

The background of the cover is a close-up photograph of a rock garden. It features several bright pink flowers with dark centers, some in full bloom and others as buds. The flowers are surrounded by a dense carpet of white, lichen-like ground cover. Dark green, succulent-like leaves are also visible, interspersed with the white ground cover. The overall scene is a detailed, naturalistic depiction of a rocky alpine or tundra environment.

NORTH AMERICAN ROCK GARDEN SOCIETY

The Rock Garden

QUARTERLY

WINTER 2017/2018

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All illustrations are by the authors of articles unless otherwise stated.

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Front and back cover: *Kalmia procumbens*, Todd Boland

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From the Editor

I RECENTLY MOVED from Michigan to Virginia. I've gone two hardiness zones warmer and a world away from the gardening that I used to do. Here, people talk about what plants can make it through the summer, and I'm pretty sure that winter, as I would define it, doesn't even exist here.

So I'm learning from local gardeners, and most of all, from NARGS. I had the chance to attend the Annual General Meeting in Raleigh, North Carolina, and that was hands down the best thing I've done for my new garden. I had a lot of fun and learned even more. I came away with a thick stack of notes from the talks, chatted with friends I hadn't seen in years, and, thanks to the generosity of one of those friends, even left with a massive camelia in the back seat.

NARGS, for me, is all about learning from each other. Seeing what plants people have tried in different climates, what soil mixes everyone prefers, hearing about trips to see rare plants in their native habitat, be that in China or right in our backyard.

Luckily, as editor of the *Quarterly*, I get to track down brilliant people and ask them to write articles. I pretend it is because I think you will enjoy the articles, but in all honesty, I mostly get people to write things that I want to learn about myself. That's what I did in this issue, and I hope you enjoy it as much as I have.

We start with articles about Newfoundland, highlighting the upcoming Annual General Meeting and tour. I tell the NARGS board that these articles are to promote the event and get people excited about them, but let's be honest for a second: I'm not sure I'll be able to make it up to Newfoundland for these events, so these articles are the next best thing for me. The only problem is, the photos are so beautiful (I mean, check out the shot from Todd Boland I used for the covers!) and the flora sounds so exciting that now I just want to go even more.

Ditto for Anna Leggatt's article about the flora of Yunnan promoting the NARGS tour to China. I cannot believe the sheer number of incredible plants she describes seeing in her two trips to the region – a province that holds, according to her article, fully half of the species native to all of China. If you can manage to get on that trip, go. And send me lots and lots of photos so I can put them in the *Quarterly* so everyone else can live vicariously through you.

Then we've got Glenn Shapiro's article on hepaticas. I may have accepted the job of editor so that I could get Glenn to write this article. I met Glenn and saw her incredible rock garden when I was working on my last book and was dumbstruck by her hepatica collection. Her

article walking us through her plants and the information on how she grows these incredible plants has sent me tumbling over the edge into obsession. Now to try and find a source for all of these plants in the US.

April Frost's clear how-to on building a pondless waterfall is one I'm saving for later. I'm not ready to construct a water feature quite yet, but now I know how, and really, every rock garden could stand to have a waterfall or two.

I'll publish anything Bob Nold writes, so I'm thrilled to have another article from him this issue. I love Bob's style of writing, and he always has me rethinking some received gardening wisdom that turns out not to be true. His technique for overwintering conifers is as simple as it is effective: do nothing. That's advice I can follow.

This issue wraps up with a piece written by the NARGS hive mind. Back in the summer, I asked you to tell me how you make troughs. Ideas came flooding in, and I've compiled them all together. I love this article so much because I think it is precisely what makes NARGS so great: a whole organization of creative, talented people who are more than the sum of their parts. No matter how experienced a trough maker you are, I think you'll find something in this article that surprises and excites you. For starters, there are more different recipes for hypertufa than I ever imagined. And how many of you are making troughs that involve old towels and t-shirts? Or auto body filler? Trough-making workshops just got a lot more diverse and exciting.

I'm thrilled with this issue, and I hope we can keep sharing our various experiences and knowledge through the rest of this year. To that end, I have two requests for you. First, I'd love to do another Hive Mind article based on the combined knowledge of the NARGS membership, but I'm not sure what topic to pick. What would you like to hear about next? Soil mixes? Seed starting? Favorite sources for plants? Overwintering techniques? Favorite places to source cheap stone? Send your ideas to me at gsparrowgardens@gmail.com. Secondly, I'd like to publish profiles of outstanding home rock gardens in the *Quarterly*. So please take a moment, and think of that rock garden near you that makes you sick with envy. Got it? Okay, now, please write me an article about it! It is easy. Snap some pictures, ask the gardener a few questions about how they built it, problems they ran into along the way, their favorite plant or their most hated weed, and send it all off to me in an e-mail. You get the pleasure of seeing your name in the byline, your gardening friend gets the thrill of seeing their garden profiled in the *Quarterly*, and we all get to drool over and learn from their gardening successes. Everyone wins!



The Barrens: Heathland of Newfoundland

SUSAN J. MEADES AND WILLIAM J. MEADES

WHEN I FIRST moved to Bill's home province of Newfoundland and Labrador many years ago (we currently live near Sault Ste. Marie, Ontario), I was struck by the haunting beauty of the barrens. From the road, the boreal forest appears very monotonous, but every rise and dip in the barren landscape is visible. In many areas, huge boulders covered with a variety of colorful lichens are scattered everywhere. These boulders, called erratics, were deposited centuries ago by glaciers that once covered most of Newfoundland. Small bogs and fens are visible in nearly every depression in the barren surface. In the fall, the barrens are ablaze with the bright red leaves of blueberry and chokeberry, and the purplish cast on the evergreen sheep laurel against the pale brown sedges and grasses of the intermingled wetlands. The barrens contain a large variety of shrubs that produce edible fruit, which bring berry pickers out in droves each fall. Some of the most interesting barrens on the island can be seen along the Trans-Canada Highway as you drive across the Isthmus of the Avalon Peninsula. Another noteworthy barren site, the Flakey Downs, can be seen between the Witless Bay Line and Butter Pot Provincial Park on your way to St. John's.

In Newfoundland, the type of landscape referred to as 'the barrens' is called heathland in other parts of the world and comprises roughly 19% of the vegetation cover. Barrens are characterized by low-growing shrubs, many of which are evergreen. Their thick, leathery leaves, often with involute (rolled under) margins, allow them to withstand the severe exposure, cold temperatures, and winter drought that are typical of cold northern climates. The dominant plants in the barrens belong to the blueberry (Ericaceae) family. In Newfoundland, there are six major types of barrens or heath: *Kalmia* barren, crowberry (*Empetrum*) barren, moss barren, alpine barren, limestone barren and serpentine barren. The first four categories are found on acidic soil, while the limestone and serpentine barrens are found, respectively, on basic and ultrabasic soils. The focus of this article will be the first four barren types, as these are the one you will likely see during the NARGS Annual Meeting field trips in July 2018.

Opposite: An alpine barren at Hawke Hills in Newfoundland, Canada.
(Photo by Todd Boland)

Kalmia Barrens

Of the various categories of barren on the Island, *Kalmia* barrens are the most common and the type that visitors will encounter most frequently. Also known as dwarf shrub heath, these barrens are the North American equivalent to the heathlands of northern Europe. The dominant plants in the European heathlands, heathers (*Calluna*) and heath (*Erica*), are replaced by other members of the Ericaceae in North America, most commonly sheep laurel (*Kalmia angustifolia*), Labrador tea (*Rhododendron groenlandicum*), rhodora



Kalmia angustifolia in bloom.

(*Rhododendron canadense*) and lowbush blueberry (*Vaccinium angustifolium*). European *Calluna* heaths developed mainly after clearing of forest stands to develop grazing lands for sheep, who feed on *Calluna* and other heath species. On the Island, extensive *Kalmia* barrens developed following the destruction of the boreal forest by repeated fires of anthropogenic origin, caused either by fires set by early European settlers to clear land or by burning cinders escaping from smokestacks of trains that traversed the Island during the mid-1800s. When the boreal forest, dominated by black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*), is burned too frequently, the seed source for the tree species is removed, and the natural understory plants (in our case *Kalmia*) eventually form the dominant vegetation. Thus, scattered across many barren landscapes you may see dead sun-bleached tree trunks, called starigans, which attest to the previous forest cover. Unlike European *Calluna* heaths, which reforest relatively quickly if left undisturbed, Newfoundland barrens are fairly stable following their initial formation. While the toxicity of *Kalmia* to livestock precludes grazing on Newfoundland heaths, aggressive competition from ericaceous shrubs for nutrients, the lack of seed source, the dense *Kalmia* litter layer, and lack of bare mineral soil for germination of black spruce seeds are the main reasons that secondary succession to forests is prevented.

Although most visitors, affectionately called locally “come-from-aways,” will quickly learn the term barren, few will hear the more colloquial name, “goowiddy,” which refers collectively to all of the dwarf shrub species of the *Kalmia* barrens. In addition to the ericaceous shrubs, wild raisin (*Viburnum cassinoides*), mountain holly (*Ilex mucronata*), mountain alder (*Alnus alnobetula* subsp. *crispa*) and serviceberry (*Amelanchier laevis* and *A. bartramiana*) are typical of the *Kalmia* barrens. July is a wonderful time to explore these barrens, with the lavender-pink blossoms of rhodora giving way to the ubiquitous bright pink clusters of sheep laurel and white Labrador tea. Beneath the shrub cover, the careful observer will notice many of the feathermosses that are characteristic of the boreal

forest and several species of caribou lichens. In drier barren areas, you may find herbaceous plants such as the pink lady's-slipper (*Cypripedium acaule*), three-toothed cinquefoil (*Sibbaldia tridentata*), bracken fern (*Pteridium aquilinum*), wavy hairgrass (*Avenella flexuosa*), and various clubmosses. In wetter areas of the barren, leatherleaf (*Chamaedaphne calyculata*), cinnamon fern (*Osmundastrum cinnamomeum*), and even an occasional pitcher plant (*Sarracenia purpurea*) may be observed. In certain areas, *Kalmia* barrens are burned periodically to promote the growth of blueberries, which are abundant following a fire. Those who sign up for the tour of the natural area of the MUN Botanical Garden will see *Kalmia* barrens on one of the trails, a site that was severely burned in the 1960s.



A *Kalmia* barren with *Sarracenia purpurea* in bloom.

Crowberry and Moss Barrens

In coastal areas, hikers will notice that the knee-high *Kalmia* barren plants are replaced by a ground-hugging vegetation dominated by black crowberry (*Empetrum nigrum*). Crowberry barrens, or *Empetrum* barrens, are typically found throughout Newfoundland on coastal headlands and less frequently on inland ridges at altitudes approaching treeline. The crowberry carpet is usually continuous, except in areas where wind erosion has occurred. Black crowberry (*E. nigrum*) is the most common species, but on more exposed sites, such as Hawke Hills, the pink crowberry (*E. eamesii*) is frequently encountered. Alpine bilberry (*Vaccinium uliginosum*), partridgeberry (*V. vitis-idaea*, also known as lingonberry or mountain cranberry), juniper (*Juniperus communis* var. *depressa*), three-toothed cinquefoil, and various grasses, as well as caribou lichens are also common plants of the crowberry barrens. Although crowberry barrens at higher elevation (800 feet, 250 m) may appear to be climatic in origin, they were formerly forest-covered, as demonstrated by the presence of relict tree trunks, exposed by fire, in the heath humus. Those who opt for the Cape Spear field trip will be able to explore some crowberry barrens.



The crowberry barrens at Cape Spear

In areas where fog frequency is very high, and wind exposure is extreme, such as along the southeast coast of Newfoundland, a type of heath called moss barren dominates. This vegetation type is similar to the crowberry barrens, except that the greyish heath moss (*Racomitrium lanuginosum*) and pink crowberry (*E. eamesii*) form nearly continuous carpets. Alpine bilberry, partridgeberry, bearberry willow (*Salix uva-ursi*), and numerous lichens and clubmosses are also present. At Hawke Hills, one of the possible sites we will visit during the field trips, you can observe many aspects of the moss barrens.



Empetrum eamesii, the pink crowberry.

Alpine Barrens

Most alpine barrens occur above treeline, which in Newfoundland, varies from about 2000 feet (600 m) on the west coast (Long Range Mountains) to about 1000 feet (300 m) on the east coast (e.g., Hawke Hills); they also form on extremely exposed coastal headlands. Regardless of location, alpine barrens are characterized by a very short growing season, extreme exposure, high winds, and shallow snow cover. Also known as rock barrens, alpine barrens have a base of rock outcrops, coarse in-situ gravels, and patches of bare soil that alternate with low cushions or mats of vegetation. The most common plants in these mats are pink and purple crowberry (*E. eamesii* and



Arctous alpina (left) and *Diapensia lapponica* (right)

E. hermaphroditum). Dwarf shrubs characteristic of the alpine barrens are diapensia (*Diapensia lapponica*), which often form tight cushions or mounds, while alpine azalea (*Kalmia* [*Loiseleuria*] *procumbens*), alpine bearberry (*Arctous alpina*), alpine bilberry (*Vaccinium uliginosum*), and bearberry willow (*S. uva-ursi*) grow in tight mats. Highland rush (*Oreojuncus trifidus*), northern firmoss (*Huperzia selago*), caribou lichens, and a few sedges are also common.

The harsh climatic conditions of alpine and coastal barrens are also responsible for the formation of stunted wind-swept forms of spruce and fir, known locally as tuckamore, or technically as krummholz. Tamarack (*Larix laricina*) responds to the extreme exposure by often growing horizontally along the rocks or adjacent vegetation. The Hawke Hills tour will also provide a good introduction to the alpine barrens.

Limestone and Serpentine Barrens

The remaining two barren types, limestone barrens and serpentine barrens, are restricted in range to Newfoundland's west coast. Both are characterized by basic or ultrabasic bedrock and support a unique flora that includes many of our endemic species, such as dryleaf sandwort, *Cherleria* (*Minuartia*) *marcescens*, which can be seen at The Tablelands, Gros Morne's serpentine barrens. Fernald's and Long's brayas (*Braya fernaldii*, *B. longii*), barrens willow (*Salix jejuna*), and the Newfoundland or vanilla-scented orchid (*Pseudorchis straminea*) are native to exposed limestone barrens along the Great



Larix laricina

Northern Peninsula. The best example of limestone barrens can be found at Burnt Cape Ecological Reserve, located at the tip of the Great Northern Peninsula. These barrens boast large frost polygons, a dramatic backdrop of limestone terraces, expansive flats of mountain avens (*Dryas integrifolia*) and dwarf willow (*Salix calcicola*, *S. reticulata*, *S. vestita*, and *S. uva-ursi*) mats, as well as rarities such as alpine milkvetch (*Astragalus alpinus*), Burnt Cape cinquefoil (*Potentilla pulchella*), and arctic bladderpod (*Physaria arctica*). No botanist's trip to the west coast of Newfoundland would be complete without a visit to Burnt Cape.

Limestone and serpentine barrens, as well as alpine, moss, and most coastal crowberry barrens develop through primary succession (initial colonization of soil by plants), while *Kalmia* barrens and upland crowberry barrens develop through secondary succession on sites that were previously forested.

No matter what part of the province you visit, the barrens provide great hiking terrain. There are many species of songbirds and raptors that frequent the open landscape, and caribou or moose are often seen traversing the barrens. Once you have explored them, I am sure that you also will fall in love with the barrens of Newfoundland.



Alpine Troughs at the Memorial University Botanical Garden

TIM WALSH

TWENTY NINE YEARS ago, I came to the Memorial University Botanical Garden as a horticulture student through a job placement co-op program designed to provide practical experience for the academic portion of my gardening program. It was the first time I had ever visited the garden or any public garden for that matter. Growing up in outport Newfoundland did not afford much opportunity to experience large public displays, let alone one specifically dedicated to garden plants. Up to that point, my experience with gardening had been mostly of the edible type. However, I was fortunate enough to have an Irish grandmother who always tended a flower garden. My mother, on occasion, would send me over the road to Nan's for a piece of her globeflower (*Trollius europaeus*), yellow loosestrife (*Lysimachia punctata*), or some seed from the sweet william (*Dianthus barbatus*).



Tulips in front of the alpine house.

The botanical garden was a somewhat different place back then, but I remember how awe-struck I was by the sheer breadth of the place, the variety of plants in its collection, and the number of themed gardens within its borders. Perennial borders were followed by a cottage garden, peat and woodland gardens, a kitchen garden and even the Newfoundland Heritage Garden which, to my surprise, included those familiar plants from my grandmother's collection. However, the display that sent my mind reeling and opened my eyes to incredible possibilities in landscape design was the rock garden. I was immediately struck by the delicate balance between the hard stone and the careful selection of plants and placement. At that time, Bernard Jackson was the curator of the garden, and over the next three years, I watched him take what I thought was already a large rock garden and triple its size. He also incorporated an existing concrete wall from an old house which once stood on the property to form the foundation for the Alpine House. The Alpine House and newly expanded rock garden opened to the public in 1992 and remains the largest themed garden in our collection with plants sourced from around the globe.

