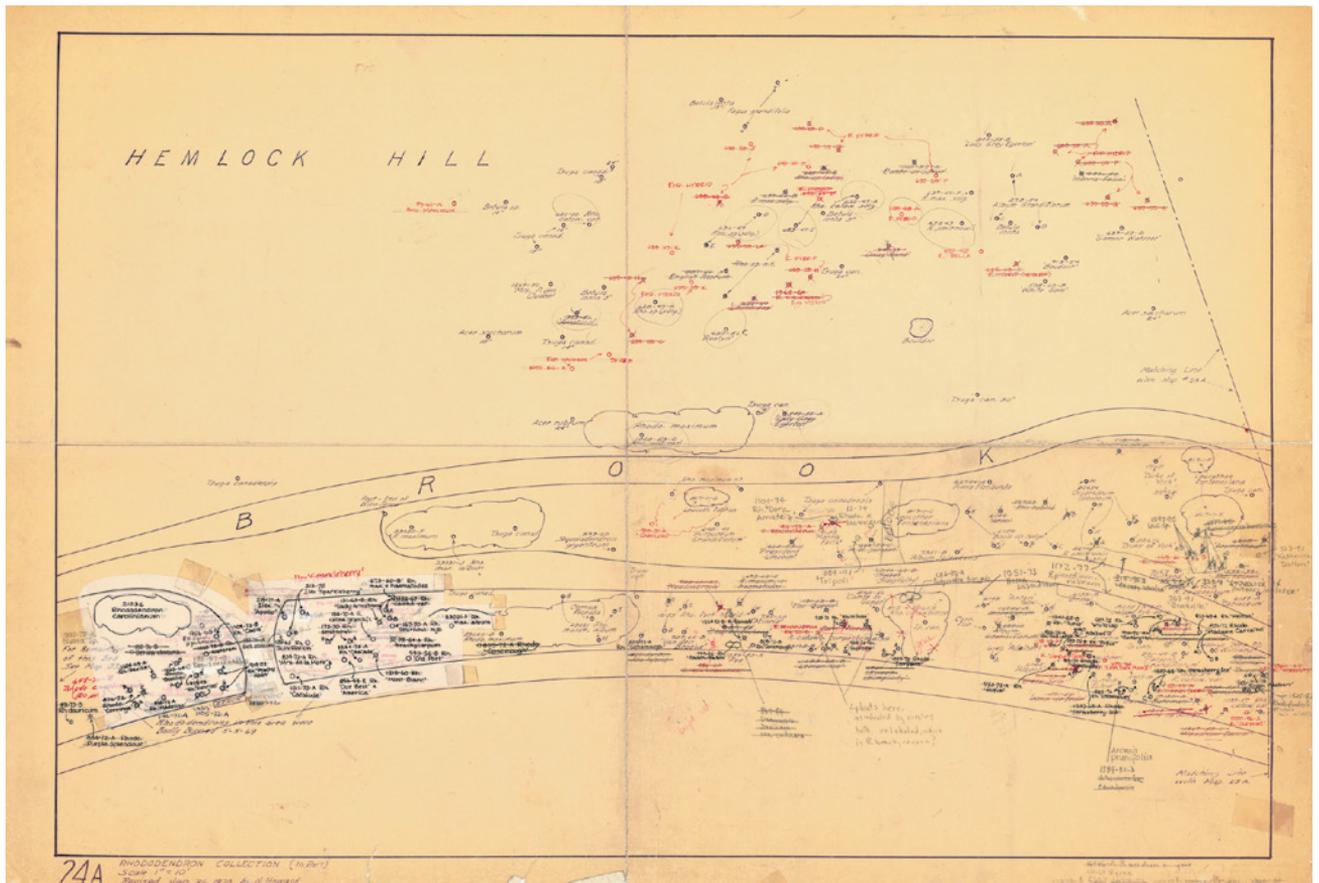
### ***Archival maps and records***

The first maps documenting the location of accessioned plants in the permanent collections were purportedly authored by Henry Sargent Codman in 1887. Plan views of the landscape



This specimen of *R. 'Purpuream Elegans'*, accession 6135-B, came to the Arboretum in 1891 from the nursery of Anthony Waterer, who hybridized this and many other rhododendron cultivars.

from this era were copied from the Frederick Law Olmsted papers in 1987 but as yet do not reveal individual planting sites. Fortunately, the detailed cartography begun by León Croizat in the 1930s is well preserved in the Arboretum archives. Croizat, employing a triangulation survey method, made his cartographic representations of features (e.g., plants, hardscape) on 24- by 36-inch tracing cloth. Iterations of these drawings were annotated based on the field work of Heman Howard and a few others. The last notations on hand-drawn maps covering the two acre Rhododendron Dell area are from the 1980s and 1990s. A total of 90 maps at scales of 1 inch=10 feet and 1 inch=20 feet masterfully convey the scope of these collections over a roughly fifty year period. Since 1987, map edits have been accomplished digitally using AutoCAD (from 1987 to 2008) and ArcGIS (since 2009) software.



