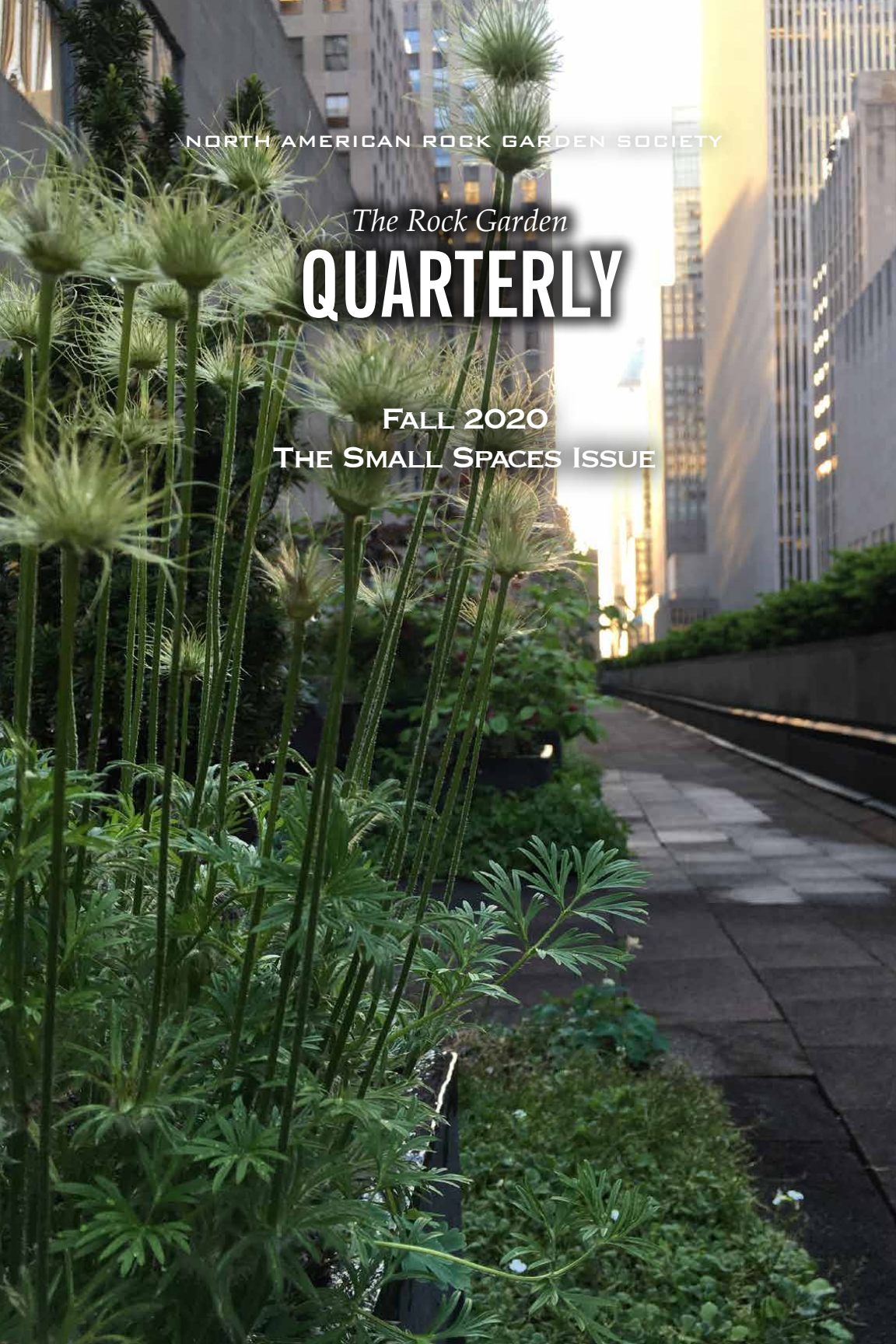
NORTH AMERICAN ROCK GARDEN SOCIETY

The Rock Garden

QUARTERLY

FALL 2020

THE SMALL SPACES ISSUE



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

Allen Juba is a practicing landscape architect with over 36 years of experience designing public parks, playgrounds, urban spaces, and childrens' gardens in the New York-New Jersey Metropolitan area and farther afield. He cultivates a large selection of plants scaled to his small property in central New Jersey. He attributes this early found passion for plants to being thoroughly amazed when his maternal grandmother placed the cut-off top of a carrot in a dish of water and it sprouted new leaves.

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Jeff Wagner is a nurseryman. He's had his hands in the soil since he was four. He loves plants indiscriminately.

Erratum: In the Summer 2020 issue, the wrong bio was printed for Ger van den Beuken. The correct bio has been uploaded in the digital issue on the NARGS website.

Front cover: Pulsatilla seed heads at sunset, Josie Lawlor.

The Rock Garden

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From the Editor

I'M VERY EXCITED about this special issue of the *Quarterly* focused on gardening in small spaces. I wanted to do this issue because I hear from a lot of people that they wish they could have a garden, but don't have the space. Some are living in an apartment, some have downsized to a condo because the upkeep of a yard has become too much, and some live in a large city where ample garden space is simply unavailable. But the fact is, rock gardeners don't need a lot of space. The tiny plants we treasure fit perfectly into containers that can be placed anywhere they can get enough light: patios, balconies, rooftops, or unused corners of driveways.

This is a topic that is close to my heart because I've spent most of my gardening life living in apartments while making use of tiny spaces and borrowed land. Now that I finally own a home, I'm still gardening somewhere else as well because my home garden is entirely shaded by mature trees.

When I first had the idea for this special issue on small spaces I wasn't sure I'd be able to find enough articles, but people came from all over with article ideas – so many, in fact, that you'll be seeing more small space gardens featured in future issues as well. I'm really thrilled with the range and diversity of articles. This issue features gardens growing on top of iconic buildings in New York City, perched on a narrow stone sill along a railing, and filling in the corners of a small lot. The authors in this issue tell the stories of downsizing from a larger property to the tiny space around a condominium, dealing with the unique climate on a rooftop, and bringing their professional landscape design eye to bear on arrangements of troughs.

In addition to the inspirational images of beautiful small-space gardens, I'm also excited to include an article on techniques from the world of bonsai that can be applied to keeping trees and shrubs small in our trough gardens. You can grow a whole forest in your tiny garden with the right techniques.

Finally, one treasured rock gardening activity that can be done just as easily if you have a small space to garden, is botanizing for beautiful alpines in the wild. So the last article in the issue is by Jeff Wagner, taking us all along with him to enjoy the alpine beauty of western China in autumn.

Many Troughs in a Small Space

Allen Juba

LIVING MY ENTIRE life on the small, suburban, central New Jersey property that I have inhabited since the age of one and being interested in the cultivation of a vast array of plants has always been a challenge for me. By small, I mean a 50 ft by 100 ft (15 m by 30 m) lot that also includes a 35 ft by 35 ft (10 m by 10 m) dwelling and a 20 ft by 20 ft (6 m by 6 m) detached garage, not to mention a driveway, paved and gravel walks, and a raised patio. By vast array of plants, I mean any sort of hardy, alpine-like, dwarf woody or succulent plant that inspires and satisfies my regard for the beauty, geometry, and care of nature. Well, those are the ones that this narrative focuses on anyway; there are many other plant types in the garden. I have found that the small size of many alpine plants works to my advantage in assembling troughs that sustain my passion. Every outdoor space on my tiny property is used in some way for planting or caring for plants.

I call my collection of troughs a "troughery" (think fernery, stumpery, rockery). Although I have various plant beds with shrubs, perennials, minimal lawn, and such throughout the front and back gardens, I also have pavement including a driveway up to the patio and garage. It is these paved spaces that I use to stage my trougheries.