Bernard was also at that time dabbling in the art of alpine troughs. Alpine troughs and sink gardens have been around ever since famous British nurseryman Clarence Elliot first used an abandoned stone cattle watering trough as an alpine planter. They reached wider popularity after Clarence displayed his troughs at the Chelsea Flower Show in the early 1930's.



Inside the alpine house at Memorial University Botanical Garden.



Sempervivum sp. in a small trough.

Our botanical garden had two or three newly formed large troughs measuring 3 feet by 4 feet (0.9 by 1.2 meters). These included a nice collection of compact plants to create scale and, of course, well-weathered rocks to complete the miniature landscape. With my limited available space at home in my St. John's apartment, I immediately saw the potential for this style of rock gardening. If bonsai is the art of restricting a tree's growth in a small container to create the effect of a full-scale tree, then an alpine trough is a way to arrange a miniature alpine landscape in a rugged container to create the effect of a "bonsaied rock garden." I could finally have my very own rock

garden, or two or three.

I dove into trough making and experimented with making various sizes and shapes. It wasn't long before I realized how much space was required to display these large troughs. After a little more research I stumbled upon the process of making much smaller, more



Fall color on *Larix* 'Emerald Curtain' in a large trough.



A trough with drabas, sedum, and hens and chicks planted with Newfoundland limestone.

manageable troughs. These small planters, often measuring no more than 1 foot (30 cm) in diameter, make it possible for anyone to have their very own. Shortly thereafter, I began offering classes in trough making at the botanical garden. Since then I have taught hundreds of local gardeners the steps to make their very own hypertufa trough. Hypertufa is relatively light when compared to traditional stone or concrete and easily withstands our harsh northern winters. My mixture is equal parts of peat, sand, and cement with enough water to form a moldable mixture.

In 2014, the botanical garden decided to dedicate part of the garden to a trough collection. At that time, the only available



Primula marginata blooming in a trough.



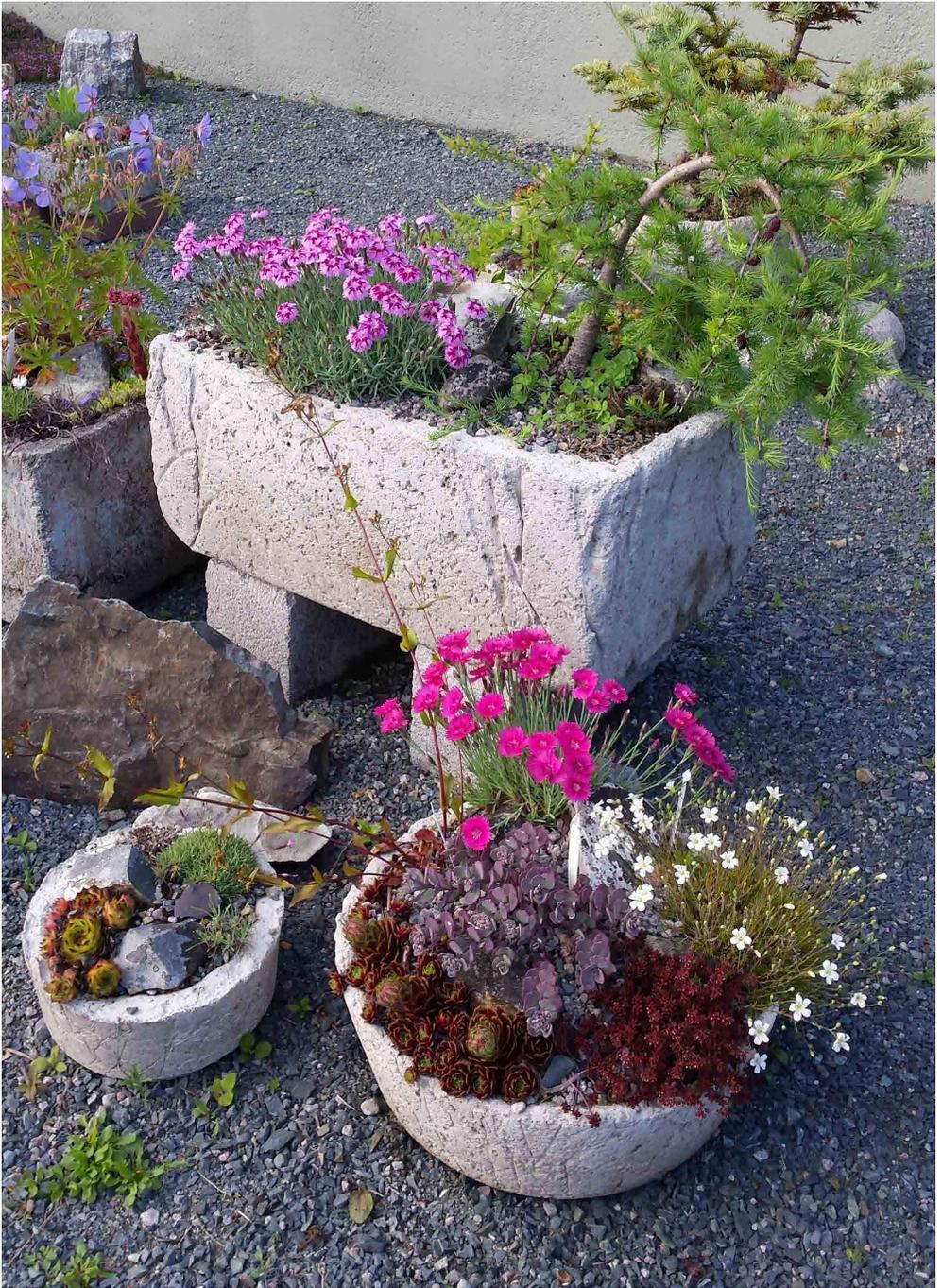
A large, rectangular trough.

space was a gravel area adjacent to the public greenhouse. We quickly set out a dozen or so troughs in this open gravel area and installed an interpretation panel. This year, following a generous donation to the garden from a private donor, we were able to relocate the collection to a more fitting space adjacent to the Alpine House in the rock garden. The grounds staff excavated the site and installed a curved stone retaining wall with a wide concrete cap that doubles as informal seating and display for smaller troughs. A flagstone walking surface completes the site and provides ample space for the bulk of our trough collection, including some very large heavy troughs surrounded by smaller forms. The sand between the flagstones was planted with small divisions of creeping thyme and *Antennaria alpina* in hopes of establishing a natural alpine effect.

Our troughs typically include a collection of plants that represent the classic characteristics of an alpine plant: low stature, creeping or bun shaped, small leaves and tight flower clusters. Alpine forms of campanula,

saxifrage, thyme, sempervivum, sedum and primrose all work together to complete the landscape. True alpine plants are well suited to growing in shallow, nutrient-poor, well-drained soils, making the alpine trough an ideal display case for these hardy plant jewels. There's even a small trough dedicated to the plants of the Limestone Barrens of the Great Northern Peninsula of Newfoundland following a recent collection trip we made to that area in 2016.

While lifestyle changes may have forced many folks to move away from large-scale gardening, alpine troughs make it possible for anyone to have an alpine garden of their very own within a small footprint. At the botanical garden, we are delighted our collection now has a permanent home fitting comfortably within the alpine garden. We are looking forward to experimenting with more trough designs and continuing to build on this tradition started so many years ago.



A portion of the garden's trough collection.



Burnt Cape: Newfoundland's Botanical Hotspot

TODD BOLAND

IF THERE WERE a single spot in Newfoundland where I would suggest an alpine enthusiast visit, it would be Burnt Cape. It is perhaps the most important botanical site in Newfoundland with over 30 provincially rare arctic-alpine plants. Burnt Cape is located at the northwest tip of the Great Northern Peninsula, near the community of Raleigh. At 2.5 miles (4 km) long and 0.6 miles (1 km) wide, the Cape is nearly an island, connected to the mainland by a grassy sandbar. The underlying rock is limestone, hence the vegetation is typical of our limestone barrens, which runs the entire length of the west coast of the Great Northern Peninsula. However, unlike most of our limestone barrens, which are only about 10 feet (a few meters) above sea-level, Burnt Cape is a high, windswept promontory at 250 feet (75 m) above the cold North Atlantic. Winter temperatures can drop to -22°F (-30°C) while summer temperatures rarely rise above 70°F (20°C). In fact, the mean daily temperature in July is just 54°F (12°C). The growing season is 110 days, with frost possible at any month in the summer. Wind is constant year-round. Annual precipitation averages 50 inches (130 cm) mostly in the form of snow; but with the high winds, little snow actually accumulates except in the hollows. All these climatic features make for the ideal habitat for arctic plants, over 900 miles (1500 km) south of the Arctic Circle.



Pockets of snow can persist into July on the south side of the Cape.



Frost polygons in the dryas rock garden.

The famous Harvard botanist, M.L. Fernald, visited Burnt Cape back in the 1920's. He was the first to recognize the unique flora of this region. His botanical explorations were published in *Rhodora* in 1926. One excerpt from this article describes the excitement of his botanical group:

“Griscom, Pease and Hotchkiss were to work northward around the tip of the Cape, and the rest of the party started due west to make a sort of cross-section. In two minutes the shouting began. ‘*Carex concinna*.’ ‘Yes, we’re getting it too, and the queer *Asplenium*.’ ‘Here’s *Polystichum lonchitis*.’ ‘What’s the other *Carex*?’ ‘What’s the *Habenaria*?’ And so on until the parties were out of hearing.”

With Burnt Cape’s isolation and lack of access, the area was not botanized again until the 1970s when provincial botanists discovered several additional rare species missed by Fernald. However, in the 1980s, commercial and domestic gravel quarrying seriously threatened the survival of these rare plant species. Thanks to petitioning by local botanists, the provincial government withheld renewals of quarrying permits on the Cape though this action still did not ensure the permanent survival of the plants on the Cape. Through the continued work of botanists, the province’s Wilderness and Ecological Reserves Advisory Council, and the Nature Conservancy of Canada, Burnt Cape was set aside as an ecological reserve in March of 2000.

Within the Burnt Cape Ecological Reserve, 301 species of plants have been identified. A total of 35 are considered provincially rare, of which one is an endemic species, *Braya fernaldii*, named in honor of Fernald who discovered the plant. The vegetation of the Cape is broadly



Dryas integrifolia

divided into three plant communities: the dryas rock garden, the crowberry lawn, and the cow parsnip snowbed.

The highest point of land, which forms a ridge lengthwise along the Cape, is mostly exposed limestone gravel scree and bedrock, appearing in many places like a moonscape. This is the dryas rock garden, dominated by mats of the creamy-flowered *Dryas integrifolia*. Overall, the plants of this community are widely spaced with limestone gravel between them. There is little-to-no soil development, and the gravel is sorted, through repeated frost action, into circular patterns called frost polygons. This is the land of the true Arctic-alpine calciphiles. Besides *Dryas*, isolated mats of vegetation are also created by several Arctic willows, namely *Salix reticulata*, *S. calcicola* and *S. uva-ursi* along with *Arctous alpina*, *A. rubra*, *Arctostaphylos uva-ursi*, *Dasiphora (Potentilla) fruticosa*, *Shepherdia canadensis* var. *prostrata*



Silene acaulis



Saxifraga oppositifolia.

and *Juniperus horizontalis*. Common bun plants are *Silene acaulis*, *Oxytropis campestris* var. *johannensis*, *Potentilla crantzii*, *Saxifraga aizoides*, *S. cespitosa* and *S. oppositifolia*. In late summer, the gravel beds are peppered with blue and purple from the blossoms of the various Gentianaceae that grow there, namely *Gentianopsis detonsa* ssp. *nesophila*, *Gentianella propinqua* and *G. amarella*. Several of the plants here have grey foliage and are camouflaged by the grey

limestone rock. Only by slowly walking over the limestone gravel will you pick out these little alpine beauties which include *Arabis alpina*, *Antennaria alpina*, *Potentilla pulchella*, *Potentilla nivea* and *Saxifraga paniculata*. With so much precipitation per year, it is not surprising that there are often little pools of standing water scattered among the limestone gravel. These moist pockets are home to three species of primrose: *Primula laurentiana*, *P. mistassinica* and *P. egaliksensis*, as well as the insectivorous *Pinguicula vulgaris*.

Closer to the coast you find well-vegetated terraces dominated by black crowberry, *Empetrum nigrum*. This plant community looks decidedly turf-like from a distance and is referred to as crowberry lawns. Walking atop this vegetation releases volatile oils in the *Empetrum* foliage to produce a distinct sweet smell. Here some peaty soil has accumulated allowing for a mixture of both acid-loving and calciphile species. Some of the dryas rock garden species like *Arctous alpina*, *Dasiphora fruticosa*, *Dryas integrifolia* and *Salix reticulata* grow



Above: Turf-like masses of *Empetrum nigrum* are called a crowberry lawn. Opposite: *Cypripedium parviflorum*.





Kalmia procumbens

here. But with the additional soil, you will find drifts of *Cypripedium parviflorum* as well as other orchids such as *Corallorhiza trifida*, *Platanthera obtusata* var. *collectanea*, *Coeloglossum viride*, *Platanthera aquilonis* and *Pseudorchis albida*. *Arnica lonchophylla* appear like miniature sunflowers and the narrow silvery leaves of the rare *Antennaria pulcherrima* ssp. *eucosma* arise like tiny flags to wave in the ever-present wind. In summer, from a distance, there appear what looks like patches of snow but, with close examination, turn out to be low mounds of the white-felted *Salix candida*. Early in the season you may see small spots of purple or pink from *Rhododendron lapponicum* (yes a calciphile rhododendron!) and *Kalmia (Loiseleuria) procumbens* while later appear larger pink patches created by *Hedysarum alpinum*.

The south side of the Cape is sheltered from the blasting west to north winds, allowing for stunted spruce and fir forest which may reach 6 feet (2 m) or more in height. Locally we call these windswept trees "tuckamore." Here, snow can accumulate in drifts up to 10 foot (3 m), with the snow lasting into early July before it melts. The most significant, and certainly the tallest, herbaceous plant in this area is cow parsnip, *Heracleum maximum*. The vegetation here creates the cow parsnip snowbed community. Here you can find typical boreal forest wildflowers like *Cornus canadensis*, *Clintonia borealis*, *Linnaea borealis*, *Maianthemum canadense* and *Gaultheria procumbens*. But even here, there are some botanical treasures. Peeking out from beneath limestone boulders in the Lilliputian forest are some choice alpine ferns: *Asplenium viride* and *Polystichum lonchitis*. Here, too, grows the exotic *Calypso bulbosa*, one of only three known sites in Newfoundland for this oh-so-



Calypso bulbosa

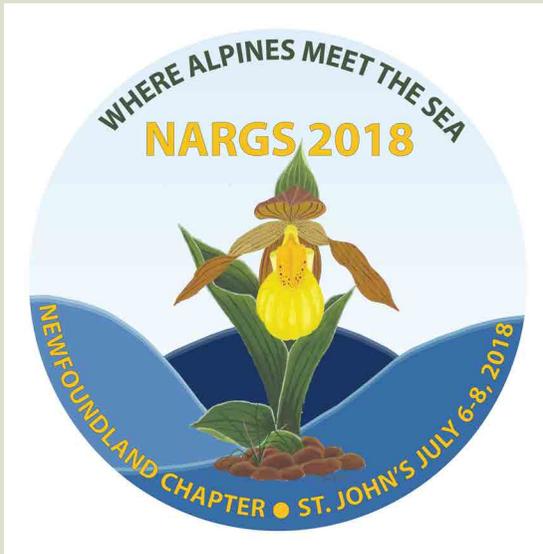
common orchid in the forests of the Rockies. *Salix candida* can become giants in this band of vegetation, reaching upwards to 5 feet (1.5 m). *Actaea rubra*, *Streptopus lanceolatus*, various species of *Parnassia* and *Alchemilla glabra* are but a few of the additional herbaceous wildflowers that call the cow parsnip snowbed community home.

While most of the Cape has coastal cliffs that drop tens of meters into the sea, the south side has a fine cobblestone beach. Even here, there are some desirable alpine wannabe plants like *Rhodiola rosea*, *Iris hookeri*, *Mertensia maritima*, *Lathyrus japonicus* and *Honckenya peploides*.

Burnt Cape is definitely off the beaten track and despite being a botanical hotspot, is rarely visited by plant enthusiasts. However, for those NARGS members attending the annual meeting being hosted by the Newfoundland Chapter, July 6-8, 2018, there will be a post-conference tour to the Newfoundland limestone barrens, and Burnt Cape will be one of the featured areas. It will certainly be the highlight of this plant tour.



Rhodiola rosea



Where Alpines Meet the Sea
NARGS Annual General Meeting 2018
Newfoundland Chapter, St. John's, July 6-8, 2018

As most of you now know, the Newfoundland Chapter of the North American Rock Garden Society will be hosting the Annual Meeting in 2018. Please refer to the Fall edition of *The Rock Garden Quarterly* for previous details about this meeting. The following is additional and updated information about the meeting, along with the registration fee, what the fee includes, the program, and a registration form you may fill in and mail if you do not have access to the internet. However, if possible, we encourage you to register by the online system at <http://bit.ly/2n8f834> where you can pay via credit card. The link will also be on the NARGS website.