Hand-drawn and annotated paper maps like this one have been replaced with accessible digital files.



**Rhododendron flower color is often lost in herbarium specimens; compare the 1936 specimen of 'Melton' (left) to a current digital image of its flowers (right).**

In 2010, grant funds awarded through the Museums for America program of the Institute of Museum and Library Services (IMLS-MFA) allowed Jonathan Damery, then a curatorial assistant, to scan and georeference the collection of hand-drawn maps. Using ArcGIS software, these rasters can be layered with current representations of the Arboretum grounds. In addition, they can easily be printed on 11- by 17-inch paper for problem solving in the field. The IMLS-MFA grant also provided resources to enter the Arboretum's entire plant records card catalogue and review accession books (dating from 1872 to 1987). Spearheaded by curatorial assistant Kathryn Richardson, the entry of these data has improved all aspects of curatorial work.

### ***Herbarium resources***

A curatorial review would not be complete without a thorough review of specimens in the Arboretum's Cultivated Herbarium. In the case of hybrid rhododendron, these resources are limited for one major reason: flower color.

Often lost in the drying process, flower color variations (including the blotch on the dorsal lobe) are critical identification characters of rhododendron hybrids. Other flower data such as truss height, width, shape, fragrance, and number of buds can be difficult to discern (or be entirely absent) from a two-dimensional dried specimen. Without question, examination of the whole plant at relevant phenophases provides a more accurate determination.

The importance of identifying rhododendron flower color accurately is well documented. Arboretum horticulturist Donald Wyman was a proponent of the Nickerson Color Fan published by the American Horticultural Society and used this resource to describe the flowers of Rhododendron Dell collections (Wyman 1969). Agents of the Royal Horticultural Society, United Kingdom, have also published a color chart, which many have used to describe rhododendron cultivars (Leslie 2004). These color designations have been saved to the Arboretum's plant records database and are easily retrieved.

## A LOOK AHEAD

### *Collections development*

The Arboretum's curatorial staff is analyzing the current inventory of evergreen hybrid rhododendrons and will determine which new cultivars will be acquired. In the meantime, anticipation grows around rhododendron hybrids already being raised by Dana Greenhouse staff. Of these, *R. 'Robert Stuart'* will likely be sited in Rhododendron Dell next year. Registered with the Royal Horticultural Society in 2006 by long-time Dana Greenhouse volunteer George Hibben in collaboration with the Massachusetts Chapter of the American Rhododendron Society, *R. 'Robert Stuart'* is an early flowering lepidote with *R. minus* and *R. concinnum* in its parentage. Hybridized by the late Robert Stuart of Stratham, New Hampshire, unrooted cuttings were obtained from Gus Mehlquist's garden by Arboretum propagator Jack Alexander in 1978. The resulting plants were sited in the permanent collections and propagated for distribution through the 1989 Arboretum Plant Sale. By 1991, the Arboretum's specimens had died but George Hibben's plant thrived. It is from Hibben's plant that repatriation by way of cuttings of this cultivar is made possible. Our detailed record keeping and relationships with like-minded plantspeople ensure important germplasm is conserved. *R. 'Robert Stuart'*, with its purple hued flowers, fading to pink, has been missed in the permanent collection and its return will be welcomed.

Beyond historical cultivars, the core collections of large-leaved *Rhododendron* species are under continuous development. In 2006, wild collected seeds of *R. catawbiense* and *R. maximum* were obtained from Mount Holyoke College Botanic Garden in South Hadley, Massachusetts. Cultivated under a lath house added to the Dana Greenhouse in 2007, these T. E. Clark collections from North Carolina were added to the permanent collections in 2012.



This specimen of *R. fortunei* (accession 1-2008-A) with a lineage from west of Tien Mu Shan Reserve in China was planted in Rhododendron Dell this spring.

More recently, a lineage of Peter Del Tredici's 1989 collection of *R. fortunei* from west of Tien Mu Shan Reserve, Zhejiang, China, was added to the collection this spring.

### *Infrastructure and horticultural care*

In Rhododendron Dell, scouring by Bussey Brook has compromised the root zones of *R. 'Purpureum Elegans'*, *'Coriaceum'*, *'Caroline'*, and *'Francesca'*. Repropagation efforts to conserve these accessions are underway by Dana Greenhouse staff. At the same time, collections managers are considering options that would slow the flow of Bussey Brook upstream and shore up existing infrastructure installed to mitigate bank erosion through Rhododendron

## Other Notable Rhododendron Dells

The Arnold Arboretum's Rhododendron Dell is modest when compared to the largest rhododendron collections of the same name found on earth.