Opposite and above: Views of the author's "troughery."

A potted Japanese maple provides shade to surrounding troughs..

While some experts may not recommend siting troughs on pavement, citing the excessive reflected light and heat that can occur on such surfaces, I have not found this to be a problem. For one thing, my trougheries often include containerized small trees that provide some shade to the troughs below as well as being ornamental in their own right. I also find that spacing the troughs closely together minimizes the exposed pavement area and allows more troughs and plants to be accommodated. Having troughs in rectangular, square, and circular shapes allows me to compose interesting arrangements, with one trough playing off the attributes or supplementing the floral display of its neighbor. I also use simple low tables or even wood planks supported on overturned clay pots to elevate troughs and other containers above the pavement.

I do take advantage of the various sun exposures and microclimates that occur on my property. Most of the troughs are located in full sun on the colored concrete driveway apron but some shade is provided to them by a collection of containerized Japanese maples, a witch hazel, and a weeping *Cercis* 'Ruby Falls'. These troughs include such sun

Shade-loving plants in troughs on the north side of the house.

lovers as small varieties of dianthus, campanula, sedum, delosperma, and potentilla, among many others. Individual containers of dwarf evergreens such as cryptomeria and small-scale erigeron add to the seasonal mix of plants and provide individual points of interest within the geometric arrangement of troughs.

The north side of my residence provides shade on the adjacent driveway for most of the day. Similar staging using low tables here allows planters to be elevated and better appreciated. Many of the containers in this shady locale are *faux bois* cast stone, emphasizing the shady, woodsy nature of its inhabitants. This area includes such planters with dwarf evergreens such as pieris and hemlocks, ferns, and a collection of dwarf hostas. Dwarf varieties of ophiopogon, lysimachia, and even woodland natives such as *Mitchella repens* round out the grouping in the shade.

Woody plants provide scale and a sense of permanence to a trough planting.

Design

Being a practicing landscape architect for 36 years and counting, I can't help but bring some sense of design to the individual troughs as well as their arrangement and relationship to one another. This is an important consideration for the troughs, especially in a small-scale setting, to avoid a feeling of disarray and disorder. I approach the design of each trough, which is in effect a miniature landscape, with the same design principles and visual effects I would expect to see in a larger-scale landscape. I often use woody plants to suggest a feeling of permanence to the trough as well as adding a sense of scale and larger, more vertical, attitude. Smaller, alpine-type plants supplement the larger evergreen or woody plants and are more horizontal or rounded in their shapes. I employ trailing plants such as small sedums, antennaria, and even sempervivum to provide that ever-important aspect of cascading plants over the edges of the trough. The "ground plane," or interior, of the container need not be flat either, just like a full-scale landscape. I use rocks of various sizes to build up the topography of the troughs, situating them next to one another to act as small retaining walls. Filling in with planting medium behind the rocks allows the plants to assume a higher elevation, extending the visual topography, but also providing particularly good drainage. One caveat I heed when using stones or small rocks in a trough is to use all the same type, lest a range of rock types make the design look disjointed.

Use rocks to build up a varied topography within the trough.

In addition to designing troughs as miniature landscapes, the collector in me enjoys assembling troughs of various species or cultivars of the same genus. The chance to view and appreciate often differing subjects assembled this way invites closer inspection and observation of their similarities and differences. Such troughs include one with a variety of draba species, another containing dwarf varieties of *Picea glauca*, and others of sempervivums. This satisfies my collector's impulse, and arranging them in a single trough brings some clarity and purpose to the design. While some plant types, such as dwarf conifers, will eventually outgrow their containers, they may be grown together for a few years. Single genus troughs can look good with just those types (such as draba), but those made up of woody plants, such as the dwarf Alberta spruces, look better with some sort of ground cover plants added. Conversely, varieties of creeping thyme are brought together in a single trough, thereby creating a sort of thyme lawn in miniature. Spring flowering bulbs are also excellent specimens for a single genus trough and provide color to the troughery early in the season. I have used dwarf or rock-garden varieties of narcissus, crocus, tulips, and *Fritillaria meleagris* successfully in troughs. A major advantage of cultivating these geophytes in containers is the ability to move them out of the trough arrangement post-flowering to allow their foliage to mature and die down in a more inconspicuous place. The arrangement of troughs may then be tightened up or another more permanently-planted trough moved in.

Troughs filled with spring bulbs make a dramatic statement and can be moved out of sight once flowering has finished.

Single-variety troughs filled with spring bulbs and pulsatilla.

A bunnery of plants with rounded, bun-shaped forms.

Another type of designed trough planting can accentuate the shapes of alpine-type plants, what is sometimes called a bunnery, a collection of bun-shaped plants such as gypsophila, picea, and, chamaecyparis. Rounded river stones can gently emerge from the gravel ground plane to reinforce the bun idea even more.

Lastly, color-themed gardens may be translated to individual or groupings of troughs as well. Plants in a silver/blue themed collection, for example, can beautifully reinforce one another as a designed trough. As those specific colors are most often expressed in foliage, it is incredibly important to include contrasting textures and forms. Broader-leaved plants contrast with more finely-textured ones while others provide a more upright aspect in contrast to trailers cascading over the trough edges. Silvery, woolly, and glaucous-leaved plants often inhabit the same sunny, dry exposures in nature so collecting them in a trough this way not only emphasizes their color but also respects their cultural preferences. Occasional flowering in other colors only adds an intriguing, discordant note.

Cultural Practices

Most of my troughs are made of hypertufa, although I do have some that are actual stone or cast stone. I employ terracotta alpine pans and other similarly-shaped containers as well, often using these for succulent plants such as sempervivum. A simple square of screen is used to cover container holes to allow good drainage while permitting the soil mix to be retained in the container.

I use the same basic potting mix for all plant types from woody plants to perennials to succulents: one part Pro-Mix BX (a peat, vermiculite, and perlite based potting medium) to one part inorganic aggregate which is a combination of very small gravel (locally called grit), Turface MVP (fired calcined clay particles) and/or pumice. I refrain from using perlite as part of the aggregate component as I dislike the prominence of its white color in the mix and its tendency to blow away due to its light weight. The planted troughs are topped off with a layer of the same grit aggregate I use for the potting mixture. Individual particle size varies from an eighth to a quarter of an inch (3-6 mm). I prefer the more natural look of a varied color range in my gravel or grit with grays, browns, and burgundies predominating.

Living in zone 6b in central New Jersey (and getting warmer), I find that I don't need to do anything special with the troughs over the winter, most of the time. Winter wetness can kill many alpine-type plants, so I am careful to stop watering them in the late fall and allow natural precipitation to supply the plants' water needs. Luckily, I do have a detached, unheated garage at my disposal, so if the troughs are unusually wet because of prolonged precipitation, they can be trundled into the garage to allow them to dry out. The garage keeps an ambient temperature about 10 to 12°F (5 to 6°C) above the outdoor temperature. If the weather during the winter is forecast to go down to the single digits (below -12°C), I will put the troughs in the garage as well, just for peace of mind for their survival. The larger troughs are on rolling dollies to make their transport to the garage that much easier.

Unless the weather is unusually wet or cold, the troughs stay outside all winter.

Troughs need occasional pruning along with regular weeding and fertilization.