Booking flights

For American attendees, there are no direct flights into St. John's from the USA. You will have to fly to Toronto, Montreal or Halifax then onwards to St. John's. While there are several flights per day into St. John's from those airports, they are mostly late afternoon through the evening hours. For those attending the official opening of the meeting on Friday evening, July 6, you may need to fly into St. John's on July 5. From the UK, there is one direct flight per day into St. John's from Heathrow and Gatwick, both arriving early afternoon, so it is possible to book your arrival for Friday, July 6. Please remember that the airport code for St. John's, Newfoundland is YYT. Make sure you do not accidentally book a flight to Saint John, New Brunswick (it has happened before!) whose airport code is YSJ.

Car Rentals

Most of the standard car rental agencies are available at the St. John's airport. However, as July is high tourist season, it is recommended that you book a car rental ASAP rather than risk there not being any vehicles available.

Hikes – 3 levels

Our field trip hikes will take place Saturday, July 7 and Sunday, July 8. While these hikes were described in the Fall 2017 Rock Garden Quarterly, there have been slight changes compared to what was previously published. On the registration form (both online and printed) you can select two tours from the following three offerings.

Tour 1 – Easy – these walks will take place on relatively level ground utilizing mostly gravel pathways; some steps are involved. The venue for these walks will be a combination of the Memorial University of Newfoundland Botanical Garden (www.mun.ca/botgarden) and Cape Spear National Historic Site (www.pc.gc.ca/en/lhn-nhs/nl/spear), the most easterly point in North America. Each venue is about 1 kilometer in length.

Tour 2 – Moderate – these walks will be over uneven ground with an uphill hike along a gravel road. The venue for these walks will be a combination of the Hawke Hills (the highest elevation on the Avalon Peninsula), a site renowned for *Diapensia*, *Loiseleuria* and a plethora of clubmosses, and a fen where we will look for orchids and various insectivorous plants. The Hawke Hills portion will be about 3 kilometers round trip (1.5 kilometers uphill then 1.5 kilometers downhill), while the fen is about 1.5 kilometers round trip with some ups and downs. This tour will occupy the longest time as there is a bit of a drive to the sites.

Tour 3 – Moderate-Difficult – this venue is slightly more strenuous than tour 2. This tour will be a combination of the North Head Signal Hill coastal trail (www.pc.gc.ca/en/lhn-nhs/nl/signalhill) with some 300 plus steps (we will do most of them downhill!) and the natural area trails at the MUN Botanical Garden, where we will see *Kalmia* barrens and boreal forest wildflowers. The North Head trail is about 2.5 kilometers in length with stunning views of the "Narrows," the entrance into St. John's harbor. The Garden nature trails are about 2 kilometers with much more gentle hills.

Accommodations

A suite of rooms has been held at Macpherson College residence located on the Memorial University of Newfoundland campus. Each room has two separate bedrooms, each with a single bed, and a

shared bathroom, at a cost of \$60.00 Canadian per bed per night, taxes included. These rooms will be held until June 1, 2018.

For those opting to stay at other locations, there are two hotels located reasonably close to the University.

Gov'ner Inn – 389 Elizabeth Avenue (709-726-0092) (less than 1 kilometer away, about 15-minute walk)

Holiday Inn – 180 Portugal Cove Road (709-722-0506) (about 2 kilometers away)

Reservations must be made directly with Memorial University or alternate hotels. If distance is not an issue, there are plenty of other hotels within a 10-15 minute drive.

To book at the University, go to www.mun.ca/conferences/bookings/nargs2018.php and enter promotion code NARGS2018. Payment is due at the time of booking by Visa or MasterCard. For more information or if you have any questions, please email stay@mun.ca.

Attendees staying at the University residence will require parking permits if you have a car. Permits can be purchased from their desk upon check-in. It is an extra \$4 per day per space. When you arrive at check-in, the University will collect payment for parking and issue you the permit.

A map of the University campus is available here https://www.mun.ca/campus_map/

Macpherson College residence is located in Cluett and Shiwak Halls, situated near Burton's Pond at the east side of the campus. Check-in is located on Livyers Loop, beneath the pedestrian overpass.

For delegates staying off-campus, free parking is available in lot 15 (located on either side of Burton's Pond Road, in front of Cluett and Shiwak Halls) after 5 pm on Friday, July 6 and all day Saturday and Sunday. Before 5 pm on Friday, you will have to use metered parking.

Registration and Meals

If possible, please register online at <http://bit.ly/2n8f834>. The link will also be on the NARGS website. If you do not have access to a computer, you may fill in the attached form and mail in your registration fee.

The conference registration fee is CAD 495 or USD 415. Registration for the conference will close as of June 1, 2018

For those who require breakfast on Monday morning, July 9, you may pay an additional US\$8 or CAN\$10. This option will be offered on the registration form.

Cancellation

There is a \$25 cancellation fee until May 1, 2018. Unfortunately, after that date, there are no refunds except under extraordinary circumstances.

What the registration fee includes

The price of the conference fee includes access to the speakers' presentations, field trips, and the following meals: opening dinner banquet on Friday, July 6; breakfast and box lunch on Saturday, July 7 and breakfast, box lunch and the closing dinner banquet on Sunday, July 8. Please note the optional breakfast on July 9 IS NOT part of the registration fee. See note above under Registration and Meals.

Plant Sales

Unfortunately, there is a ban on the export of soil from Newfoundland due to several soil-borne potato-specific diseases present in the province. Our apologies that there will be no plant sales at this meeting.

What to Bring

No place in North America has a climate as variable as St. John's. The sun might be "splittin' the rocks" and 25°C (80°F), or it can be "mauzy" - rain, drizzle and fog and 10°C (50°F), so bring layers, rain clothes, and umbrella. Whether sunny and warm or rainy and cold, wind is almost guaranteed. If you plan to do the orchid bog / fen tour, you will need waterproof boots. Sturdy hiking boots are fine for the other planned hikes. A day pack is recommended as a place to store extra layers of clothes as well as the boxed lunch. Newfoundland is well known for its mosquitos and especially blackflies. If the weather is windy, they are not likely to be a problem but should the wind be light, be prepared! This is especially true for the bog / fen walk. Fly repellent is highly recommended.



Program

(subject to minor changes)

Thursday, July 5

Open garden visits

Friday, July 6

1-3 pm – NARGS AdCom meeting

3-5 pm – NARGS Board Meeting

4-5 pm – Book signing and sales for Newfoundland field guides by
Todd Boland

2-6 pm - Registration

5-6 pm – Social/Cash bar

6 pm – Opening dinner

7:30-9:30 pm – Opening lectures by Gene Herzberg and John Mitchell

Saturday, July 7

7:30 am – Buffet Breakfast

9 am- 4 pm – Meet buses in front of Macpherson College for
departures for day hikes

Saturday evening dinner on your own.

7:30-9:30 pm – Lectures by Jay Ackerley and Jamie Ellison

Sunday, July 8

7:30 am – Buffet Breakfast

9 am- 4 pm - Meet buses in front of Macpherson College for
departures for day hikes

4-5 pm – NARGS Annual Business Meeting

5-6 pm Social/Cash bar

6 pm – Closing Dinner

7:30-9:00 pm – Closing lectures by Todd Boland and John Mitchell

Monday, July 9

Pre-purchased breakfast or breakfast on your own and departures for home or continued exploring of Newfoundland. Open garden visits of Greater St. John's area. For those participating in the post-conference tour, we will be leaving early on the morning of July 9. Refer to the information specific to the post-conference tour.

For any questions contact Todd Boland at todd.boland@warp.nfld.net

Registration Form

We would prefer that you register through the Memorial University Conference Services website but if you do not have computer access, please fill out this form, and send with a check payable to "Newfoundland Rock Garden Society."

Mail to: **Bodil Larsen, 141 Lower Road**
Outer Cove, NL, Canada A1K 4B7

You need to be a NARGS member to register (though you can join on this form or online if you are registering online). If more than one member of a household is registering for the meeting, please complete a registration form for each person.

Name: _____
Mailing Address: _____
City: _____ Prov./State: _____ Postal/Zip code: _____
Country: _____
Email: _____
Phone: (_____) _____
Friday Banquet: Chicken ___ Salmon ___ Vegetarian ___
Sunday Banquet: Pork ___ Cod ___ Vegetarian ___
Other special dietary requirements: _____

REGISTRATION: Please check if payments are in US dollars ___ or Canadian ___
Registration Fee: USD\$415 or CAN\$495 _____
One-year NARGS membership fee (if not a member):
USD\$40 if resident in North America; USD\$45 if overseas: _____

AVAILABLE: Heather-gray, short-sleeved T-shirt with Conference logo as a chest crest: USD\$16 CAN\$20

If you wish to purchase a conference T-shirt, please tick your size and quantity below.

SM ___ M ___ L ___ XL _____

Overall total payment enclosed: _____

Hiking Options: circle one for each day
Saturday, July 7 Tour 1 Tour 2 Tour 3

Sunday, July 8 Tour 1 Tour 2 Tour 3

NOTE: Sorry, refunds after May 1 only in extraordinary circumstances.

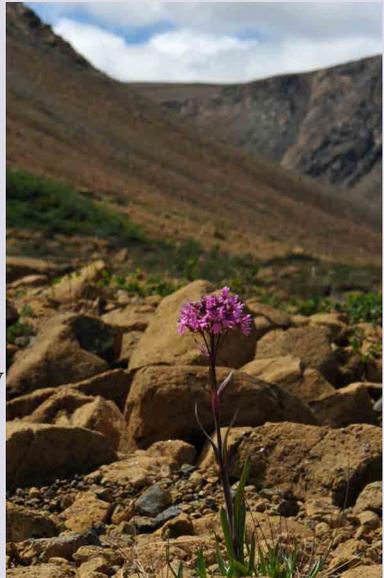


Newfoundland Limestone Barrens Post-conference Tour

Led by Todd Boland
July 9-16, 2018

Schedule

July 9 – Flights arrive in Deer Lake early in the morning. Once we pick up our vans we will head to Gros Morne National park, a UNESCO World Heritage Site. Our first stop will be the Lomond River where we will look for several orchids including *Cypripedium parviflorum* and *C. reginae*. In the afternoon we will visit the serpentine barrens of the Tablelands. This area looks like a moonscape and superficially looks quite dry. However, looks are deceiving; water flows just below the rock surface allowing pitcher plants to grow in the gravel! Here we will look for some endemics and near-endemics such as *Cerastium terrae-novae* and *Minuartia marcescens*. Other highlights will be *Armeria maritima* var. *siberica*, *Silene acaulis* and *Adiantum aleuticum*. We will have lunch in Bonne Bay and spend the night at Shallow Bay Motel in Cow Head.



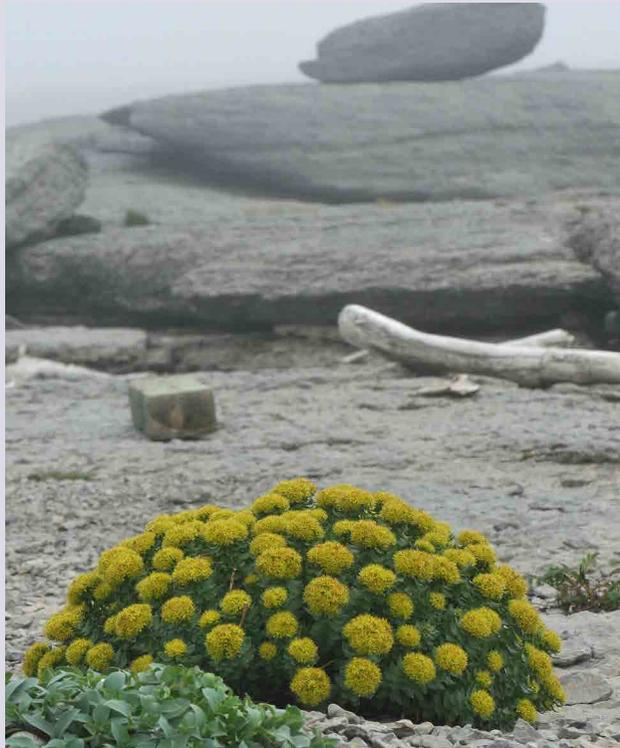
Silene suecica blooming in the
Tablelands.



The Arches

July 10 – Today we will visit a bog which, if the conditions are perfect, will be pink with *Arethusa* orchid blossoms. We even have the potential to find white and bicolored forms. Pitcher plants and sundews will also abound. Next, we will visit the Arches, a coastal limestone outcrop with several open arches. Look for humpback whales offshore as they are often seen this time of year. Later in the afternoon, we will have our first taste of the limestone barrens at Belburns. We will look for the Newfoundland rare Hooker’s orchid and see several species of dwarf Arctic willow and many, many yellow lady’s-slippers. Tonight we will stay at the Torrent River Inn at Hawke’s Bay and a bag lunch from Shallow Bay Motel.

July 11–Today we head to the Point Riche Peninsula where we will see yet more limestone barrens plants. We will also visit the Maritime Archaic Indian National Historic Site at Port-aux-Choix to learn about the people who lived in this area 5000 years ago! In some years there are literally thousands of yellow lady’s-slippers in this area. We will have lunch at an excellent seafood restaurant. We will head to another place for our very special and unique dessert, but that is a secret! We will head back to the Torrent River Inn for the night.



Rhodiola rosea at Point Riche Peninsula.



3.5 billion year old thrombolite fossils at Flower's Cove

July 12 – Today we head to Plum Point and points further north. Stops will include Brig Bay, Nameless Cove and Anchor Point. Here we will see a mix of coastal flora and limestone barrens flora, including the endemic *Braya longii*. We will also visit the thrombolite fossils of Flower's Cove. These rare fossils date back more than 3.5 billion years! We will have lunch in Plum Point, and spend the night in Plum Point Motel.

July 13 –We have a bit of driving today with a morning stop at Cape Norman and the afternoon at Burnt Cape. Cape Norman is home to three endemics; *Braya fernaldii*, *Salix jejuna* and *Astragalus bodinii*. The scenery here is stunning with chances of seeing icebergs if any are around. Burnt Cape is a botanical wonderland with the widest diversity of Arctic-alpines found anywhere in Newfoundland...or this far south in the world! It will be early evening before we reluctantly leave this Shangri-La and head to St. Anthony for the night.



An iceberg off of St. Anthony

July 14- Botanizing will be limited today as we take a boat tour in the morning with the intent of looking for whales and icebergs. In the afternoon we will visit L'Anse-aux-Meadows, another UNESCO World Heritage Site...the only authenticated Viking presence in North America dating back to the year 1000 AD. Dinner this evening will be at the Norseman Restaurant, seafood extraordinaire. We will then head back to St. Anthony for the night.

July 15 –Today is a driving day as we head back down the Great Northern Peninsula to Deer Lake. We will make scattered stops to pick up on any plants we might have missed earlier in the trip. Night in Deer Lake at the Driftwood Inn.

July 16 – Today we head back to our respective homes, feeling botanically overwhelmed after a week on the unique and hauntingly beautiful Newfoundland limestone barrens.

Please note, the weather is VERY variable...could be 25° C or 10° C (77F or 50F), so be prepared. I am sure we will get some rain, and the wind can be quite brisk at times...a pain for photography unless we all surround the plants in question to form a human shield! Having said this, if the season is normal, we should see blooms on a good 80% of the native flora. Aster, goldenrod and various Gentianaceae are about the only plants I would not expect to see in bloom as they generally flower in August.

Cost per person in Canadian dollars: 3,100 which includes flight from St. John's to Deer Park, van rental and gas, accommodations, and all meals, extra fees for entrance to parks, boat ride, and tour leader. At current exchange rates, the cost is estimated around US \$2,500.

Booking: those wishing to book should email NARGS Tour Committee co-chairs: Jody Payne (jodycpayne1@gmail.com) or Lola Horwitz (llhorwitz@gmail.com).



Burnt Cape



Yunnan: A Plant Hunter's Paradise

ANNA LEGGATT

THE NARGS EXPEDITION to Yunnan in June, 2018 promises to be the trip of a lifetime.

Yunnan, a province in southwestern China, is 570 miles (910km) from north to south, with high mountains in the northwest and dropping down to almost sea level in the south. The rich flora boasts about 15,000 species of higher plants, half of China's total number, although Yunnan makes up only 4% of China's landmass. The northwestern region, where the expedition will go, is considered "the bright pearl" of the plant kingdom. There are over 5000 species of highland plants (200 species of *Rhododendron*, 100 species of *Primula*, 90 species of *Corydalis*, 47 endemic genera, etc.) with more waiting to be discovered. These include many important garden plants as well as sources of traditional medicine.

You are constantly reminded of the famous plant-hunters as you learn the names of the plants in Yunnan: *Rhododendron wardii*, *Primula forrestii*, *Sophora davidii*, *Berberis wilsonii*, etc. However, unlike those great explorers, you will arrive in comfort in just a few hours, seeing places that the explorers took weeks to reach only about 100 years ago.