- **Dunedin Botanic Garden is New Zealand's oldest botanic garden. Celebrating its 150th anniversary in 2013, its nearly 3,500 rhododendrons are displayed across 10 acres (4 hectares). Dunedin's Rhododendron Dell specimens flower during the month of October.**
- **Royal Botanic Gardens, Kew, United Kingdom, maintains a Rhododendron Dell dating to 1734. It contains more than 700 rhododendron specimens and reaches peak flowering in April and May.**
- **Conceived in 1942, Golden Gate Park's John McLaren Memorial Rhododendron Dell in San Francisco, California, has been under extensive renovation since 2001. Between April and May, an estimated 850 rhododendron hybrids flower.**



Arboretum horticulturist Brendan McCarthy and Hunnewell interns John Aloian and Ryan Plante at work in Rhododendron Dell, May 2012.

Dell. Previous efforts in this regard were completed for the western section (in 1990) and eastern sections (in 1995) of Bussey Brook. With some repairs over 20 years old, an undertaking of similar scope is needed.

Arboretum horticulturists put much effort into maintaining the Rhododendron Dell collections. Annual removal of bud blast, a fungal disease that ruins flower buds, has greatly reduced its incidence. Damage from root weevils (chewed leaves) and stem borers (dead branches) is being monitored and control methods are being investigated. Extensive deadwood removal by horticulturist Sue Pfeiffer in the fall of 2012 has encouraged new stems to regenerate from the base of many historical cultivars. This new growth is encouraging, since some of the finest specimens in the collections currently hold their flowers well above the heads of their admirers. In addition to maintenance pruning, the separation of abutting accessions by removing tangled layers is underway. This step is critical and will undoubtedly help prevent identity confusion going forward.

Attention has also turned to the overstory. The application of imidacloprid (insecticide) has saved some of the surrounding eastern hemlocks (*Tsuga*

*canadensis*) from the voracious appetites of hemlock woolly adelgid (HWA), but we continue to research which tree species should be planted to succeed old-growth hemlocks. To prevent excessive competition, it is likely that a number of oak (*Quercus*), mountain ash (*Sorbus*), beech (*Fagus*), and linden (*Tilia*) accessions will be removed or transplanted from Rhododendron Dell in the coming year.

### HYBRIDIZATION

Hybridization in *Rhododendron* can occur naturally and frequently between sympatric species (Milne et al. 1999), but it takes the hands of plant hybridizers to bring together wild and cultivated *Rhododendron* from around the globe. When successful, these intentional unions result in exciting new crosses. The Rhododendron Dell collections reveal the masterful talents of many hybridizers through the years. The earliest and latest documented hybridization efforts in the Arboretum's collection are seen in *R.* 'Cunningham's White' (introduced by James

Cunningham in 1830) and *R.* 'Landmark' (from Wayne Mezitt in 1985).

The specimens in Rhododendron Dell come from over 65 sources, including nurseries, hobbyists, and other botanical institutions. The highest numbers of accessions were acquired from Waterer (Bagshot and Knap Hill), Van Veen Nursery, Westbury Rose Company, and agents of the American Rhododendron Society, Massachusetts Chapter. There are extensive personal and institutional legacies tied to each specimen in Rhododendron Dell.

### Parentage

Tens of thousands of *Rhododendron* cultivars have been formally registered under the auspices of the Royal Horticultural Society. Of these, the Arnold Arboretum grows a mere fraction. At least one or all of the parent species of Rhododendron Dell cultivars are known. Eighteen cultivars (17% of total) are of unknown parentage or probable parentage is cited; these are excluded from Table 1.



*Rhododendron* 'Cunningham's White' was introduced around 1830 by James Cunningham of Edinburgh, Scotland, and has been widely used in hybridizing.



A catawbiense hybrid from E. V. Mezitt, Weston Nurseries, *Rhododendron* 'Henry's Red' is a relatively young cultivar (selected around 1970, registered in 1987) noted for its deep red flowers and excellent cold hardiness.