Maintenance

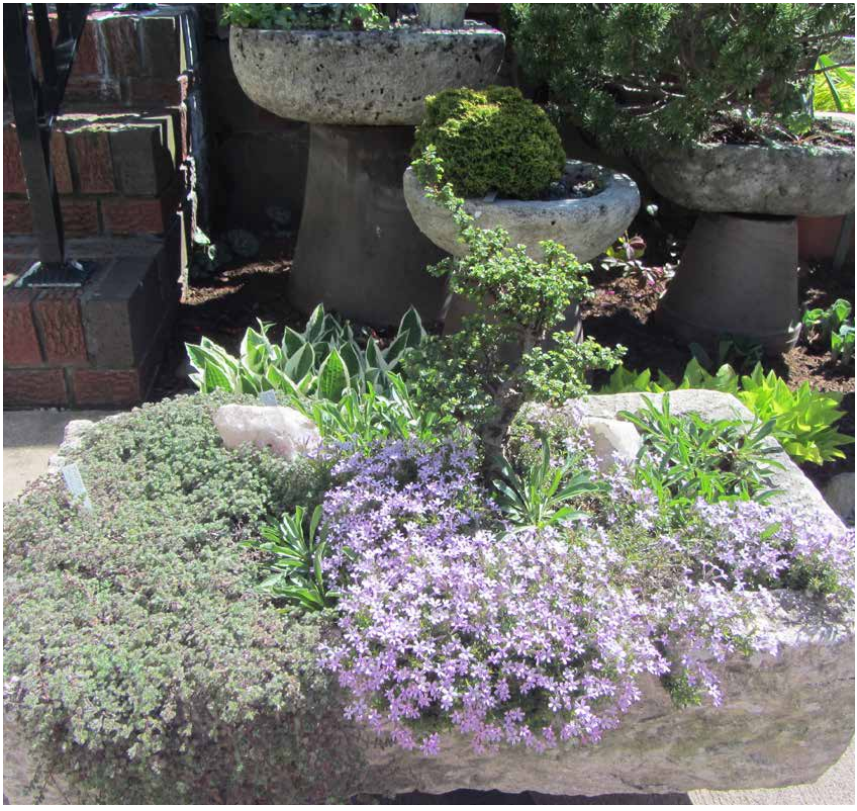
Being landscapes in miniature, troughs require similar maintenance activities. Weeds often seed in and need to be removed, easily done with a sharp-pointed small trowel to get to their roots while disturbing the surrounding plants as little as possible. Careful attention should be given to these "grow-ins," however, as some of these may be desirable plants having seeded in from nearby troughs. I have found various species of lewisia, erigeron, and papaver, among others, to act this way. It is up to you to decide if these are allowed to stay or be pulled out. Topping up the gravel/grit used for soil covering after weeding or new planting presents a well-maintained, aesthetically-pleasing trough.

Some pruning of errant growth, especially on woody plants, is sometimes required to maintain proportion and scale in the trough. Dwarf varieties of chamaecyparis are notorious for showing brown foliage in their interiors as they age. Removing these portions can be both cathartic and aesthetic, allowing the specimen to look cleaner and

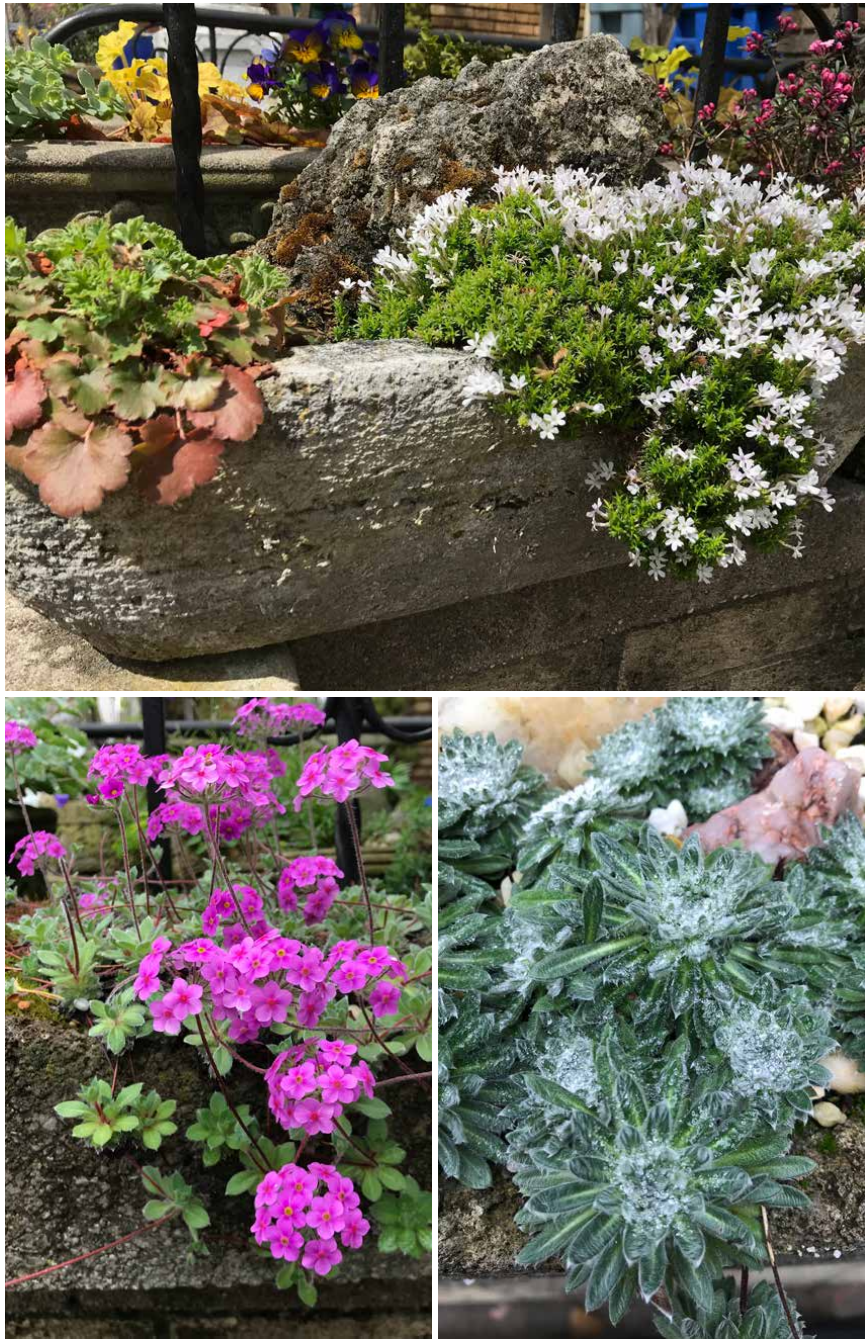
often more miniature tree-like. Despite my best efforts, some plants die because of excessive rain or humidity during the summer or an unexpected wet, cold winter, but that allows a different plant to be used. I give the troughs a liquid feed once or twice in the spring but they are really on their own the rest of the year as to fertilizer. If foliage is looking yellow during the summer, I may apply a light application of liquid feed.

Final Thoughts

I suppose the small-scale nature of troughs (compared to an actual rock garden) along with their diminutive inhabitants is what attracted me to them in the first place, especially given my small property. In a limited area, these containers maximize horticultural experimentation and can be rewarding through all seasons of the year. A lack of expansive space is not a limiting factor in cultivating alpine-like plants in troughs and I urge anyone interested in doing so to embark upon the experience.



The potential for trough gardening in small spaces is limitless.



Top: Long trough with dwarf heuchera and phlox.
Bottom: *Androsace sarmentosa* in bloom (left)
and showing its silver foliage in fall (right).

From Alpines to Bogs

Gardening in Pots and Troughs in a Brooklyn Garden

Judi Dumont

I'M ALWAYS AMUSED by articles on "small gardens" which invariably feature a plot around the size of a small suburban yard. In Brooklyn, we know small, as in truly tiny or postage-stamp sized. Those of us in New York City and other dense urban environments are happy to have any outdoor space at all and try to make full use of it, tucking pots, troughs and other containers full of treasures into every available space.