The British and Chinese organized plant research and seed collecting trips in 1994 called the ACE. (The Alpine Garden Society Expedition to China). I was lucky enough to visit Yunnan in 1997 and again in 2007 with 2 botanists from those trips: Peter Cunningham from Ness Botanic Gardens and Sun Weibang from the Kunming Botanical Garden. I wish I could go with NARGS as there are 3 places on this trip I haven't visited. However, my traveling time is running out despite there being so many places with fantastic flora and fauna left to visit.

The NARGS trip will start in Lijiang, which is an interesting old town with canals, quaint buildings, public parks, museums and great views of the mountains. Our hotel had local people waiting for tourists outside with curios and bangles for sale. We had fun bargaining, but the real reason to go is the plants! I learned the Chinese word for "stop" – useful when I saw something exciting--though this terrified one driver.

Many beautiful plants grow around the Ganghoba pass near Lijiang. Look for *Roscoea* (perhaps 3 species), *Primula forrestii*, and several *Cypripedium*. *C. margaritaceum* has oval, pleated and spotted leaves with a flower nestled in the middle.

Opposite: Beima Shan in Yunnan

There are many treasures beside the road as you travel north. You will see small shrubs of *Daphne calcicola*, yellow buds of *Stellera chamaejasme* opening to cream, and *Podophyllum emodi* var. *chinense* with near scarlet poppy-like flowers and blotched leaves among larger shrubs. I yelled when I saw a beautiful blue and white pea shrub. It was a very blue form of prickly *Sophora davidii*. As we went on, I spotted an oak less than 3 feet (1m) high with small leaves and acorns and tight branching, as well as many rhododendrons – but we couldn't keep stopping.

We saw many treasures as we reached the Zhongdian Plateau: a wonderful colony of *Incarvillea zhongdianensis* (pink with a yellow eye, petals fluttering in the breeze), pink *Rhododendron racemosum*, and then *Thermopsis barbata*, like a short black lupine with silvery-grey fuzzy leaves. Wow, and wow again!

The trip to nearby Tianchi Lake was very rewarding. We passed through Tibetan villages and soon stopped for large-flowered, pink *Nomocharis*, a lily relation leaning out from among the scrub. The best flowers often seem to be on high, steep banks, indicating the necessity for good drainage. There were orchids, *Primula*, *Arisaema*, and *Rhododendron*. Large sprays of pale yellow *Meconopsis pseudointegrifolia* filled one dell, while nearby we saw *Adonis brevistyla* with bluish buds that opened to white flowers above frilly leaves.



Meconopsis pseudointegrifolia

Tianchi

Lake was astounding floristically. We looked across knee-high flowering rhododendron scrub to the lake and a snow bank beyond. The rhododendrons proved to be about six species forming a hybrid complex. They provided shelter for amazing species: dancing purple heads of *Primula amethystina* among a bright gold tiny *Caltha*, *Primula deflexa*, *P. chionantha*, a small *Polygonatum* with pink flowers and darker tips to the corolla tube, just to name a few.



Rhododendron scrub in front of Tianchi Lake.

There was some pasture for yaks, so we looked for plants where they could not reach. Luckily, *Mandragora caulescens* was unappetizing to the yaks, and one plant had about 40 nearly black bells above just-emerging leaves in the pasture. It was beautiful, but the yak droppings surrounding it made photography a little difficult.

We found ethereal blue *Primula sonchifolia* with farinose, pale-green leaves. It was growing in shade, protected by rhododendron roots. This is very difficult to grow, even in England. Yellow *Rhododendron wardii* was growing a bit further down on open, drier slopes.



Mandragora caulescens



Cypripedium tibeticum

Napa Hai is a nature reserve. We drove up to about 11,000 feet (3350 m) above a dried-out lake. There were beautiful blue *Meconopsis horridula* beside the road on a steep slope, tiny annual gentian, *Corydalis*, *Androsace*, *Morina*, etc., but my favorite was *Cypripedium tibeticum*, looking like purple eggs in various shades on dry slopes. Pink *Calanthe delavayi* was growing on a shady bank with yellow spikes of *Oreorchis erythrochrysea* clustered nearby. We saw the short, pink-flowered *Sorbus filipes* with much divided leaves, and large shrubs of yellow-flowered *Paeonia delavayi* ssp. *lutea*. We saw a reddish one as well, perhaps a hybrid.



Androsace bulleyana

We walked down partway through fields with scrub and saw tiny *Cypripedium guttatum*, more *Androsace*, and a sweet-scented yellow *Primula sikkimensis* in a damp meadow. Around us, apples were in blossom, farmers were cutting hay, and cuckoos were calling. It was bliss!

We saw new species from the bus on both my trips. White *Clematis montana* sprawling up shrubs, red patches of annual (biennial?) *Androsace bulleyana*, innumerable species of iris, and always rhododendrons. One clump of *Arisaema elephas* had 15 beautiful, dramatically striped flowers.

The old road split off from the new road as we climbed up Beima Shan. Earlier,

there were lovely big patches of *Primula secundiflora* beside a mossy stream. It was even more beautiful the second time with yellow *P. sikkimensis* adding to the effect. Then we saw big clumps of *Paraquilegia anemonoides* dripping down rocks above a stream, with nearby large-flowered white *Anemone*. As we reached 13,000 feet (4,000 m), we saw tiny pink *Polygonatum hookeri* growing in the gravel, blue *Corydalis pseudoadoxa*, and a scented crucifer, *Solms-laubachia linearifolia*, forming buns in the screes that sloped down to the road.

We hiked up the grassland to above 14,000 feet (4,200 m), avoiding yaks, yurts, and dwarf shrubs. As we hiked, we saw *Lamiophlomis rotata*'s rosettes of dark green leaves with tufts of purple flowers in the center, while yellow *Thermopsis smithiana*, with fuzzy grey leaves, was growing taller in the screes. *Pegaeophyton scapiflorum*, a white crucifer with icy blue veins was hidden among the grasses. As we reached the screes at higher elevation we saw *Paraquilegia*, a rare *Androsace*, *Corydalis*, a mauve-flowered *Draba*, and *Incarvillea compacta*.

Large, hard cushions of *Arenaria polytrichoides* with flowers covering some of the clumps were growing just below the north side of the pass. A yellow *Pedicularis* was growing in buns while brown bells of *Fritillaria crassicaulis* and *Cassiope selaginoides* were growing between the shrubs lower down the mountain.

The soil was acid on the west side of the road, with rhododendrons growing in the boggy ground. We saw *Lloydia*, *Primula nanobella*, and perfect clumps of pink flowered *Diapensia purpurea* ssp.



Paraquilegia anemonoides

rosea. We didn't find this again 10 years later. However, *Androsace delavayi* was an equally special find with beautiful pink flowers and tight, hairy leaves. *Rhododendron rupicola* ssp. *chrysium* was covered with yellow bell-shaped flowers while a yellow saxifrage was just opening with star-like blooms dotting a bright green cushion.

Chionocharis hookeri grows at around 16,500 feet (5000m). This was too far for me to hike. We saw big clumps in Tibet from the bus though, unfortunately, regulations would not allow us to stop. It is better than *Eritrichium nanum*, with bigger flowers making a silvery blue cushion.



Chionocharis hookeri

When I visited in 1997, there were only a few herdsmen around, and we were invited into a yurt for butter tea. Luckily, we did not have time to stop. On my trip 10 years later, there were many more people around, and one musician even had a luxury yurt! Unfortunately, there was also more garbage littered around.

We had a great view across to Meili Xue Shan on our way down to Dechen. The mountain peaks were hidden by clouds. However it is apparently considered bad luck to see the tops of the mountains, so perhaps that is just as well. The view was framed by *Rhododendron yunnanense* blooming in many shades of pink.

We explored the area on the south side of the pass on our last day on Beima Shan. There were several short *Lilium euxanthum* in perfect condition, and my favorite, *Lilium lophophorum*. This little yellow lily is the size of a small egg, and the flowers look a little like a lantern as the petal tips stick together. There were grazing yaks in



Meili framed by *Rhododendron yunnanense*

the area; however short rhododendron bushes protected the lilies. There were more *Diapensia* and *Primula nanobella*. *Gnaphalium* sp. (sharp silvery leaves surrounding white daisies) covered some areas. Yak bells were tonking away, and the herder was playing a traditional instrument as we ate our lunch. What an end to the high mountains!

China has changed fantastically in a very short time. Twenty years ago, we saw many bicycles and small all-purpose vehicles that were like tricycles with lawnmower-type engines. There were occasional, official-looking Mitsubishi SUVs and logging trucks. Agriculture was mostly by hand or with water buffalo. Wheat was being harvested, and the paddies flooded and plowed. Rice seedlings were planted one by one. Coal smoke was everywhere in the small communities.

What a change in 10 years! Many more cars, better roads, less pollution and some signs of reforestation. I didn't notice much smoke, but construction was everywhere. Good main roads were being built with tunnels and bridges speeding up traffic. We reached the Beima Shan pass quickly, without the former bone-shaking ride.

We ate in many small restaurants in small communities on both trips. A dish of a sort of scrambled eggs and tomatoes was frequently our first course, finishing with rice, with many delicious vegetable dishes in between made of unusual ingredients such as lichen, *Smilacina* leaves, and others we could not identify.

Join the NARGS trip and find out how China has changed. You still will see amazing flora. Keep looking out your bus window as you may see something the others have missed, and sometimes the very same spot will look different at different times of the day. On our trip, a patch of blue appeared as if by magic. How could we have not seen it earlier? It turned out to be *Iris collettii*, which opens in the afternoon.

My apologies if some plants are wrongly identified. The Chinese often have slightly different names, and others disagree as to whether a plant is one species or two. New plants are continuously being found, and their ranges extended. Ten years ago, we found 37 species of *Primula*, 18 *Androsace* and 32 *Rhododendron* as well as new species of *Viola* and *Primula* and a new area for other species. But whether new or old, precisely identified or a bit of a mystery, the flora of Yunnan will thrill and astonish even the most jaded rock gardener and lover of alpine flora.



Lilium lophophorum



Registration Now Open:

云南

PLANTSMAN'S TOUR OF
YUNNAN, CHINA

16-day tour, June 13 – June 29, 2018

From our tour leader Panayoti Kelaidis:

"The Snow Mountains of Yunnan are the southernmost extension of alpine flora in China. This region possesses some of the greatest biodiversity on the planet; here we'll follow the footsteps of Forrest, Kingdon-Ward, Rock (and Harry Jans) through several mountain ranges northward towards Tibet. Expect to see a vast range of *Primula*, *Androsace*, *Rhododendron* and no end of *Roscoea*, *Anemone*, alpine gesneriads, aroids and woodland treasures galore--a living encyclopedia of alpines!"

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Airfare (roughly \$1500 USD) from and to the U.S. is not included. Also airfare to Lijang and from Shangrila is not included in the price. Participants will need to book their own flights. For questions please contact Jody Payne (jodycpayne1@gmail.com) or Lola Horwitz (llhorwitz@gmail.com)

Booking:

Those wishing to book should email NARGS Tours Committee co-chairs Jody Payne (jodycpayne1@gmail.com) or Lola Horwitz (llhorwitz@gmail.com). Panayoti Kelaidis is also happy to answer any questions about the tour. You can email him at telesonix@outlook.com or call 303-356-1698.





Itinerary:

June 13

Lijang

Arrive and transfer to hotel.

June 14

Lijang

Visit Yufeng Monastery, Naxi Yu village plus Joseph Rock Residence, Black Dragon Pool Park and free time in the old town of Lijiang for you to explore the town by yourself. After dinner, enjoy the evening show of ethnic dancing and singing.

June 15

Lijang

Drive to Ganghoba and botanize at top of the pass and into the Ganghoba valley.

June 16

Shangrila

Transfer to Shangrila; en route, stopover for overview of the First Bend of Yangtze River, and visiting the deepest gorge in the world, Tiger Leaping Gorge. Make some stops for botanizing flowers on the way.

June 17

Shangrila

Visit Songzam Monastery, which is also named "Small Potala" and the local market. Free at leisure for the rest of the day.

June 18

Shangrila

Botanize on Shangrila plateau and around Napa Hai

June 19

Shangrila

Take jeeps to go to Tianchi Lake (3850M), and botanize around the lake.

June 20

Shangrila

Take cable car up to the top Shika Shan (4400m) and walk down (about 7 km) to the middle station (3745M) botanize on the way.

June 21

Hong Shan

Take jeeps to go to Hong Shan. Make stops on the way for flowers, and botanize at the top pass (4500M).

June 22

Hong Shan

Drive back towards the top pass, botanize on the way.

June 23

Hong Shan

Drive back to the pass again, botanize at different places on the pass.

June 24

Shangrila

Transfer back to Shangrila, botanize en route.

June 25

Dechen

Drive to Dechen, see bend of Yangtze near Benzilan and Botanize en route.

June 26

Dechen

Drive from Dechen to top Bai Ma Shan pass and botanize whole day (east side).

June 27

Dechen

Drive from Dechen to top pass Bai Ma Shan and botanize whole day (west side).

June 28

Shangrila

Drive from Dechen to Shangrila, botanize en route.





Part of the Ashwood Nurseries' *Hepatica* display at the Chelsea Flower Show

A Journey Up the Rocky Road of *Hepatica*

GLENN SHAPIRO

HEPATICAS ARE ONE of the most stunningly beautiful early spring flowers, coming in a spectacular range of colors. A snow melt plant of mountain woodlands, hepaticas often grow on the side of village footpaths of local communities in every continent of the Northern Hemisphere, but sadly not in England or the rest of the United Kingdom. Perhaps that is one reason why I love and appreciate them all so much and decided to dedicate myself to growing them.

Recently, hepaticas gained a huge boost to their popularity since Ashwood Nurseries won not only a gold medal but the 'Diamond Jubilee Award,' the very top award in the Floral Marquee, for their exhibit at Chelsea Flower Show in May 2016. This was the first, and possibly the last, time that hepaticas have been exhibited at Chelsea. This award was an extremely well-deserved appreciation of the huge amount of work and skill required to exhibit perfect early-spring flowering mountain plants out of season, something those of us who were lucky enough to see will never forget. The display was the incarnation of a lifelong dream of the nursery's owner, John Massey, our doyen of *Hepatica*, and a wonderful source of help and inspiration to me.

Hepatica (named for the liver-shaped leaves, once thought to be of medicinal value for liver diseases) is a member of my favorite plant family Ranunculaceae, the buttercups. It was formerly classified as *Anemone hepatica*, and in the light of recent DNA analysis, it is indeed closely related to that genus. Since DNA analysis, the number and names of the species within the genus are also up for debate but currently stand at 12. If the recent DNA evidence is adopted, I may need to do a lot of re-labeling among the species within my collection! However, anyone serious about *Hepatica* is already unlikely to feel confident about the established nomenclature, so in this article, I will use the names commonly used by enthusiasts.

Here in the UK, hepaticas are not native, so most of our gardeners have never heard of them. Back in the early 1990s, we had a huge problem with rabbits and deer in our garden, so I had to grow my special favorite plants in a shady enclosed concrete yard next to the house. The yard housed pots of hellebores, early flowering bulbs, and clematis, but a bit of research led me to that extra something:

hepaticas, a plant I had never seen except in photos. The first plants in my collection were two selections of the European species *Hepatica nobilis* in blue and indigo, *H. nobilis* var. *pyrenaica* 'Apple Blossom,' and an American *H. acutiloba* with particularly lovely clean, white, upward-facing flowers. The plants arrived bare root by post from Ashwood Nurseries and were



My hepatica house

just starting to flower. I was enchanted; no photographs I had ever seen had done them justice. When I gazed into the deep iridescent indigo and pristine white flowers before diving back into the chaos to assist lamb deliveries from my Bluefaced Leicester ewes, I knew that hepaticas had entered my life in a big way. Today the lambing barn has been converted into my hepatica house. Let us take a walk around my collection benches, which I have organized in species order.

European Hepaticas

Hepatica nobilis is widespread over most of Europe, up to the Arctic Circle in Scandinavia in the north and eastward to the Volga River in Russia. This species is found at sea level in the far north but only in the cool mountain woodlands further south as most hepaticas prefer to be covered by snow in winter. In the wild, shades of blue are the most common color, but pink and white are also found. *H. nobilis* var. *glabrata* is small, pure white, and hairless and is found only in Sweden. *H. nobilis* var. *pyrenaica*, found in the Pyrenees, has marbled foliage and flowers in soft pastel colors. In cultivation, the patterned leaves will provide year-round interest if not covered with snow. A very lovely new marbled form is *H. nobilis* 'Stained Glass'.