**Table 1. Arnold Arboretum: The Parent Species of Rhododendron Dell (RD) Cultivars as of January, 2013**

SUBSECTION	SPECIES	TRAITS VALUED BY HYBRIDIZERS	NATIVITY	% of total (RD) cultivars (n = 103) with known parent (backcrosses not tallied)
Fortunea	<i>R. griffithianum</i>	Large flowers (some of the largest of the genus)	E. Nepal, Sikkim, Bhutan, N.E. India	3% (n = 4)
Fortunea	<i>R. fortunei</i>	Scented flowers; heat resistant	Most widely distributed Chinese species.	7% (n=8)
Pontica	<i>R. catawbiense</i>	Extreme hardiness; tolerant of exposed sunny sites	E. United States; South-eastern Appalachian Mountains	48% (n = 50)
Pontica	<i>R. caucasicum</i>	Tolerant of poor, dry soil	N.E. Turkey and parts of the Caucasus	2% (n = 3)
Pontica	<i>R. macrophyllum</i>	Flowers often with crinkled lobes, rachis fairly tall	W. North America	<1% (n = 1)
Pontica	<i>R. maximum</i>	Large, narrow, dark green leaves	E. North America	5% (n = 6)
Pontica	<i>R. ponticum</i>	Species commonly used as understock	Caucasus and N. Turkey	5% (n = 6)
Pontica	<i>R. smirnowii</i>	Hardiness; thick indumentum	N.E. Turkey and Caucasus	2% (n = 3)
Rhodorastra	<i>R. dauricum</i>	Hardiness; early flowering	E. Russia, Siberia, Mongolia, N. China, Japan	1% (n = 2)
Rhodorastra	<i>R. mucronulatum</i>	Hardiness; early flowering	E. Siberia, China, Mongolia, Korea, Japan	2% (n = 3)
Neriiflora	<i>R. haematodes</i>	Small stature; longevity of leaf retention	China: W. and N.W. Yunnan	<1% (n = 1)
Pentanthera	<i>R. prinophyllum</i>	Hardiness	E. North America	<1% (n = 1)
Scabrifolia	<i>R. racemosum</i>	Tolerant of dry soils	China	1% (n = 2)
Arborea	<i>R. arboreum</i> ssp. <i>arboreum</i>	Leaf, silvery indumentum; flower bright red to carmine, rarely pink or white	Himalayan foothills, Kashmir to Bhutan	2% (n = 3, two are <i>R. arboreum</i> )
Arborea	<i>R. arboreum</i> ssp. <i>cinnamomeum</i> var. <i>roseum</i> (Album Group)	Leaf, rusty brown indumentum; flower with purple spotting in throat	E. Nepal, N.E. India, Bhutan, S. Tibet	<1% (n = 1)
Maddenia	<i>R. ciliatum</i>	Hardiness (variable)	E. Nepal, Sikkim, Bhutan, S. Tibet	1% (n = 2)

Additional hybrids of interest grown in Rhododendron Dell include:

*R. × myrtifolium* (*R. hirsutum* × *R. minus*); *R. hirsutum* tolerates near-alkaline soils and is native to the European Alps

*R. × laetevirens* (*R. minus* × *R. ferrugineum*); *R. ferrugineum* does not flower in abundance but is hardy and late flowering.



*Rhododendron* 'Catawbiense Album' is a hardy hybrid introduced by Anthony Waterer in 1886.



Native to the Caucasus Mountains, *R. smirnowii* is the hardiest indumented rhododendron species. Its distinctive indumentum and crinkled petal edges are traits favored by hybridizers.

#### References

- Cox, P. A. and K. N. E. Cox. 1997. *The Encyclopedia of Rhododendron Species*. Perth, Scotland: Glendoick Publishing.
- Leet, J. 1990. The Hunnewell Pinetum: A Long Standing Family Tradition. *Arnoldia* 50(4): 32–40.
- Leslie, A. C. 2004. *The International Rhododendron Register and Checklist*, second edition. London: Royal Horticultural Society.
- Madsen, K. 2000. In pursuit of ironclads. *Arnoldia* 60(1): 30–32.
- Milne R. I., R. J. Abbott, K. Wolff, and D. F. Chamberlain. 1999. Hybridization among sympatric species of *Rhododendron*: (Ericaceae) in Turkey: morphological and molecular evidence. *American Journal of Botany* 86: 1776–1785.
- Nilsen, E. T. 1990. Why do rhododendron leaves curl? *Arnoldia* 50(1): 30–35.
- Rieseberg, L. H. and S. C. Carney. 1998. Plant hybridization. *New Phytologist* 140: 599–624.
- Sargent, C. S. 1914. Rhododendrons. *Bulletin of Popular Information* no. 57, June 5, 1914.
- Wilson, M. J. 2006. Benjamin Bussey, Woodland Hill, and the Creation of the Arnold Arboretum. *Arnoldia* 64(1): 2–9.
- Wyman, D. 1969. Seventy-five years of growing rhododendrons in the Arnold Arboretum. *Arnoldia* 29(6): 33–40.