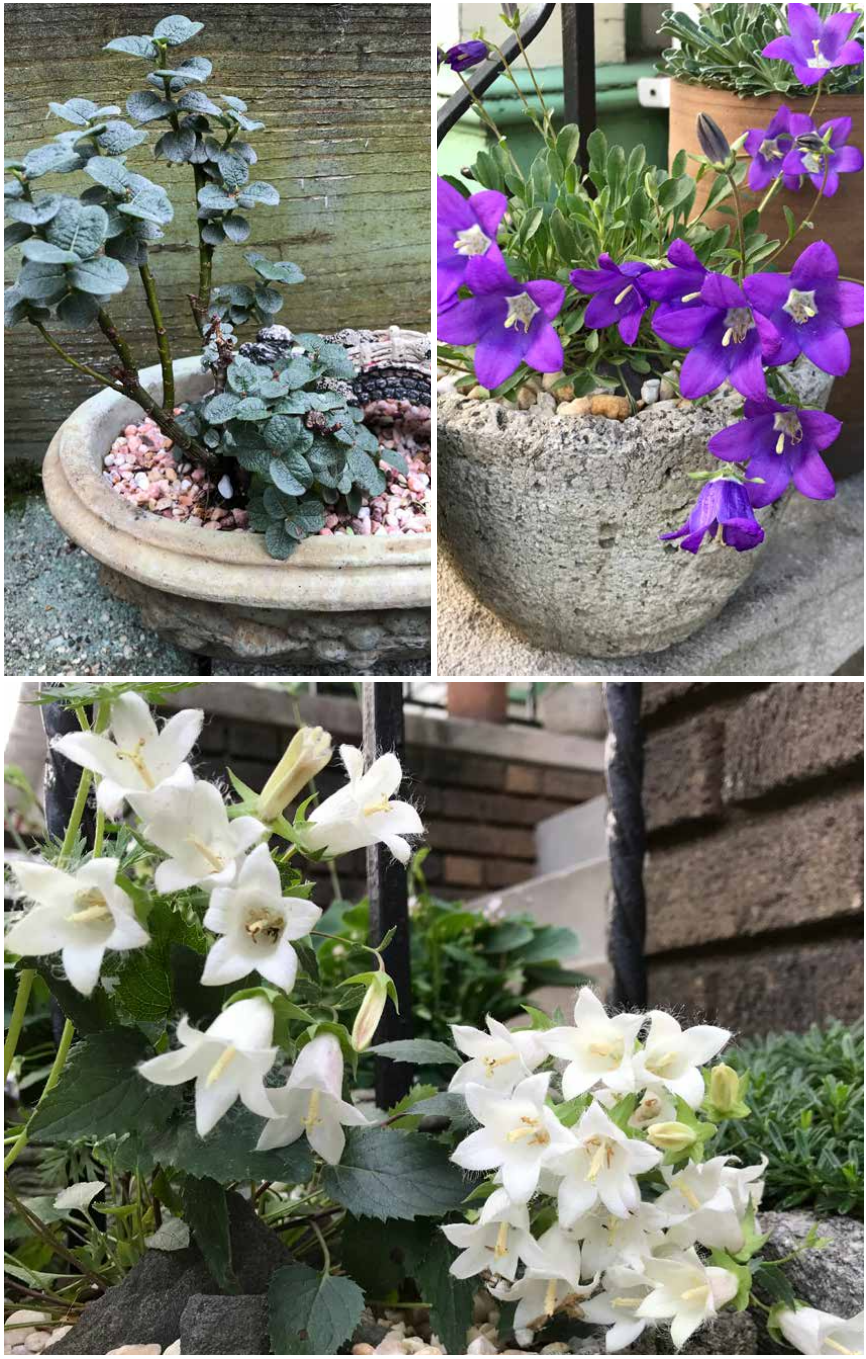
To that end, after I joined NARGS and our local Manhattan Chapter, I began to set up troughs along the narrow edge of the wall next to my driveway in the front of my house, and this became my Alpine Zone. With full sun through winter and spring and dappled sun in summer and fall, I grow traditional rock garden plants here, for the most part those that can take a bit of shade. The troughs vary a bit in size and shape but have to fit along the brick ledge. Other pots and troughs perch on the wall by the steps to our porch.

Troughs perch on a brick ledge in this tiny urban garden.

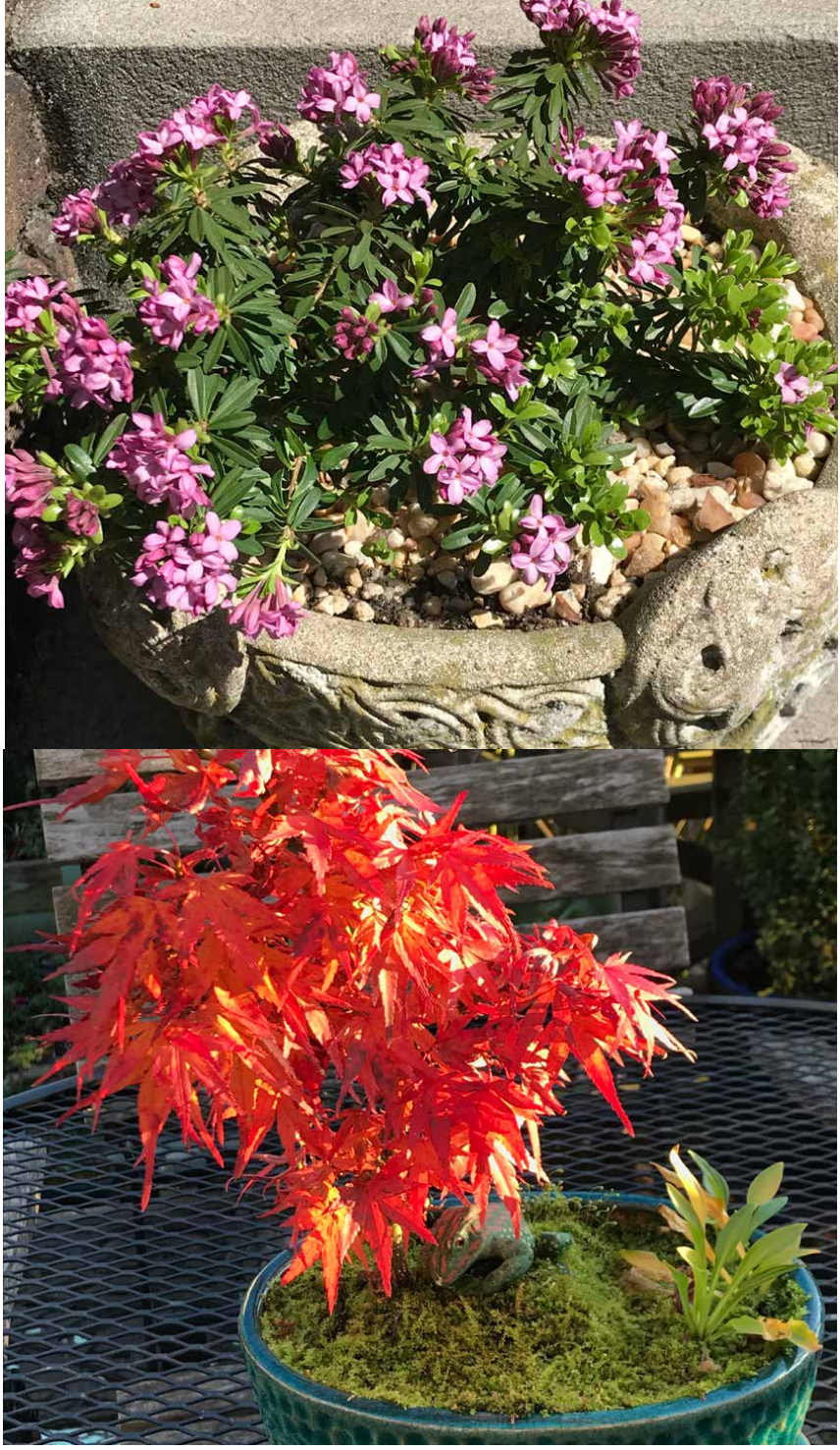
Verbascum 'Letitia'

Our springs here in Brooklyn can be cold and wet, and some plants that are looking good in winter succumb in spring. An open-but-covered front porch and single-specimen pots enable me to move these touchy plants out of the damp so they still get sun and cold but only as much moisture as I provide. I'm lucky enough to have several beautiful pots made by Larry Thomas, the founder of our chapter. These I generally reserve for single specimens such as *Verbascum* 'Letitia', one of the plants that get front porch winter protection.