Most of the named double cultivars of *H. nobilis* were originally collected from the wild and, if you are lucky, you may find some plants in specialist nurseries' lists. Many of the double blues are rather similar and expensive but *H. nobilis* Multipetala Group, a seed-raised semi-double form, is a good alternative. An old deep pink, *H. nobilis*



Clockwise from top left: *Hepatica nobilis* 'Rubra Plena', 'Indigo Blue', var. *pyrenaica* 'Stained Glass', 'Mussel Plena'

'Rubra Plena', is the most readily available and the only double I would recommend growing in a UK garden. White *H. nobilis* doubles are the hardest to come by, and I only have one, known as *H. nobilis* 'Double White'. I did have it in the garden, but the flowers are so heavy that they flop when they are wet, so now I grow it under cover. Personally, I usually prefer single-flowered hepaticas; the stamens can look stunning. All the single *H. nobilis* grow well if planted in a suitable spot in my garden, which is on a limestone cliff in the mild, but often very wet, northwest of England. Hepaticas often thrive in limestone, but I think that is more to do with drainage than pH because the leaf litter on the surface is quite acidic. I used to add lime to my potting compost, but they grow just as well without it.

Hepatica transsilvanica is the only other European species, and it is confined to Romania, mostly in the Carpathian Mountains, but also thrives on lower wooded hillsides in the surrounding alkaline areas of Transylvania. Where the range of *H. transsilvanica* and *H. nobilis* overlap, the two will cross to make *Hepatica* x *media*, which is generally sterile.

H. transsilvanica and the *H. x media* cultivars make excellent garden plants. They are larger and tougher than *H. nobilis*. You can grow



Clockwise from top left: *Hepatica transsilvanica* 'Blumenstadt Erfurt', 'Mrs. Alison Spence', 'Super Nova', and *H. x media* 'Blue Jewel'

them in semi-shade if it is moist and well-drained. A south-facing slope under deciduous trees or shrubs is ideal. As with all hepaticas, they need the light to open the flowers fully in the spring, followed by the shade from the trees as their new leaves appear to prevent scorching. On all species, but especially *H. transsilvanica*, it is best to remove some of the old leaves in early spring because they tend to hide the flowers. *H. transsilvanica* extends short suckers through the leaf litter, so it eventually forms large clumps, while *H. x media* has a tighter growth habit more like its *H. nobilis* parent.

The only double cultivars of *H. transsilvanica* are 'Mrs. Alison Spence' and the almost identical 'Konny Greenfield', and they both grow well in my garden. There are many lovely blue singles. *H. transsilvanica* 'Super Nova' is dramatically dark and is one of several beautiful selections bred by Andreas Händel in Germany. A common pink form is known as 'Lilacina', while for white try 'Eisvogel' (Kingfisher) with blue feathery marks on the reverse of each petal (more correctly, sepal). For early flowers, look for 'Winterfreude' or 'Blumenstadt Erfurt'. It is important for me as a collection holder to look for plants of historic interest, such as the first named crosses that

became available between different species. For example, I collect plants that have been written about in old journals and plants with connections to pioneers or that have their own interesting stories. The first UK *H. x media* 'Ballardii', the work of Ernest Ballard in about 1917, ticks most of these boxes. It is very beautiful but slow to increase and consequently it is on the Plant Heritage Red List of threatened cultivars. Another *H. x media* I would not be without is the very easy to grow 'Blue Jewel'. I have it in a heavy glazed pot on the outside windowsill of my northwest facing office where it flowers its socks off all spring, delighting all. Pots like this, glazed on the outside only, are a very good way to grow hepatica if you don't have suitable garden space.

American Hepaticas

Hepatica acutiloba is widespread in the deciduous alkaline mountain woodlands of northern USA and Canada, tolerating damper conditions than *H. americana* (see below). *H. acutiloba* often has sharply pointed leaves, a feature positively selected by breeders and collectors. The tall, upward-facing flowers are usually white, though sometimes pale pink or blue, and are occasionally fragrant. Forms in purple and dark blue sometimes turn up in cultivated populations, and it would be interesting to know if this is also true in the wild. One of my favorite hepaticas is the American cultivar 'Millstream Merlin', a spontaneous hybrid of uncertain parentage, found in the garden of the North American Rock Garden Society's former president H. Lincoln Foster and his wife, Laura Louise. It is a frequent prize winner on our Alpine Garden Society (AGS) show benches, perhaps because the very striking deep violet color is accentuated by the lack of stamens. Merlin is even happy in our mild, wet UK gardens where it is always the last to finish flowering. Another much sought after American cultivar in my collection is the very pretty double form of *H. acutiloba* named 'Louisa Koehler', which combines shades of pink and lavender blue, but I would not risk this one in my garden.

It was another spontaneous *H. acutiloba* cross that really got me involved in the early days. My first four hepaticas thrived in pots in the yard, moving from the sunnier patches in spring to the shadow of the surrounding buildings in summer. I collected seed, and although I started with only blue *H. nobilis*, I was delighted when cerise seedlings also appeared. I had not thought about cross pollinating until one day I was thrilled by a particular seedling in the *H. nobilis* var. *pyrenaica* 'Apple Blossom' pot. The seedling had the typically marbled foliage of 'Apple Blossom', but it also had the sharply pointed lobes of its neighboring *H. acutiloba*. Sure enough, as luck would have it, it was a rather special hybrid, producing masses of lavender-blue flowers that last for many weeks because, like most hepatica hybrids, it does not



Clockwise from top left: *H.* 'Millstream Merlin', *H. americana*, *H.* x 'Hazelwood Froggie', *H. americana* 'Louisa Koehler'

produce seed. I named it 'Hazelwood Froggie' because the emerging marbled foliage among the pale blue flowers in the spring reminded me of clusters of spawning frogs in our pond. It has also proved to be very happy in our open garden, unlike its *acutiloba* pollen parent.

Hepatica americana grows in most of the same areas as *H. acutiloba* but is more prominent further north. It often grows in woodland at higher altitudes up to 4000 feet (1200 m) in dry situations, sometimes in the root clefts up against tree trunks, often in acidic soil. *H. americana* is smaller and more compact than *H. acutiloba*, with rounded evergreen foliage, sometimes beautifully marbled. The flowers come in white or pastel shades of pinks, lavenders and blues, some with lighter picotee edges or darker centers, and are framed by large bracts. I have several *H. americana* cultivars and selections in my collection. 'Ashwood Marble' is a UK seed strain with pretty lavender flowers and hairy marbled leaves, while 'Ashwood Flare' has a larger white

flower with a deep violet center. I am still looking for Don Jacobs' selections including 'Eco Regal Blue' and 'Eco White Fluff', and also 'Elkins Double' and the cut leaf form of *H. acutiloba*. These would complete my *H. americana* and *H. acutiloba* collection benches, so any information would be welcome! My impression is that although North America has a very diverse mix of flower colors and leaf forms in the wild population, they have been less exploited by plant breeders than in Europe and Japan.

Asian Hepaticas

Hepatica asiatica is confined to northern and eastern China, Korea, and the far east of Russia. The foliage looks like *H. nobilis* but is deciduous with mainly pink to purple flowers. I have examples in white and pink. This, like some of the other less dramatic species, doesn't seem to have any cultivars.

Hepatica falconeri was thought to be extinct until recent years when it was rediscovered along the "Silk Road" in the Pamir mountains



Clockwise from top left: *H. henryi* 'Flora Plena', *H. henryi* 'Rose', *H. falconeri*,
H. insularis



Clockwise from top left: *H. japonica* 'Tensei', *H. japonica* 'Ryokkou', Plants from an AGS show labelled, catalogued and ready to join my collection, *H. x eurasia* 'Surprise'

of Kashmir, northern Pakistan, and large populations in Kyrgyzstan. Found on rocky slopes in mixed woodland, between 6,000 and 8,000 feet (1,835 to 2,500 m), *H. falconeri* was considered to be the link between *Hepatica* and *Anemone*. Like an anemone, it has a much lower bract than the other hepaticas. The flowers are small and white, while the foliage is deciduous and deeply divided, often with lighter blotches.

Hepatica henryi is from Hubei and Chongqing (formerly part of Sichuan) provinces of China growing among deciduous woodland and bamboo at altitudes of 4,500 to 6,000 feet (1,400 to 1,800 m). *H. henryi* is a small, compact species with scalloped leaves that often take on an attractive bronze tinge in the spring. The flowers are white, pink or pale blue, often with protruding bracts with three notches. A few wild-collected fully double varieties of this species have found their way into cultivation. My tiny *H. henryi* 'White Plena' was probably collected from the wild, but I rescued it from a nursery giving up hepaticas, so I don't feel too guilty about that. Almost dead when I got it, the plant has



Clockwise from top left: *H. japonica* 'Yu Zuru', 'Kimon', *H. japonica* yellow flower, a *H. japonica* forma *magna* selection

since thrived and became a great favorite. I have split it and swapped divisions many times.

Hepatica insularis is a species from the coastal areas of Korea and some of the off-shore islands. It is closely related to, but more compact than, *H. asiatica*, with similar white or pink flowers and light blotches on the leaves.

Hepatica japonica is by far the most important species for hepatica breeders and cultivators. It is known as "Yukiwariso," the snow breaking plant, and the Japanese have been collecting hepaticas from the wild since the 1600s. Several decades ago, large numbers of new mutations appeared, many stunningly beautiful, and this has given fascinating opportunities for further breeding. Most important is the group called *H. japonica* forma *magna*. Found in a few coastal districts on wooded hillsides and almost infinite in its variety, this is the form from which most of the plants labeled *Hepatica japonica* come. Now true reds and yellows have joined the extensive range of colors, but for most of us, it is the intricate detail within the full doubles that enchants.

H. japonica 'Tensei' is often flowering in October and usually goes on until the end of March, while *H. japonica* 'Yu Zuru', which translates as "Crane at eventide," grows happily in a strawberry pot on our patio; both would be good choices for a small collection. I also love single flowers, and many of these are named and beautifully marked with contrasting stamens. New hybrids between *Hepatica japonica* and *H. nobilis*, called *Hepatica* x *eurasia*, are becoming available. I have several from Gunhild Poulsen in Denmark including her *H. x eurasia* 'Surprise'.

A serious collector of *Hepatica japonica* needs a greenhouse or cold frame. Though they are hardy, and some are grown outside in the UK, the exquisite flowers are easily spoiled by heavy rain. Inside, they need moist but very free draining compost, shade netting as soon as your local deciduous trees get their new leaves and very good ventilation.

H. japonica forma *japonica* is found in small populations growing close to the ground at higher altitudes (1,000 to 3,000 feet; 300-950 m) than *H. japonica* forma *magna*. The leaves are small with three sharply pointed lobes. They have small flowers with fewer pistils and stamens and are mostly ivory colored. Sometimes the flowers are pink to dark purple, and rarely, but very significantly, can be red or pale yellow.

H. japonica forma *variegata* needs cooler conditions and is considered difficult to cultivate, but large populations grow in the wild among deciduous woodlands and bamboo at 500 to 2,500 feet (150 to 770 m). This form has more rounded lobed leaves and petals than *H. japonica* forma *japonica* and mostly white flowers.

H. maxima is endemic to a single island, Ulleungdo, east of the Korean Peninsula, where it grows in dense shade on steep slopes among camellias and rhododendrons. I grow it successfully in the shadiest end of my hepatica house. *H. maxima* is the largest of the hepaticas, up to 16 inches (40 cm), with leaves 4 to 6 inches (10-15 cm) wide. The flowers are a bit disappointing, relatively small white or slightly pink, surrounded by a large bract. Leaves and bracts are attractively fringed with fine hairs. The black and white seeds, affectionately called panda seeds, remain on the plant, black end out, for several months, looking like blackberries. The hybrid between *H. nobilis* and *H. maxima* is officially *Hepatica* x *schlyteri*, named after Severin Schlyter who produced the first and named it 'Nomax'. These hybrids are excellent plants and commercially available as *H. x schlyteri* Ashwood Hybrids in several colors. The strong cobalt blue is particularly attractive. This hybrid is usually sterile, but there is a distinctly different white *H. x schlyteri* bred by Robin White named 'The Bride' which does come true from seed if kept away from other plants. Strangely, it will also cross back to *H. nobilis* and other species to make complex hybrids that are sometimes fertile.

H. pubescens (syn. *H. nobilis* var. *pubescens*, though the DNA suggests it is closer to *H. japonica*) has foliage covered with fine hairs, as the name implies. The flowers are simple in form, often only six rounded petals of white, pink, or violet, and frequently bicolored. The pistils are often a beautiful, contrasting, red color. These are garden-worthy (but expensive) plants that prefer to be kept a bit drier than *H. japonica*.

H. yamatutai comes from the wet mixed forests of Mt. Emei in the Sichuan province of China at 3600 to 7000 feet (1100-2100 m), among rocks on steep, well-drained slopes. A large hepatica, the leaves have five and sometimes more pointed notches, often bronze at first and



Clockwise from top left: *H. x schlyteri* 'The Bride', *H. x Schlyteri* Ashwood Hybrid, *H. x euroasiatica* 'Rötesbütteler Röschen', *H. pubescens* 'Tenjinbai'

occasionally boldly marbled. The flowers are ivory white, sometimes with pink on the reverse of the petals. Lovely, new, intense blue-flowered crosses with *H. transsilvanica* are proving to be hardy garden plants.

Hepaticas can be grown from seed, but it needs to be sown while it is fresh and green in late spring, because it is useless if it dries out. You may find seed on exchange lists, but look for ones that are damp packed, or order from suppliers that send out fresh seed in the spring. To germinate, sow your seed on top of very free draining compost and lightly cover with fine grit. Keeping the pot damp, but not wet, until the following year when they will begin to germinate. I leave seedlings in the same pot for another year or two and then pot them individually. My compost is two parts homemade leaf-mold (mostly beech leaves), one part vermiculite or perlite and one part John Innes: use No 2 sieved for seeds but No 3, also sieved, for potting on.

I replot all the plants in my collection every other year, but quite a lot of them are done annually because they need splitting. If you leave them too long, they start to die out in the middle. In a wood, hepaticas get a fresh mulch of leaves each year and put out new roots from the top, while the older roots will be working their way through older leaves that are still breaking down. My fresh leaf-mold compost mix is a good substitute for these unfortunate hepaticas stuck in a pot. To replot, I knock each plant out of the pot and shake off the loose compost. Grasping the leaf stems in one hand, I start to comb out the roots from the bottom until they are all free. This process takes out a lot of the dead and weaker roots. I inspect the remaining roots and remove any that appear old or damaged. If you want a big showy pot full, you could separate the buds slightly at the top and pot them into a larger pot. That is what I used to do until I started running out of space. Now, I split them if they are too big to go back comfortably into the same pot, leaving room for the compost between all the separate roots. Healthy roots will grow very long, but personally, I don't like to fold them along the bottom of the pot. If the roots are too long to fit with a gentle curve, I cut them to the depth of the pot. I start replotting if we get some dull days in August and stop before there is a risk of frost inside my hepatica house. You can also replot straight after flowering, and young plants are best done then because there is less risk of overwatering, which is the easiest way to kill hepaticas. Watch out for slugs and mice outside, and aphids occasionally on new growth indoors.

With all this beauty to choose from, it is easy to see how one might get drawn into a collection. Nobody is going to manage to collect all of them, and some lucky people will end up with exactly the ones they like best. There is nothing like having a large collection to make

you appreciate the huge variability between individual plants within the same species. I try as well to keep as many colors and forms of all the species as I can, even if they are not named. Because I hold a national collection, people are very generous in giving and swapping plants, and equally, it is important for me to help get cultivars back into the nursery trade and to help and encourage people who are taking an interest in the genus.



Clockwise from top left: *H. yamatutai* 'Pink-backed', A large *H. x media* unpotted, With roots combed out, Split into 17 new plants.



Building a Pondless Waterfall

APRIL FROST

IN NEW ENGLAND, a tromp through the woods will often bring you across piles of boulders worn smooth by their time and travels with a glacier. Sometimes when crossing one of these washes you can hear a brook running, but it cannot be seen because of all the stone deposited on top of it. If you follow that sound, you may just get lucky and find the mossy pool where the brook wells up out of the ground. If you follow it further, that brook may just disappear again under another mass of boulders. If you've experienced the joy of a hidden stream, then you've experienced the joy of a pondless waterfall.

A pondless waterfall is a recirculating waterfall that ends with water disappearing into river stone rather than falling into a pond. The waterfall adds the ambiance and many of the planting possibilities of a pond without having to maintain an entire ecosystem. Unlike a pond, a pondless waterfall can be maintained in less than 10 minutes a week.

There are a hundred ways to skin a cat or to build a waterfall. We've built many waterfalls from scratch, but have also removed and redesigned many waterfalls that have never functioned properly. We want to share with you a few tips and tricks we've learned along the way so that you can successfully build a pondless waterfall without heartbreak.

1) Choose a course for your waterfall. The best place to build a waterfall is where you will see it daily. A garden hose laid on the ground may help you to visualize the course for your waterfall. Be sure to add twists and turns for a natural look. If you are attempting your very first waterfall, start small.

2) Figure out how much water is going to run down your stream. To calculate how much water is in your waterfall in gallons, the formula is length (in feet) x width (in feet) x average depth (in feet) x 7.48. Let's say, for example, you are building a 10-foot stream and waterfall that varies in width, but is generally about 2 feet wide and 3 inches ($\frac{1}{4}$ of a foot) deep. Your formula would look like this: $10 \text{ ft} \times 2 \text{ ft} \times .25 \text{ ft} \times 7.48 = 37.4$ gallons of water in transit. For metric measurements, simply multiply the dimensions of your waterfall in centimeters and divide by 1000 to get the number of liters of water running down your stream. For a similar sized waterfall, that would be $(300 \text{ cm} \times 60 \text{ cm} \times 8 \text{ cm}) / 1000 = 144$ liters.