Since I'm in NARGS, I of course want to grow plants that are native to habitats far from Brooklyn, or treasures that I've seen and lusted after in gardens at AGMs or on NARGS tours. I grew *Salix* x *boydii* in a too-small pot in my garden and it succumbed to the heat of a Brooklyn summer in its second year. I then saw it growing beautifully in every garden we visited on the NARGS Scotland tour so I will of course try it again, but this time in a deeper, cooler pot, and a location with more shade in summer.



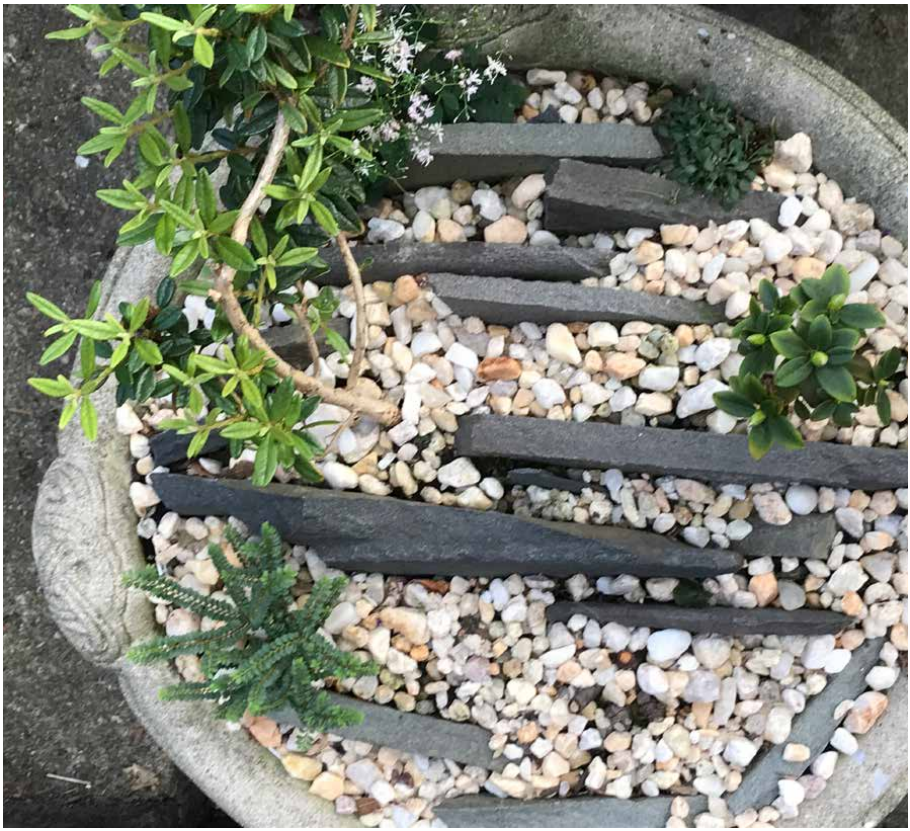
Top left: *Salix* x *boydii*
Top right: *Campanula bellidifolia* subsp. *besenginica*
Bottom: *Campanula betulifolia*



Top: *Daphne x napolitana* ′Bramdean′
Bottom: A Japanese maple with naturally short internodes.

Woody plants are a love of mine, but even small varieties of larger shrubs can get too big too fast. Some daphnes and rhododendrons are either small enough for a trough or pot or can be kept small by pruning. (Note, however, that I suspect my second-season *Daphne* x *napolitana* 'Bramdean' will outgrow its pot in another year or two.)

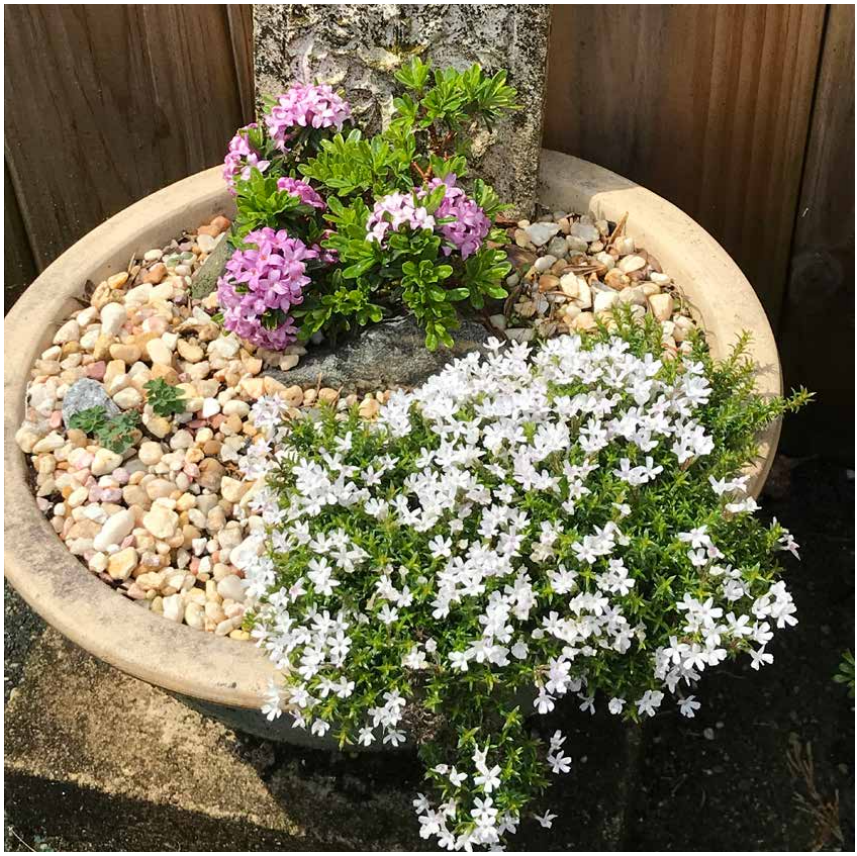
A Japanese maple given a rudimentary bonsai treatment will stay small, as will a Japanese maple with naturally short internodes. And of course, there's *Ulmus parvifolia* 'Hokkaido', also known as lazy man's bonsai. A mature specimen in a trough at Wave Hill (a public garden in the Bronx) whetted my appetite for this tiny tree. My *Ulmus* 'Hokkaido' is in a newly planted container in front of the house, with *Rhododendron* 'Wren', *Rhododendron sargentianum*, a seedling *Hepatica nobilis*, and *Houstonia caerulea*, which generally resists my efforts to plant it, but seeds around gently where happy. *Thalictrum kiusianum*, a placeholder for to-be-sourced *Salix* x *boydii*, rounds out the plantings in this pot. This is one of my attempts at a crevice garden—no heavy equipment needed.