3) Design your basin. The basin is the hole in the ground that all the water ultimately falls into before being pumped back up to the top of the waterfall. The size of the basin should be 2.5 times the water

in transit. Using the numbers above our basin should hold a minimum of 93.5 gallons (360 liters). Pondless basins are constructed with water storage blocks (in the US, small ones hold 16.5 gallons, larger water storage blocks hold 33 gallons). Since our example is a smaller waterfall, we'll use the smaller blocks ($93.5/16.5=5.66$ or 6 small blocks.) You will also need a pump vault in your basin to house your pump and other equipment. Place the vault in the lowest point in the excavation to make an easy clean-out point.

If steps 2 and 3 seem intimidating, consider buying a kit. Pondless waterfall basin kits come with everything you need (minus the stone and elbow grease). Step-by-step instructions make it simple to assemble and take all the mathematical equations out of the building process.

Whether you choose to use a kit or not, I recommend you choose one manufacturer for your entire system, so all the pieces fit together smoothly. And don't substitute other household items for pond products. They may look similar, but rarely hold up and will cost you more money and time in the long run.

4) Excavate the basin. The excavation for the basin should be a rectangle with sides as perfectly straight as possible, 6 inches (15 cm) longer and wider than the size of your water storage blocks. The bottom of the excavation should be level and free of any sharp objects such as



Completed basin with water storage block installed.

rocks and roots. Dig the space for the pump vault so the foot (bottom of the L shape) sits just below the grade of the bottom of your excavation. Make sure you leave a couple of inches on either side of the vault excavation to accommodate your liner and underlayment. Use the soil from the basin to elevate your waterfall berm and level the area around the basin, compacting it as you go.

5) Put it all together. Now that you have your basin excavated, line it with non-woven geotextile underlayment. Smooth it out across the bottom and carefully fold it in the corners (much like a bed sheet) leaving a foot (30 cm) of excess on all four sides. Next install your basin liner in the same manner leaving the longest overlap in the direction of your waterfall. We use 45 mil EPDM liner, which is rugged and flexible with a long lifespan and 20-year warrant. Place another layer of underlayment on top of the liner to help protect it from the sharp corners of the water storage blocks. Place your pump vault into the basin, and then install the water storage blocks, being careful to make sure that they are level, as this gives them strength. This basin is the foundation of your waterfall. Avoid substituting milk crates and laundry baskets for water storage blocks. Water storage blocks are engineered to have great weight placed on them; properly installed for the application a semi-truck can run them over. Other household items are not strong enough and will soon collapse under the weight of the rock placed on them.

6) Design the top of your waterfall. The top of the waterfall can be built using a few different methods.

The simplest waterfall is built with a spillway. This simple diffuser is attached to the end of the plumbing. It offers no added filtration, but is inexpensive and has no consumables to replace each season. For more filtration, you can use a plastic biological filter holding several filter mats. These are easy to install but need to be replaced annually.

Our favorite method, though more complex and expensive, is to build a wetland filter at the top of the waterfall. Essentially this is a small version of the basin at the bottom of the waterfall installed at the top of the waterfall. The plumbing runs into the bottom of the wetland filter and the water will push up through the river stone. This filters the water and makes a perfect bog garden as water flows up, slowly delivering nutrients to the roots of your plants before spilling over a waterfall stone. A wetland filter is exceptionally natural as it appears to be a small pool welling up from the ground, and it filters water like a septic system.

7) Excavate the waterfall. The course of the waterfall should be excavated to a depth of 1 foot (30 cm), creating vertical walls on the sides and level steps (much like a staircase), which will become your waterfalls down the slope. Avoid making a staircase of waterfalls that



Meandering, irregular falls look more natural than stair-like ones

are uniform. Brooks naturally meander down hillsides turning whenever they encounter a large rock or other obstacle, so more irregular steps will look more natural. Be certain that your soils are well compacted and free of roots and sharp stones that may cause damage to the liner. Your last drop into the basin must be at least 8 inches (20 cm) tall if you have two separate liners (one for the basin and one for the waterfall). Line the excavation with underlayment. Use crisp folds where necessary to go around corners. Make sure that these folds, like shingles on a roof, fold downhill so water will run over them smoothly. Avoid using newspaper or old carpets that so many thrifty writers recommend in their pond

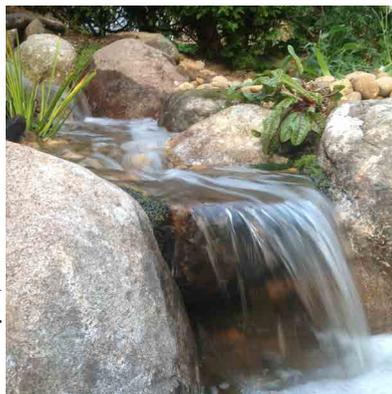
building publications. These break down over time leaving your liner vulnerable to sharp objects. Install your waterfall liner in the same manner as the underlayment. Be certain that your basin liner comes up and over the first shelf of your waterfall and your waterfall liner goes down to the top of the water storage blocks if overlapping liners. If you are using a pre-made basin, your liner will go over part of the basin per manufacturer's instructions.

8) Build your waterfall. It is helpful to look at pictures of waterfalls and to visit nearby streams to look at some of the different types of waterfalls.

To build a very simple waterfall, choose two rocks called shoulder rocks. Place these stones on either side of the falls, and place a stone or even a piece of log between them. The shoulder rocks will guide the water over the stone, to create your waterfall. Waterfall stones can be any shape, and each will create a different effect. Be sure to level the stone left to right to ensure water flows over the whole stone.

When constructing the waterfall, start at the basin and work your way up. Place pieces of underlayment under any sharp boulders to keep them from puncturing the liner. After you place larger stones, fill in the areas between them with smaller stones and gravel.

Once your stones are in place, use black waterfall foam to keep water from flowing under and behind rocks, forcing it to flow down the middle of the stream and over waterfalls. Waterfall foam is water resistant, so it diverts water well, but it's not waterproof. Taking extra time to seal all cracks and crevices behind frame rocks and waterfall rocks will make a big difference in water flow and the outcome of your project. Waterfall foam should be covered with stone, log pieces, or moss to make it look like a natural element.



A waterfall rock placed between two shoulder rocks creates a simple cascade.

9) Choose your pump. How much water do you need? A backyard waterfall generally has a minimum of 1500 gallons per hour per foot of waterfall width (about 16,000 liters per hour per meter). For commercial features or waterfalls to be enjoyed from a distance, you will want as much as twice that.

Pump manufacturers have charts for their pumps that will show each pump's capabilities at particular head pressures. To calculate the required head pressure, measure the vertical distance from the water level in the basin to the top of the waterfall. Add to that number 1 foot of head pressure for every 10 feet of plumbing required to connect the pump to the top of the falls. The pump should be outfitted with a check valve and installed in the vault located in the basin.

10) Install your plumbing. We use flexible PVC plumbing that can withstand freeze and thaw cycles and is far superior to rigid PVC in both durability and ease of installation. The plumbing is dug into the ground 6-8 inches (15 to 20 cm). The trench for the plumbing should have a slope from the waterfall to the basin that is even. Avoid making dips in the trench as water will settle in the pipe in these areas during the winter. Connect the check valve to your plumbing and run it up to the top of your waterfall. Install it according to the manufacturer's instructions.

11) Finish your edges. At this point, turn on the waterfall. While the waterfall is running, work on finishing the edges. Cut your liner 6-8 inches (16 to 20 cm) above the waterline and fold the liner back on itself so it stands vertically against the stone lining your stream edge. Once folded into place, backfill with soil, taking the time to pack the soil carefully so it doesn't settle later. Most leaks are created in the edges of the waterfall, so be particularly careful here. Once your edges are securely backfilled, use a combination of river stone, log/stump pieces, and moss or plants to dress up your edges.

Potted Pines -- and Spruces Too

BOB NOLD

ABOUT TEN YEARS ago I made the mistake of visiting Jerry Morris'S conifer nursery. What I regret most was not the actual visit, but the fact that, at the time, I didn't happen to have several thousand dollars in my wallet.

I suppose that most gardeners develop an interest in certain plants shortly after they learn to read and maintain that interest until their last breath. Obituaries say things like "He developed a lifelong passion for begonias" or "At the age of -, she became hooked on roses." Well, not me. I'm lucky if I can find something that interests me for longer than a week.



Potted conifers at Jerry Morris'S nursery.

It's easy for me not to focus on what might be considered a personal failing and, instead, blame the climate here. So I will. Denver's climate, from a gardener's perspective, can only be described as horrible. I became interested in growing oncocyclis irises, which turned out to be quite easy to grow here, but the irises apparently disliked having to endure a frost-free March followed by an April with record cold temperatures, and so they refused to flower. My interest waned rapidly.

I'm not certain how I feel about conifers, for that matter. Several years ago I purchased three large, collected pinyons (*Pinus edulis*), which were delivered to my driveway with no indication as to how I might get them into the holes which I had cleverly pre-dug for them. My late wife, bless her heart, had put a hay hook in the shed as decoration, and so I used that to drag the pines to their respective holes. The pines only weighed about six hundred pounds each. It was like dragging a refrigerator uphill. My doctor said that getting my heart rate up to five hundred beats per minute was "good exercise."

Dwarf conifers, however, weigh less. I can buy several and not get a hernia lifting them. They don't need to have snow knocked off them at two in the morning, and they can go practically anywhere.

Jerry's conifers were selections of native species, and while I like non-native plants as much as natives, there's something very exciting in the idea of specially-selected native plants. That sort of thing has always interested me. I went back the next year, and then again the year after that. I wound up with a lot of dwarf conifers. It turned out that I had fewer places for them in the garden than I thought I did. So I planted them in those glazed pots everyone has. Why I happened to have so many empty pots is a story for another time, but for the last several years the pots have been home to a variety of dwarf conifers.

The first conifers which were planted in pots were blue spruces (*Picea pungens*) which were selected by Jerry but are not in the trade. So, in other words, I have dwarf conifers that no one else has. (I could repeat that several times, but it might seem like I was lording it over everyone.) Many of them just have numbers, but they're still dwarf conifers that no one else has. Jerry would rummage through the rows of pots, pull out a pot and hand it to me, saying "This is a good one," and of course it was, so it came home with me.

I wasn't sure whether or not the little potted conifers needed to be moved into a protected spot for the winter (or even brought into the house), but Jerry said they could simply be left outside, and, in fact, there were hundreds of his conifers at the nursery growing in pots, or wooden trays, perfectly happy throughout the year. Of course, I saw them there and could have realized that, but I was surrounded by dwarf conifers and only the acquisitive part of my brain was functioning at the time.



Small conifers in troughs at the New York Botanic Gardens. Photo by Joseph Tychonievich

The fact is that nothing happens to conifers growing in pots in the winter. They just sit there.

Blue spruce, limber pines (*Pinus flexilis*) and the others which I grow have very hardy roots; the roots can stand being frozen for months at a time. Contrary to what you might read (not that the internet provides any information which might be considered wrong), conifers, in pots or in the ground, do not need water in the winter. All photosynthesis stops after a night below freezing; roots do not take up water without photosynthesis. Decreasing soil temperature is a signal for the roots to stop growing; the soil temperature in a pot decreases much more quickly than the soil in the garden. So every night below freezing is a signal to the conifers to do nothing. Conifers can go for months without photosynthesis. This is what enables them to endure long, cold winters.

If the soil-less mix (I use more or less equal parts peat—or, better, a peat-free compost—perlite, and scoria, or something similar, which makes water more available to plant roots, and provides the necessary soil oxygen) thaws during the winter, again, I do nothing. (You might see a pattern emerging here.) Watering conifers during a period of warm weather can lead to deacclimation, making the plants susceptible to cold temperatures later on in the winter.

The conifers do need regular water during the growing season, especially in autumn, so that they can manufacture the cryoprotective sugars necessary for winter survival. About one hundred percent of conifer deaths or damage, including “winter desiccation,” can be attributed to insufficient hydration prior to the onset of dormancy. It’s difficult to tell when precisely to stop watering; conifers enter the first stage of winter dormancy when days become shorter (really, when nights become longer) and the second when temperatures begin to go below freezing, so I would say the best time to stop watering is before the first frost.

That’s all there is to it. The beauty of this, to my way of thinking, is that I don’t need extra space in the garden any time I think I need more dwarf conifers (which happens at every chapter plant sale I attend). I just need more pots.



For the gardener who wants a collection of conifers like this but doesn’t have space or feel like digging a lot of holes, pots are the answer. Photo by Joseph Tychonievich



NARGS Hive Mind: Troughs

JOSEPH TYCHONIEVICH

BACK IN THE summer issue of the *Quarterly*, I asked you to share your methods for making troughs so that we could all learn from each other. The response I got was amazing! People wrote in with recipes, techniques, lessons learned, and pictures. What follows is my attempt to compile all the messages I received into a guide to trough making from the NARGS hive mind.

Hypertufa

The most popular techniques for trough making were based on hypertufa. Hypertufa is the classic faux stone for rock gardeners and exists in a thousand different permutations. Hypertufa is essentially a variation on concrete. Concrete is made of portland cement mixed with sand and gravel. Hypertufa is the same thing, but with peat, perlite, and other light-weight materials in place of the sand and gravel to make a lighter, more porous material. Everyone who wrote in had the same basic approach, but with a lot of variation in the specifics.



Above: David Marsolo make this trough using a variation on the traditional hypertufa recipe using all perlite instead of peat.
Opposite: A collection of troughs in the Allen Centennial Garden in Madison, Wisconsin. Photo by Joseph Tychonievich



Brian Coleman includes sand in the hypertufa mix when creating large, intricately formed troughs like this striking gothic design.

Ben Burr wrote in saying he uses the recipe from Joyce Fingerut and Rex Murfitt's excellent book *Creating and Planting Garden Troughs* which is 3 parts cement, 4 parts peat, and 5 parts perlite. That is probably the most standard recipe, but many people had slightly different versions. David Marsolo does 4 parts perlite to one part cement with no peat whatsoever. He finds this approach is stronger and lighter weight than using peat. Brian Coleman goes with 3 parts peat, 3 parts perlite, and 2 parts cement, and sometimes replaces some of the peat with sand for stronger, but heavier, troughs. A similar recipe comes from Tim Walsh who uses equal parts each of sand, peat, and cement. Kathleen Sayce is experimenting using coir (coconut fiber) and other more environmentally sustainable materials in place of peat. I've also personally made troughs of papercrete, using 3 parts paper pulp, 1 part perlite, and 2 parts cement.

The collective wisdom here? Hypertufa is versatile and far from an exact science. In all cases, the cement acts as a binder to hold together the filler ingredients, but the ratio and the specific ingredients used can be incredibly diverse. The universal recipe from the NARGS Hive Mind: 1 part Portland cement and anywhere between 2 and 4 parts fillers which can be nearly anything including sand, perlite, peat, coir, or paper fiber.

With that basic (highly variable recipe) the technique is universal. Work somewhere you can make a mess. Wear long, water-proof gloves and a mask over your mouth. Wet cement is caustic, and you shouldn't work it with your bare skin, and you certainly shouldn't inhale it. Mix your dry ingredients and then add just enough water that if you squeeze a handful, it will hold together like a snowball. If you can squeeze water out of the mix, it is too wet, and the final product will not be as strong.

For a stronger final product, many people recommended adding a handful or two of concrete reinforcing fibers and replacing $\frac{1}{2}$ to $\frac{1}{4}$ of the water with liquid acrylic bonding agent (both will be available where you bought your cement). These additions will make trough that is less likely to crack during the winter freeze and thaw cycle. You can also buy concrete dyes to add to the mix. These come in all colors of the rainbow, but browns and blacks will look the most natural. Just remember that a little bit goes a long way, so add judiciously. Leigh Blake notes that dyes need not be mixed in thoroughly, as variation in color can look more natural than something perfectly uniform.

What you use as a mold can be nearly anything. You can form your trough over an existing container, such as a pot or bowl; it can be formed over a mound of sand, covered with plastic; or you can build molds using wood or stiff foam boards. Molds and forms are only limited by your imagination, but be sure that whatever mold or form you use, to make a drainage hole or two in the bottom, and pack the hypertufa mixture in carefully and thoroughly to avoid air pockets that will weaken the final product.

Everyone recommended that whatever mold you use, you cover it with a layer of plastic before putting in your hypertufa to make the unmolding process easier. Well, everyone except Brian Coleman who sometimes uses plastic and sometimes a layer of petroleum jelly.



With the right mold, troughs can be made in any size or shape you can imagine.

Photo by Brian Coleman



Kathleen Sayce rubbed the top right and bottom left troughs with dry cement to create a smooth finish. For comparison, the other two troughs were left untreated.

Brian has many excellent illustrations of his techniques on website. Start with <http://barrowworks.blogspot.com/2012/07/newish-square-trough.html> and <http://barrowworks.blogspot.com/2011/06/new-trough-design.html> to get some exciting ideas.