Newly planted container crevice garden with *Ulmus parvifolia* 'Hokkaido', and miniature rhododendrons.

Moving to the back of the house, there are areas of both shade and sun through most of the year but in winter and early spring the garden is generally shaded by my house and adjoining houses. A couple of pots are positioned to take advantage of the very limited sun. I grow only a few traditional rock garden plants in the back garden, but daphnes, some gentians, and a few others seem to be able to put up with these conditions.

Another interest, and one that's well suited to containers, is bog gardens. Yes, this was spurred on by NARGS field trips at AGMs in North Carolina and Newfoundland. I use a 50/50 mix of sand and peat, in a container lined with a double layer of heavy-duty, black plastic contractor's trash bag. Slits are cut a couple of inches from the top so that the container has a bit of drainage but generally stays quite wet. A nameless sarracenia, *Drosera capensis*, and *Vaccinium macrocarpon* 'Hamilton' have been happy in this pot for years. Having *Salix repens*



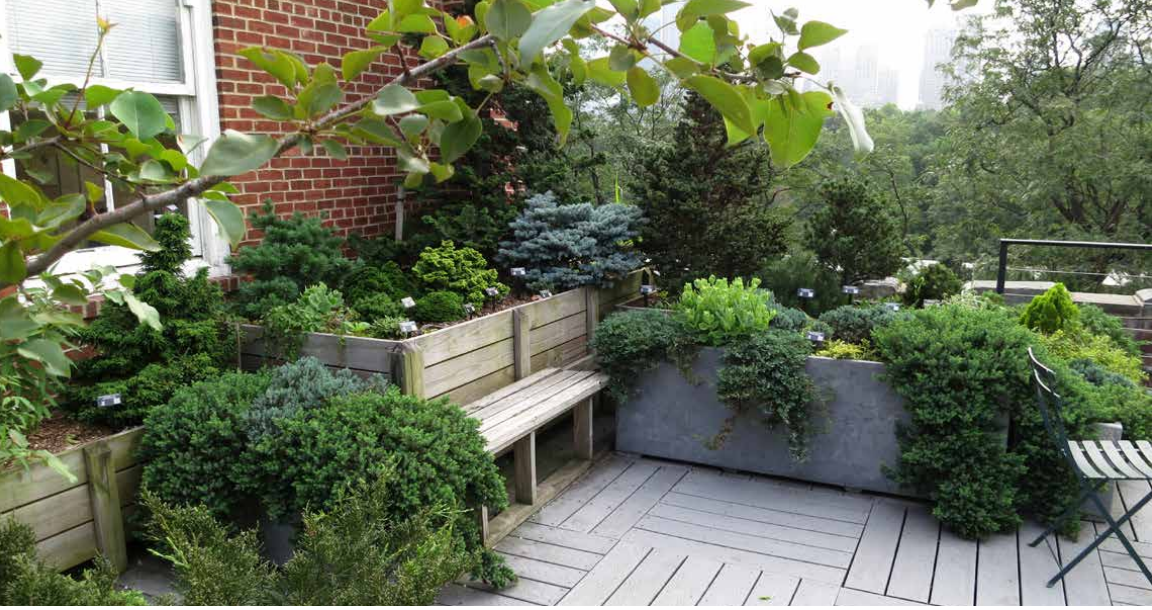
A shallow planter with a daphne and phlox.

Left: *Drosera capensis* and *Vaccinium macrocarpon* 'Hamilton'
Right: *Calopogon tuberosus*

'Iona' in this container lets me get up close to its wonderful twisty branches. Nearby, I've just added *Calopogon tuberosus* to a pot of *Sarracenia* 'Mardi Gras'. Orchids are always welcome!

And last, a bit of serendipity in the garden. This round pot was once filled with plants whose names are lost in the mists of time. *Houstonia caerulea* decided that pot was just the ticket, quickly filled it, and has lived there happily for years now. I look forward to its sea of pale blue every spring.

Pot of *Houstonia caerulea*



Rooftop Conifer Garden

Colby Feller

This article was previously published in Conifer Quarterly*, the journal of the American Conifer Society.*

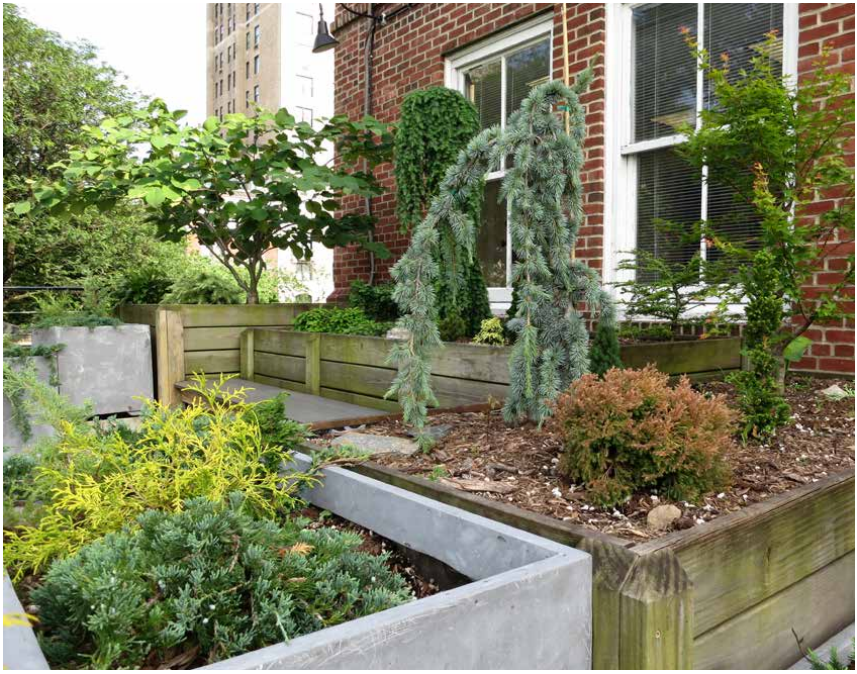
IN ANY GREAT pugilistic match, the first few rounds are a feeling out process. You have to learn the strengths and weaknesses of your opponent, adapt, and prepare for surprises. Like a boxing match, the conifer test and display garden atop the Arsenal in New York City, which was my first experience with conifers on rooftops, took a few rounds to feel out, but now it is, I believe, a knockout.

In the fall of 2010, a small conifer test and display garden was installed atop the Arsenal in Central Park. Located on the East Side at Fifth Avenue and 64th Street, the building currently houses the headquarters offices of New York City's Department of Parks and Recreation and the Central Park Zoo. The garden has a north-facing exposure with the building protecting it on one side. Otherwise, the site is fairly exposed to the elements. The Arsenal rooftop is a challenging location since the garden is neither surrounded by buildings nor under a tree canopy. It is subject to very high winds. There is no irrigation system or formal maintenance program either. Instead, the garden is cared for with the help of interns and volunteers. More information about the garden and pictures of the original installation can be found in the Winter 2011 *Conifer Quarterly*, as well as in an article by Sean Callahan, *Hidden Gem in the Making* on the American Conifer Society website.

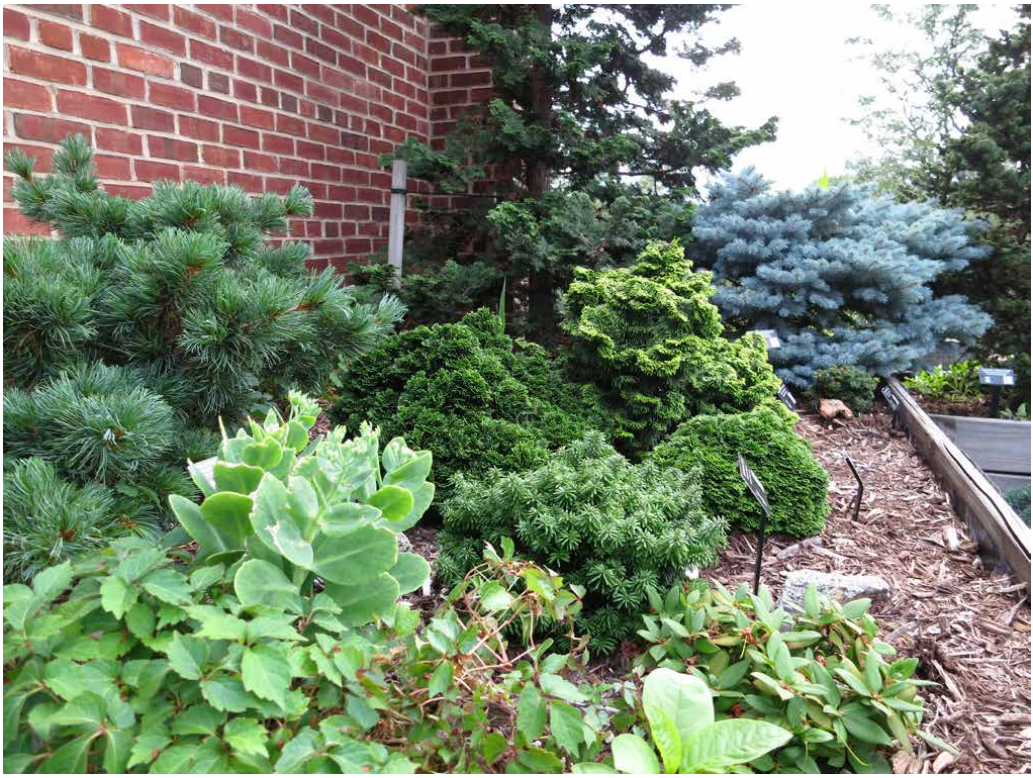
After the first year, we had a 75% survival rate. A couple of factors are likely to have been responsible for the loss of plants. Although a proponent of fall planting, logistics forced the initial planting into the first week in November, which may have been a bit late. This was followed by one of the worst winters on record. Perhaps if the plants had been more established fewer plants would have been knocked out. The good news is that during the later rounds, with winters delivering record cold and snow, only five plants were lost from the remaining original installation specimens that were replaced in year one.

The plants show an "all or nothing" pattern at the site. Besides those plants that had to be removed, only a couple of the remaining specimens looked a bit worse for wear after the challenging first winter. Most looked perfect and were pushing new growth. I have noticed a trend with conifers here in Manhattan; year one appears to be the year that makes all the difference. Even in less severe conditions, with proper irrigation, year one poses a challenge, and the plants are either lush and vibrant and off to the races, or completely dead.

Perhaps not surprisingly, our expectations as to which plants would do well did not play out. From the beginning, we recognized the site as being tough: no irrigation, a light-weight soil medium with little organic matter (Gaia soil, a peat-based potting mix), high winds, urban pollutants, and the urban heat island effect.



Above and opposite: Conifers at the Arsenal five years after planting.



Conifers and other plants beginning to knit together on the rooftop garden.

We thought plants like *Pinus heldreichii* 'Irish Bell' and the various junipers would be as tough as nails, and the cedrus more delicate, but we were incorrect. One might be inclined, since this was in a single test garden with limited specimens, to call this a fluke, but at another site in Manhattan I work on that features a number of conifers, *Pinus heldreichii* and any number of junipers also did not survive. It may be that these plants have difficulty in the City because they are grown in container gardens. However, interestingly, my father also had some difficulty with the *Juniperus horizontalis* 'Icee Blue' in the ground on Long Island, as it appears fussy until well established. Only one of two *Juniperus horizontalis* 'Icee Blue' planted at the Arsenal survives, again illustrating the importance of care until the plants are acclimated and established.

Although, in general, dwarf and miniature varieties of plants seem to be more robust, on urban rooftops, the larger juniper specimens have done well, while our dwarf favorites seem to be hit or miss. Plants like *Juniperus procumbens* 'Nana', *J. squamata* 'Blue Star', as well as the 'Icee Blue' mentioned above have turned out to be not well suited to rooftop environments. Junipers in general, though, may not be the right choice for rooftops for completely different reasons. On the

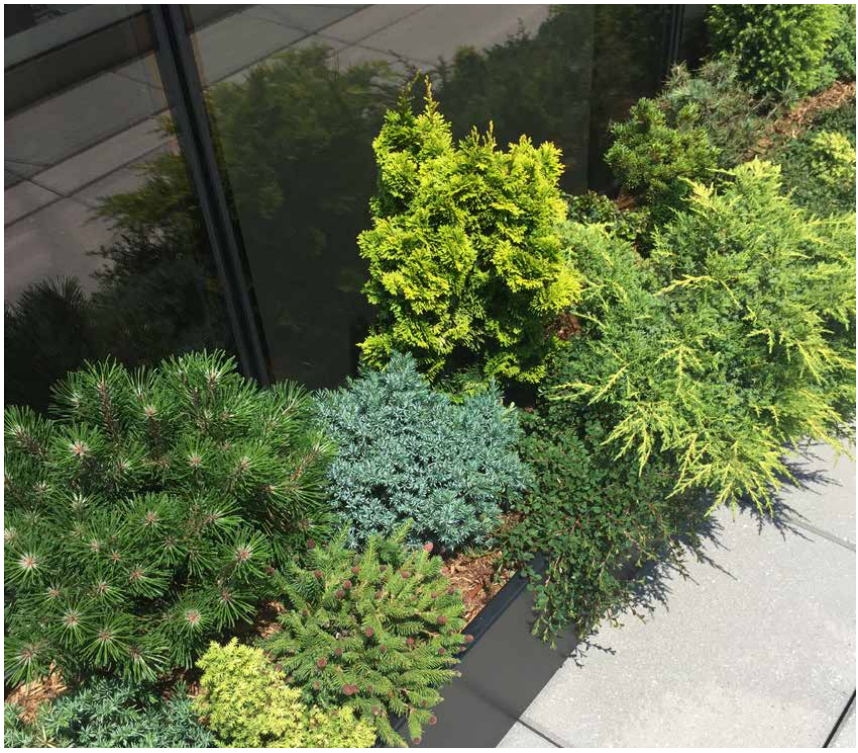
terraces and balconies in the City, clients and their plants live in close proximity to each other. Working with junipers and installing them can give us gardeners the "juniper itch," and, although clients may not be as close to their plants as we gardeners are, the people who own these gardens may like to brush their hands along their plants, walk barefoot outdoors, and may even be allergic.

In the City, wind and the resulting desiccation are also factors to contend with. Many times we think of this as a winter phenomenon as it is especially a concern in containers that freeze solid during the winter. Interestingly, this has not been the case for conifers here in the City, either for the dwarf plants discussed here, or larger specimens that can be used as hedging plants – *Juniperus chinensis* 'Hetzii Columnaris', *Juniperus virginiana* 'Emerald Sentinel', and various thuja, for example. Even with proper irrigation, it appears that desiccation is a summer event in the City, and when compounded with the hot buildings and HVAC venting atop many of these roofs and terraces, there is no room for error. The lack of irrigation at the Arsenal makes it a true test garden in the summer months.

Although I will not list every plant at the Arsenal, a number of chamaecyparis that were already at the site, as well as the *Chamaecyparis obtusa* 'Nana Lutea' and 'Lynn's Golden' that were planted in the fall of 2011, have done very well. There is an odd trend, where the fairly globose, or somewhat pyramidal forms, have not retained their shape, but have grown horizontally and irregularly, even though neither lack of sunlight or crowding are issues at the site.