Once your mold is filled, cover the trough with plastic, seal tightly, and wait at least 24-36 hours. Larger masses of hypertufa cure faster than smaller ones, so large troughs can be unmolded after 24 hours, while smaller ones should be left for up to a week. After that time, the hypertufa will be set, but not fully hardened. At this stage, it can be removed from the mold, and the surface treated in various ways to change the look of the trough. Here again, you can be as creative as you want, and everyone had very different techniques. The most common treatment is to go over the unmolded trough with a wire brush, rasp, or awl to add texture to the surface. Many people also recommended using a propane torch, lighter, or even a candle flame over the surface to burn off any peat or reinforcing fibers that can give the surface a “fuzzy” appearance. Kathleen Sayce shared a technique she learned from Jeffery Roehm. She takes handfuls of dry, portland cement and rubs them over the surface of the trough, filling in the small holes and depressions to create a smooth, uniform final surface. Leigh Blake makes a slurry of cement tinted with concrete dye and paints that with a brush over her trough. She lets this dry for several hours, then



Leigh Blake created this trough using an unusual hypertufa mixture and her free-form shaping technique.

goes over it with a wire brush to cut away some of the dyed slurry and create variations in color and texture.

Another unusual technique is Ev Whittemore's approach using spray paint. She goes over her hypertufa with first black paint, and then light accents of red and green to mimic the look of actual stone. The paint does eventually flake away, but by that point, the hypertufa has begun accumulating moss and lichen and the paint is not required. There is lots of room to experiment here to mimic the look of other stone in your garden.

After you've treated the surface, Bill Beuerlein recommends that you wrap your trough back up in plastic and let it cure for another month. Cement grows harder and stronger slowly over time, and keeping it wrapped in high humidity for a month allows it to reach its maximal strength.

One unusual variant on the hypertufa technique is one that Leigh Blake has developed. Instead of the typical portland cement, she starts with plastic cement – a product that is usually used in making stucco. She mixes one part plastic cement and one part pumice to make a mixture that is very strong and that she can mold to mimic the look of stones. She builds her containers by starting with a wire frame, and then works slowly from the bottom up, pressing small handfuls of her mixture over the wire frame. She cautions that this is harder than it sounds and takes practice, but using her unique mixture and skipping a traditional mold she creates very unusual and beautiful containers.



Ugly styrofoam boxes headed for the landfill can be turned into beautiful containers with a little shaping and paint, as in these two photos from Maryanne Gryboski.

Styrofoam

Taking styrofoam boxes and turning them into troughs is the second most popular way among our members to create a trough. The biggest advantage to this technique is that the final containers are extremely lightweight. Additionally, the styrofoam walls of the container offer excellent insulation which protects the roots of alpine plants from extremes of heat and cold. Finally, they can be the most affordable way to make a trough, particularly if you can find a supply of styrofoam boxes that are going to be thrown away. Many different NARGS members told me that they get them from hospitals, and others recommend asking at the grocery store as medicines, fruits, and vegetables are all commonly shipped in styrofoam boxes. Ask around and you can easily find a supply of free boxes that would otherwise just end up in a landfill.

The first way to turn an ugly styrofoam box into a beautiful trough is to paint it. But before you start painting, you need to texture the surface of the foam. Styrofoam is, of course, easy to cut, so you can hack at it with a knife, rasp, wire brush, or just about anything else you can find to carve up the surface and make it look more like rock. Be warned: this is incredibly messy! Tiny bits of styrofoam will go everywhere, including all over you. Be prepared to vacuum everything in the area, including yourself, thoroughly.

Once the box has been texturized, get a heat gun (not a hair drier, they're not hot enough) and run it over the surface of the styrofoam. The heat gun will melt the surface of the foam just enough to create a smooth, even surface.

If carving up the foam is too much mess, you can also just use the heat gun. By holding it still in some places, you can melt



Some of Jo Walker's collection of troughs made by covering styrofoam with a layer of hypertufa.



Mary and Bill Stark use styrofoam inside their troughs (top) to create a lightweight crevice garden that looks beautiful once planted (bottom).

depressions and create an uneven surface. You can also heat up a screwdriver or any other piece of metal with a heat gun or even in a candle flame, and use the hot metal to melt rather than carve texture into the styrofoam. Be sure to do this in an open, well-ventilated area to avoid breathing the fumes of melting styrofoam.

Once you've shaped the surface to your liking, you can start painting. Start by covering the whole thing with a coat of some base color – grey or brown – and then add variation and texture by either brushing or spraying on other shades and hues. You can examine an actual piece of stone to see what colors you can see there and try and

recreate that, or just have fun with it. The best advice I've heard is to use lots of different colors rather than just 3 or 4 and mix regular paint with spray paint to create more diversity of texture. Don't be afraid to experiment – if you don't like something you can always paint over it.

The other approach to styrofoam is to cover it with a thin layer of hypertufa. The basic technique is to make a strong mixture of hypertufa, usually with sand rather than peat to give a stronger final product and spread it in a thin layer over the surface of the styrofoam. The variation comes in how you get the hypertufa to adhere to the styrofoam. Ian Young's method, as is thoroughly illustrated on his excellent Bulb Log (<http://www.srgc.org.uk/feature/fishbox/troughs.html>), is to cut holes through the styrofoam, and pack the hypertufa through the hole and on both sides, so it holds together.

Jo Walker uses a different technique. She uses a product called Unibond PVA Plasterers adhesive. She brushes this all over the surface of the styrofoam (or, indeed, any other container she wants to cover), then mixes up her hypertufa (she uses 2 parts peat, 2 parts sand, 4 parts cement) and spreads it over the surface in a layer about $\frac{1}{4}$ of an inch thick.



Jan Tholhuijsen covers his containers with cloths soaked in a hypertufa slurry.



Jan Tholhuijsen builds very large containers by gluing together sheets of styrofoam (left) and then covering them with sheets of fabric soaked in hypertufa slurry (right).

Mary and Bill Stark use a variation on this technique that they find makes a sturdy trough that will survive contact with a wheelbarrow. They first wrap the styrofoam with a synthetic stucco fiberglass mat. Next, they coat everything with an adhesive called surface bonding cement. Finally, they cover it with a thin layer of hypertufa. The adhesive and fiberglass mat together make a very strong, lightweight surface. They also insert sheets of styrofoam inside the trough to create an extremely lightweight crevice garden. The foam guides plant roots deep just as stone crevices do, but are much cheaper and the final container is exceptionally lightweight and easy to move. Bill noted that bringing these very lightweight troughs to public sales has been a great way to recruit new members to their local chapter.

Jan Tholhuijsen uses yet another technique. He first rubs the surface of the styrofoam with sandpaper to roughen it. Then, he mixes 1 part sand, 1 part peat and 4 parts cement with enough water to make a runny slurry. Using a brush he paints a layer of this cement slurry

over the surface of the styrofoam, and then he takes clothes such as old towels or shirts, soaks them in the cement slurry, and drapes them smoothly over the surface of the styrofoam. Once this has set for two to three days, he paints over the whole surface again with a layer of cement slurry to make a smooth, resilient finish. Jan has produced an excellent video illustrating his method: <https://www.youtube.com/watch?v=jV9gzHsrfkw>



Elissa Steeves' containers made from auto body filler. Photo by Joseph Tychonievich

Auto body Filler

I learned about this very unusual technique in Elissa Steeves' incredible garden where she created fascinating containers using Bondo auto body filler. You can buy auto body filler at auto parts stores, and it comes with two different containers that, when mixed together, form a thick, spreadable paste that then hardens into an incredibly hard, strong surface. It is intended to be used, as the name suggests, in auto body shops to fill in dents. But you can, instead, spread the filler over the surface of a cheap plastic ball or even a balloon. Once the filler has hardened, cut open the ball or balloon to deflate it and remove it from the filler. The resulting container can be sanded, painted, or just left as is.

It has been incredibly fun for me to read all of your different techniques for making troughs. And I want to do this again! There is so much knowledge and experience in the NARGS membership, I want to find ways to help us share with each other. So if there is another topic you'd love to see an article like this about, please let me know! Just shoot me an e-mail gsparrowgardens@gmail.com, and we can keep learning from each other.



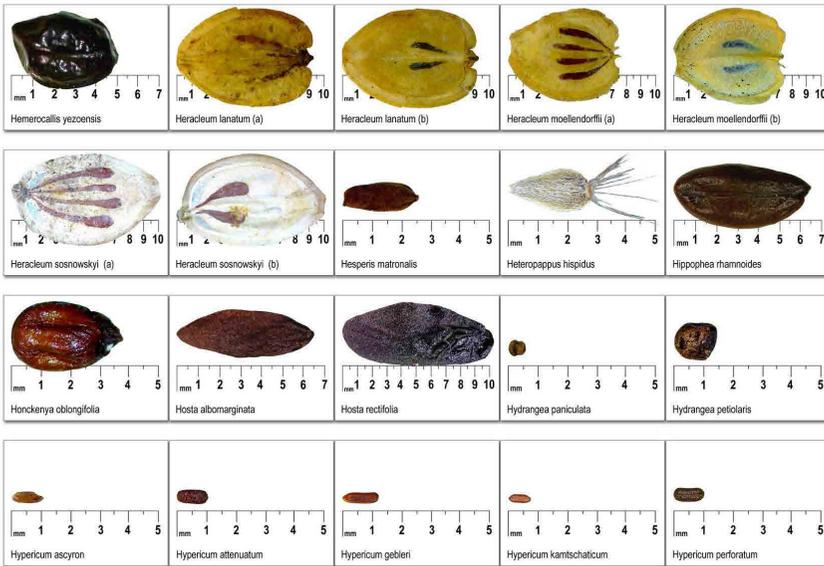
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ATLAS OF THE PLANT SEEDS OF NORTH ASIA

Atlas of the Plant Seeds of North Asia

Alexandra Berkutenko

2016, Biological Problems of the North Far-Eastern Branch of the Russian Academy of Sciences



An ambitious project undertaken by the late Dr. Alexandra Berkutenko, a botanist from Magadan in far eastern Siberia, resulted in this lavishly illustrated compendium of 800 color photographs of 773 species, within 332 genera of forbs, herbaceous and woody plants growing in far eastern Russia. Twenty-seven species in the Apiaceae are illustrated front and back for additional clarity. A scale reference in centimeters is provided to help indicate the size of each seed.

The photographs are arranged alphabetically by their Latin names, and seeing the often-minute morphological differences between various species in close proximity is very instructive for gardeners interested in growing plants adapted to climatic conditions similar to those found in the northern states

of the US and the provinces of Canada. Many genera are familiar, as well as several species with circumpolar distributions and American adaptation, like *Physocarpus opulifolius*, but others are tantalizingly alien. Eight *Saussurea*, eight *Thalictrum* and six *Tilia* species are included. Now, where to find them? Many have been noted by this reviewer for search against various seed exchange lists, with hopeful fingers crossed.

Following the photographs, the various species are grouped by family in the same alphabetical order. A convenient index lists the page numbers for each photo and descriptive text, for easy reference.

Unfortunately, the five pages of introductory text are only in Russian, but much useful information can be inferred from the images and the individual plant descriptions.

Dr. Berkutenko will be familiar to many people from her seed business, which offered wild- and garden-collected seed (including many taxa among those in the book), and visits as a speaker to ten NARGS chapters in the Fall of 1996.

This, her last book, is available for purchase from her family, who have given us permission to reprint images on our website. These images can be seen at:

<https://nargs.org/alexandra-berkutenkos-seed-atlas>

...or via the Seed Exchange Helpful Links at:

<https://nargs.org/seed-exchange-helpful-links>

The book may be purchased from her daughter, Mariya Polezhaeva, with a price of US\$50, which includes the cost of shipping from Ekaterinberg, Russia. Payment can be made through the PayPal account of her daughter, using the account name (which is the same as her email): polezhaevam@mail.ru

Contact her daughter to supply your shipping information:

Mariya Polezhaeva
Bolshakova st 13 109
Ekaterinburg
620100
Russia
polezhaevam@mail.ru

Another publication by Dr. Berkutenko, *Woody Plants of Northern Sakhalin*, is also available for US\$25.

Steve Whitesell





Bulletin Board

winter
2017/2018

volume 76 | 1

President's Letter

This message is what you like to receive--short and sweet. For most of the NARGS territory, you are days away from true fall and possibly those white flakes that we love to eat.

But out here in the Southwest it is late fall as I write this and it is still mighty hot, 90s most of the day, 60s at night. So I am planting like crazy in my new desert garden. Planting in the desert is not that different: you have little hand-me-down and pass-along plants from friends; you have 5-gallon shrubs and trees; 1-3 quart perennials. All are desert natives and you have compost and an irrigation line (a necessity of life if you wish to get your native plants started). We may have some rain in November and December to complete the planting. And then in March, I'll take a look and see what's happening. March is the bewitching month.

When I lived in New England and the mid-Atlantic area, it was similar. Not so many natives but you did have a choice. Rain and snow were more or less expected, so some of your work was anticipated. And then in March, you took a good look to see if it was defeat or reward. The life of a gardener is a constant, never-ending process of trial and error.

When you read this, the annual general meeting in North Carolina will be over. I was hoping to report on this meeting but alas, the *Quarterly* printing process has a different timing, so I will let you know more in the spring. So far so good, though. I can say that the request for donations has worked and we are in the black at the moment. Thank you to everyone of you who contributed and to the chapter chairs which kept it on their agenda. We are blessed with support. The trip schedule is out: Yunnan, China, led by Panayoti Kelaidis, June 13 – 29, 2018; and Newfoundland, led by Todd Boland, after the annual meeting, July 9 – 15, 2018. So let's see how we do. This is our bread and butter to provide you with more opportunities, speakers, and plant-rich experiences.

Please write me with any concerns you may have.

Betty Anne

bettyannespar@gmail.com



Award recipients at NARGS Annual Meeting, Durham, North Carolina, November 18, 2017. (Left to right): Bobby J. Ward (Marvin Black Award); Tony Avent (Millstream Award); David White (Award of Merit); Tim Alderton (Award of Merit); and Richard Dufresne (Marcel Le Piniec Award). Not pictured Tony Reznicek (Edgar T. Wherry Award); Nancy Goodwin (Millstream Award); and Don Selcer (Geoffrey Charlesworth Award). Awards presented by Panayoti Kelaidis and Betty Spar. (Photo by Nancy Doubrava).



Nancy Goodwin (center) from *Montrose*, Hillsborough, North Carolina, receiving the NARGS 2017 Millstream Award for outstanding garden; with Betty Spar (Arizona), NARGS president, and David White, Piedmont Chapter of the North American Rock Garden Society. (Photo by Bobby Ward)

North American Rock Garden Society
POB 18604
Raleigh, North Carolina 27619-8604 USA
December 2017

Dear NARGS member,

Subject: North American Rock Garden Society--2017 Year-End Report

The NARGS Board continues to appreciate your support of the Society in numerous ways, both through service to the society and financial support. We value your interest in our on-going goal to encourage and promote the cultivation and conservation of rock garden plants and to expand the knowledge of their value, habits, and geographical distribution.

The year 2017 was a busy year for NARGS. In May, the Wisconsin-Illinois Chapter hosted a successful Study Weekend in the Madison area, and in November the Piedmont Chapter hosted an equally successful Annual General Meeting in the Raleigh-Durham area of North Carolina. The winter issue of the Rock Garden Quarterly (to be mailed at the end of December) will identify the recipients of awards presented at the annual meeting. We also hired a new editor of the Rock Garden Quarterly, Joseph Tychonievich, replacing Malcolm McGregor, who served eight years as editor. The NARGS Tours and Adventures Committee arranged plantsman's tours of Wyoming and the Italian Dolomites. The NARGS traveling speaker in the fall was Yasemin Konuralp, a botanist from Turkey, who spoke to several chapters in the U.S. Northeast and Middle Atlantic states. And, the annual Tri-State meeting of metropolitan New York NARGS chapters (Long Island, Hudson Valley, and Manhattan) was held in October.

We welcome three new board members (Joyce Hemingson, Berkshire Chapter; Marianne Kuchel, Fells Chapter; and Steve Whitesell, Adirondack, Berkshire, Hudson Valley, and Manhattan chapters) and thank departing members Elisabeth Zander, Brian Carson, and Peter George. The Delaware Valley Chapter received a gold cup and medal for its exhibit at the Philadelphia Flower Show, adding to previous years' numerous honors. As you can see, 2017 was an active year for our membership.

It is sad to see the passing of any of our members. Of particular note in the past twelve months were the deaths of Harvey Wrightman (New Brunswick), Verna Pratt (Alaska), Tom Stuart (New York), Norman Deno (Pennsylvania), "Weesie" Smith (Alabama), and Betty Lowry (Washington). These individuals helped shape NARGS over several decades.

During 2018, the Newfoundland Chapter is hosting NARGS's annual meeting July 6 – 8, and an add-on post-conference tour, July 9 – 16, to the Newfoundland Limestone Barrens, led by Todd Boland and organized by the NARGS Tours and Adventures Committee. The NARGS Tours and Adventures Committee also has organized a tour to Yunnan, China, June 13 – 29, led by Panayoti Kelaidis of the Denver Botanic Gardens. Arrangements are being made for a traveling speaker to some chapters in 2018. Looking ahead to 2019, the Delaware Valley Chapter is organizing a NARGS meeting May 3 – 5 in the Philadelphia area.

To help offset NARGS financial difficulties as a result of net declining membership, earlier this year the Rocky Mountain Chapter announced a challenge to other NARGS chapters. During 2017, the Rocky Mountain Chapter is matching dollar for dollar donations made by other chapters (not individuals) to NARGS (up to \$10,000). To date, twelve chapters (Adirondack, Berkshire, Great Lakes, Manhattan, Mason-Dixon, Minnesota, Nova Scotia, Piedmont, Potomac Valley, Sierra, Siskiyou, and Wasatch) have responded to this challenge by contributing \$5,848.

Your continuing individual membership helps support the seed exchange, annual meetings and study weekends, traveling speakers, and our publication, *The Rock Garden Quarterly*. However, your membership dues don't fully cover these activities that you value. As a result, we depend on your additional financial support to continue our member services. In the past twelve months, 266 of you have made contributions to NARGS and 21 rejoined/joined as Patrons. Plus 181 new members have joined NARGS during this period.

We hope you will again consider a donation to NARGS for our Annual Fund. In the U.S., NARGS is a 501(c)(3) tax-exempt organization and your donation may be tax deductible to the extent permitted by law.

You may make a donation on-line on the NARGS Web site at www.nargs.org and click on the "donate" button near the top of the screen. You may donate online using your credit card or your PayPal account. Or you may donate by check in U.S. funds (payable to NARGS) or by mailing credit card information to: NARGS, POB 18604, Raleigh, NC 27619-8604 USA.

Please join us in making a year-end gift to NARGS. Thank you for helping NARGS remain a champion of the North American rock gardening community.

Respectfully,
NARGS Officers and Board of Directors

NARGS rate increase: Institutional Members

Defined as herbaria, botanical gardens,
or institutions of higher learning and research

Beginning April 1, 2018

New Rate: \$125/year

We have learned of the death of the following NARGS members:

Norman C. Deno, age 96, formerly of State College, Pennsylvania

Bruce Elkin, Monroe Township, New Jersey

Evelyn Stevens, Sheriffmuir, Dunblane, Scotland

NARGS Donations

Donations to NARGS between July 31 and November 1, 2017: \$9,450.

Designated for the general fund, Rock Garden Quarterly, Seed
Exchange, and in memory of Tom Stuart.

Berkshire Chapter—NARGS
Great Lakes Chapter—NARGS
Manhattan Chapter—NARGS
Rocky Mountain Chapter—NARGS
Siskiyou Chapter—NARGS
Avery, Lela (Vermont)
Brown, Alison (Maine)
Brown, William (Bill) (New York)
Egerton, Graham (New York)
Eichler, Carol (New York)
Lenkoski, Peter F. (Massachusetts)

Magowan, Robin (New Mexico)
Mark, Patricia (British Columbia)
McKanna, Jane (NSW, Australia)
McKenzie, Laurel (New
Hampshire)
Montague, Pat & Dan
(Washington)
Normann, Oystein (Norway)
Olsen, Suzanne (Washington)
Robinson, Gloria J. (Virginia)
Stewart, Diane (Massachusetts)
Wessel, Mark (Ohio)

Obituary: Norman C. Deno

Norman Deno died, age 96, in September 2017. He spent his career as a chemist and published many professional articles. His life-long hobby was horticulture and he published on the subject of seed germination. Norman received the NARGS Award of Merit in 1978 and the Carleton R. Worth Award in 1990. He was the author of 24 articles in the NARGS “Rock Garden Quarterly” on a variety of subjects. For many years his publication, “Seed Germination Theory and Practice,” was sold in the NARGS bookstore.

Patrons

The following recently became NARGS patrons:

BULL, NANCY (NEWARK, DELAWARE)

DURALIA, MICHELLE ANN (PITTSBURGH, PENNSYLVANIA)

GERACE, ALEX C. (WELBY GARDENS CO., DENVER, COLORADO)

GOLDMAN, DORIS (WAYNESBORO, PENNSYLVANIA)

LEIFSON, CHRISTOPHER (WILD FLOWERS, PETOSKEY, MICHIGAN)

SMEDLEY, MIKE (DURANGO, COLORADO)

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NARGS 2018 From-the-Floor Nominations Elections of Three Directors of the Board

The names of those proposed by the Nominating Committee can be viewed on the NARGS website www.nargs.org

There is now the opportunity to nominate FROM THE FLOOR until January 31.

The combined list of candidates will be published on the NARGS website and in the spring 2018 *Quarterly* (dispatched by the end of March).

Online election: May 1-15, 2018. All active members will be emailed a link shortly before the election opens. Your email address will admit you. If you are a member and have never verified your email address, please do so as soon as possible. You may contact Bobby Ward for help (email: nargs@nc.rr.com). The www.nargs.org website will have a notice when voting begins, as well as a copy of the voting-site link on the News page.

From-the-Floor nominations should be sent by email to:

Bobby Ward, NARGS Executive Secretary nargs@nc.rr.com

They can also be posted to:

Bobby Ward, NARGS Executive Secretary

PO Box 18604

Raleigh NC 27619-8604 USA

Nominations must include:

1. Name, chapter (if applicable), address and email address.
2. Bio of nominee (100 words or less, written by nominee)
3. Picture of nominee
4. Note of acceptance from (new) nominee indicating a willingness to be a NARGS Director (three-year term).

All nominations and required nominee information must be received by January 31, 2018.

New Members

*Welcome to all those who joined between
August 8 and November 1, 2017*

Alex C. Gerace, Welby Gardens Co, 7420 Clayton St, Denver, CO 80229-6602
Anderson, Bridgette, 90 Winter St, Hopkinton, MA 01748-1521
Borer, Abigail, 16 Oliver St, Petersham, MA 01366-9706
Boudreaux, 400 Willowrock Dr, Loveland, CO 80539-9394
Bull, Nancy, 100 Unami Trl, Newark, DE 19711-7507
Cresson, Charles, 1470 Amherst Ave, Swarthmore, PA 19081-1612
Dohm, Bill, 3237 Garden Dr, Knoxville, TN 37918-3319
Duralia, Michelle Ann, 1470 Hollow Tree Dr, Pittsburgh, PA 15241-2910
Elder, S.M., 513 Maple Ave, Waynesboro, VA 22980-4809
Fischer, Bryan, 612 E Coy Dr, Fort Collins, CO 80521-3503
Hollyfield, Hedy, 2345 Airline Dr, Raleigh, NC 27607-3109
Isaac-Luke, Kathie, 15818 Cardinal Ct, Sonora, CA 95370-8127
Larmon, Marcy, 1 Clark Rd, Charlton, MA 01507-6731
Lauck, Stephanie, 8700 Zinfandel Pl, Raleigh, NC 27615-2745
Lehman, Donna, 215 Strathallan St, Fergus, ON N1M 1A1, Canada
Leifson, Christopher, Wild Flowers, 66 Bridge St, Petoskey, MI 49770-2907
McCune, Glenn, 31 Valley View Dr, North Grafton, MA 01536-2104
Moran, Beckie, 1175 SE Yarrow Ave, Madras, OR 97741-1016
Nichols, Hilary, 5805 Henner Pl, Durham, NC 27713-2030
Norman, Jessica, Untermyer Grdns. Conservancy, 945 N. Broadway, Yonkers,
NY 10701-1300
Parikov, Dmitry, Ul.3-Ya Novo-Ostankinskaya, 4-69, Moscow 129075, Russian
Federation
Pfankuch, Anne, 1422 Delaware Ave, Saint Paul, MN 55118-3000
Rogers, Beverly, 1145 Venetian Way, Churchton, VA 20733-9720
Shen, Lucia S., 217 Saint Marks Sq, Philadelphia, PA 19104-3516
Smedley, Mike, 3090 E 4th Ave, Durango, CO 81301-4304
Spiers, William, 2865 W Log Lake Rd, Kalkaska, MI 49646-9563
Springer, Judith, 3241 S Troxler Cir, Flagstaff, AZ 86005-9124
Sullivan, Erin, 7 Jonathan Ln, Sandwich, MA 02563-2104
Tonsberg, Tommy, Holtervegen 169, Holter 2034, Norway
Vukson, Flora, 3516 Kemble Ridge Dr, Wake Forest, NC 27587-4851
Wa, London, 2902 Omah St, Durham, NC 27705-2621
Welch, Robert, Landtenders, 2223 Hamilton Rd, Okemos, MI 48864-1609

SEED EXCHANGE

The Main Distribution of the Seed Exchange will begin in early January. The early birds have sent their orders in, but there is still plenty of time (and plenty of seeds) for you to participate. Orders in this first round need to reach the Sierra Chapter by February 5, 2018, and orders can be placed online:

<https://nargs.org/basic-seed-exchange-information>

...or by mail, using the order form in the print copy of the Seed List (see below).

There are so many people who make this wonderful Seed Exchange possible that it is impossible to thank them all individually by name. However, we can – and do! – thank, first of all, our Donors, whose efforts at collecting and cleaning all manner of interesting, rare, and recondite seeds have made our seedlist such an inspiring and useful resource for gardeners.

Then there is our reliable cadre of volunteers who, each December (as though they don't have enough to do around the holidays), divide, package, and label the tens of thousands of packets of seed that will be distributed.

To move the seeds from our official Seed List to your wish lists, we count on the able and willing volunteers of the Sierra Chapter (California), who will be distributing the seeds, in response to the many hundreds of annual requests.

The second round of order fulfillment, from the Surplus Seed list, will be handled, beginning on March 1, by the members of the Columbia-Willamette Chapter (Oregon). If all that doesn't slake your seed lust, the packets of seed that remain after the second round of orders will be divided and sent to those chapters that request them... free of charge.

Our biggest thanks go to the hardest worker, our Seed Intake Manager Laura Serowicz, who every year records and researches the taxa, prepares and prints the Seed List, and ships the seeds to the packagers (with printed labels and all miscellaneous supplies). Laura was a prime reason that the online ordering system (finally!) operated smoothly last year, and she will no doubt have a hand in keeping it running well again through both of the ordering periods. She offers continued patient help to those who may struggle with the process of electronic orders. We are grateful that she is willing to handle all those many chores.

If you are interested in ordering online, but are new to NARGS, be sure that Bobby Ward, our Executive Secretary has a current email address for you (it's how the seedex recognizes valid members). And then set your user name and password on our website, to gain access to the ordering page. Please read the introduction and instructions before proceeding to place an order.

If you prefer to order by mail, request a copy of the printed seed list and order form – immediately:

Joyce Fingerut
537 Taugwonk Road
Stonington, Connecticut 06378-1805
U.S.A.
alpinegarden@comcast.net

After you have received - and germinated - your seeds, please plan to add yourselves to the list of supporters of the Seed Exchange by donating seeds or funds to keep this marvelous membership benefit going strong.

Be sure to check out the colorful new feature which has digital microscopy images of the seeds of 773 species from North Asia. These are from the last publication of the late Dr. Alexandra Berkutenko, the botanist from Magadan, Far Eastern Siberia, who spoke to ten of our NARGS chapters, offered a unique mail-order seedlist, and had a book reviewed recently in the "Rock Garden Quarterly." These stunning images were generously made available to us by her family and may be found at:

<https://nargs.org/alexandra-berkutenkos-seed-atlas>
...or via the Seed Exchange Helpful Links at:
<https://nargs.org/seed-exchange-helpful-links>

I hope that winter will be kind to you and your gardens. We'll talk again in the Spring.

Joyce Fingerut, Director
NARGS Seed Exchange

Upcoming NARGS Meetings for your Calendar

NARGS Annual Meeting and Board Meeting "Where Alpines Meet the Sea"

Hosted by Newfoundland Chapter

July 6 – 8, 2018

Optional post-conference trip: July 9 - 16, 2018

St. John's, Newfoundland, Canada

Contact: Todd Boland (todd.boland@warp.nfld.net)

NARGS Study Weekend "Rooted in Diversity"

Hosted by Delaware Valley Chapter

May 3 – 5, 2019 (that's right: 2019)

Philadelphia area (to be announced)

Contact: Jerry Rifkin (jerryr95@comcast.net)

Delaware Valley Chapter Award for Service: "Rad" MacFarlane

Radford "Rad" MacFarlane joined our chapter about 15 years ago. Since then he has provided behind-the-scenes support for many of the chapter activities. I believe he found NARGS through our Flower Show exhibit. Shortly after joining, he took over as co-chair of our annual plant show and in 2008 assumed the chair which he continues today, each year providing logistic support and obtaining wonderful prizes.

He assisted with our Winter Study Weekend in 2004 (the last national meeting the chapter hosted), mostly providing behind-the-scenes "labor" assisting vendors with set up and tear down. He also participated in the trough-making workshop to improve his basic trough-making skills. This interest led to his developing techniques for decorating the outside of troughs using various molds. He had since shared his knowledge through chapter programs, giving many trough-making workshops for the chapter, and regularly donating troughs for auction at the plant sales.

"Rad" regularly helps with our flower show exhibits, which is our main means of attracting members. He plays a vital role in getting the exhibit set up and the equally important tear down. Several years when Betsy Knapp designed our exhibit he was her escort for the members preview.

He regularly attends national meetings and assisted with the 2007 annual meeting at Canaan Valley, West Virginia, hosted by an ad hoc committee and he has opened his garden for chapter tours and even provided lunch for an over-flow crowd.

Submitted by Jan Slater.



The Dolomites

JOYCE JED

In June my husband Arnie Wendroff and I had the good fortune to join a trip to the Dolomite mountains in northern Italy, organized by the North American Rock Garden Society. We first learned about the trip through the Manhattan Chapter newsletter and then saw it advertised in the *NARGS Quarterly*. The tour was coordinated by Naturetrek, a British tour company, which handled all the details.

We thoroughly enjoyed the trip, from the pick-up at the Venice airport by our lovely and knowledgeable guide, Jessica Turner, through our stay at Hotel Grand Mugon in the beautiful Fassa Valley. Daily drives from the hotel to different parts of the breathtaking mountains took us to walks with wonderful alpine plants and gorgeous views. The pace was comfortable, with rest stops as needed. Jessica provided delicious picnic lunches, and other meals were taken in our hotel, with a few lunches in local restaurants.



The view from our hotel



Gentiana acaulis

We highly recommend the NARGS trips to others. Seeing plants growing in their native habitats is inspiring and instructive to those who might want to learn about alpinism and see a beautiful part of the world.

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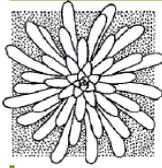
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Email: janemgary@earthlink.net

The **Tian Shan** and its **Flowers** Vojtěch Holubec & David Horák

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Alaska (Anchorage & Mat-Su Valley)	Carmel Tysver <garden@gci.net>
Allegheny (Pittsburgh, PA)	David Amrhein <amrheindav@aol.com>
Berkshire (Stockbridge, MA)	Joyce Hemingson <jhem1022@gmail.com>
Calgary Rock & Alpine Garden Society (Calgary, AB)	Margaret Fong <mjfhello@yahoo.ca>
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NARGS STRUCTURE _____

The officers of the North American Rock Garden Society consist of a president, a vice-president, a recording secretary, and a treasurer. The officers are elected by the membership.

The Board of Directors of NARGS consists of the four above-named officers, the immediate past president of NARGS, and nine elected directors.

The affairs of NARGS are administered by an Administrative Committee (called AdCom) consisting of the president, vice-president, recording secretary, treasurer, and one director-at-large, selected annually by the NARGS officers from among the nine elected directors.

OFFICERS _____

President	Betty Anne Spar <bettyannespar@gmail.com> 5051 N Grey Mountain Trl, Tucson, AZ 85750-5942
Vice President	Don LaFond <plantjunkies@gmail.com> 11836 McGregor, Pinckney MI 48169-9517
Recording Secretary	Joyce Hemingson <jhem1022@gmail.com> 44 Rock Hall Rd., Colebrook CT 06021-7072
Treasurer	Richard Lane <rhlane01@gmail.com> 4904 Hermitage Dr., Raleigh, NC 27612
Director-at-Large	Panayoti Kelaidis, 1244 S Quince St., Denver, CO 80231 <telesonix@outlook.com>

Immediate Past President	Matt Mattus <mmattus@charter.net> 26 Spofford Rd., Worcester, MA 01607
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DIRECTORS OF THE BOARD _____

2015-2018	Mike Kintgen, Denver, CO Anna Leggatt, East York, ON Jody Payne, Cushing, ME
2016-2019	Dave Brastow, Tumwater, WA Julia Caroff, Birmingham, MI David White, Durham, NC
2017-2020	Panayoti Kelaidis (CO) Marianne Kuchel (VT) Steve Whitesell (NY)

MANAGERS _____

Executive Secretary	Bobby J. Ward (919) 847-6374 P.O. Box 18604, Raleigh, NC 27619-8604 <nargs@nc.rr.com>
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