Two cedars, *Cedrus deodara* 'Prostrate Beauty' and *C. deodara* 'Blue Ball', did well for five years, and then, after pushing spring growth, both completely defoliated in a matter of a week. Since they survived for so long and have performed admirably at this site and others, I will call this an aberration. We are trying two more cedrus at the site that seem to be very content. Cedars fall into the surprise category, as we thought they would be more delicate and I had never seen them used on rooftops before. The other conifers introduced into the garden were a very small *Picea abies* 'Gem' (since deceased), *Abies balsamea* 'Piccolo', and *Tsuga canadensis* 'Minuta'. Since these are single plants any observations are of limited value. However, I was surprised by the success of the abies considering the lack of irrigation and the humid weather. I am pleased to see tsuga surviving as it may also be a good choice for shadier sites, and as we are expanding the garden this year into a new corner where shade plays more of a role. These are in addition to *Cryptomeria japonica* 'Tansu', which has excelled. Caution to those who wish to use cryptomeria on rooftops. They need to be protected from direct sun and dessicating winds, especially in the winter. The specimen on the Arsenal rooftop sits low to the ground,

Cedars have been surprisingly tolerant of rooftop conditions.



Diverse conifers thrive on another rooftop garden in the City.

and is nestled against the building. It needs a good number of hours of sunlight to thrive and remain full, thus making siting critical for growth. Various dwarf *Picea abies* cultivars have shown mixed results for us.

Any number of pine species and cultivars seem to excel on rooftops, including but not limited to *Pinus thunbergii* 'Thunderhead', *P. densiflora* 'Low Glow', *P. sylvestris* 'Hillside Creeper', *P. banksiana* 'Schoodic', and *P. mugo* 'Mughus'. Interestingly, pines appear to take sun and drought better than many of the other conifers, but suffer the most from winter desiccation, unlike the other conifers for which summer desiccation is more of a threat.

We have also added some non-conifer specimens, with a focus on dwarf plants such as *Ilex crenata* 'Dwarf Pagoda', *Rhodendron keiskei* 'Fairy's Fairy', and *Acer palmatum* 'Winter Flame'. These plants add different textures and further blend the Conifer Corner with the rest of the garden. As an aside, Japanese maples do remarkably well on rooftops and are a lot less delicate than they may first appear – I would dare say they are our best performing specimen container trees in the City.

Overall, at the test garden at the Arsenal, and other sites in the City, dwarf conifers do very well in containers due to their size, slow growth rate, evergreen foliage, and diversity of form, texture, and color. I find that conifers can make for a very clean, almost sterile and regimented design. Many people want a fairly dense planting and inter-planting with non-conifer species to create a visually pleasing garden. Unlike in a suburban garden, where your plantings are surrounded by lawn, trees, or beds, in the City, plants are in containers, and surrounded by walls, railings, pergolas, and the building itself, all very constructed environments.

In just the few years, the scale of the Arsenal test garden is already feeling mature, with plants beginning to "kiss" each other. As always, the challenge is to find a balance, because on the rooftop, like many rooftops in the City, there is simply limited space into which to transplant the existing specimens or add more plantings and containers. Perhaps this is why annuals and tropicals are so popular on rooftops. You start with a blank canvas year after year. Yet conifers, which are underutilized on urban rooftops, and are too often relegated to hedging material, are in many ways ideal for these spaces. Many people want the feeling of being surrounded by trees on their rooftops, and often large mature trees are not possible. Much like bonsai, conifers can offer the shape, feeling, and structure of a large tree without being all that large. Not only are small specimen conifers ideal for small containers, but even large specimens, 6-12 feet (1.8-3.6m), do very well in small containers. We have plenty of six-foot (1.8 m) plants in 18- or 24-inch (45 or 60 cm) containers that, although not necessarily ideal, do well and meet the challenges we face in the City with limited space. *Acer* aside, I can't say that I have seen another group of trees or large shrubs that do as well in small containers.

Overall, maybe there is no one knockout plant, but chamaecyapris cultivars are my rooftop favorite and do very well. They offer so many different sizes, colors, and a very unique texture, especially for those who find conifers too rigid or formal.

Another example of the possible uses of conifers in the City is a garden I work on professionally. This garden, one of the highest residential garden spaces in New York City, is also composed mostly of conifers and has helped inform some of my observations in this article. That far up is like planting on the side of a mountain, and when you are not in the clouds, you have views of Central Park, the Hudson River, and New Jersey to the west, and the East River and Queens to the east. This site only receives maintenance a few times a year and conifers are one of the few groups of plants that can face the challenges of the site while also adding four season interest for the owners of the apartment.

Conifers form the backbone of one the highest residential garden spaces in New York City.

Trough Gardening Among Skyscrapers

Josie Lawlor

I HAVE BEEN the steward of a unique, urban garden for several years. It comprises two parallel terraces just a few floors above street level at Rockefeller Center in New York City, planted over 20 years ago as a rock garden. There are 98 troughs raised on pedestals, with shallow, inset green roof plantings around their base. It is hand watered.

As our cities grow and become denser, we'll need to get better at incorporating pockets of nature into the built environment. I envision an urban future with more green spaces, managed less intensively yet wisely designed, as if putting ecological systems in motion rather than designing stable gardens. With this in mind, I have been renovating aged areas of the garden with new species, chosen less for their individual beauty and more for their ecosystem attributes. It is a great garden for plant trials because of its maturity, diversity, and patchwork of microhabitats. Managing it has revealed what works and doesn't among skyscrapers.

Over time, this hand-watered garden has required less watering and less maintenance. I have experimentally nudged it to better meet the site conditions that exist, including lack of renovation. The site's complexity took time to learn since beyond the extraordinary physicality of the site there are human rhythms that impact the growing conditions. There is no analogous growing environment in the wild.

What follows are some notes on urban ecology from a plant perspective.

Caterpillars feeding on *Rhexia virginica* during a parade on 6th Avenue.

On the roof of the "Today Show," plentiful shade from skyscrapers and a wind-shadow create a microenvironment suitable for temperate forest species. This lush, layered corner of the garden shelters mature and unusual perennials. We continually find signs of wildlife.

A tall narrow canyon with sheer 'walls' will funnel wind more directly than a stepped canyon, where buildings of different heights break up airflow. Within troughs, small shrubs intercept wind and create protected sites for more tender undergrowth.

Three thousand pounds (1,360 kg) of confetti is dropped in upwind Times Square on New Year's Eve. Heat from the crowd pushes it back up in a plume of air before it finally lands. Some blows through the canyons of 48th and 49th street and settles around the troughs as a colorful, visual diagram of the micro-wind patterns at this growing site. A wind eddy on the 49th Street terrace collects the most confetti; *Opuntia humifusa* holds on to it the longest.

Unlike quiet roof gardens at the top of buildings, there is often a loud din at terraces near street level. Sound bounces from building surfaces and is bent by wind tunneling through the street canyons. Sound warp is affected by the shape and orientation of a canyon which also, more importantly to a plant, affects temperatures and wind dynamics.

Confetti from the New Year's Eve celebration collecting in *Opuntia humifusa*

Top left: Bass vibration from a passing parade rippling the water in a sarracenia.
Top right: Woodland native *Mitchella repens* blooming in a sheltered corner.
Bottom: The city canyon in winter.

Tulipa biflora and the rock-hugging *Erigeron scopulinus*.

Alpine plants are well adapted to some of the conditions created by skyscrapers, like high winds. Cushion plants hug rocks, minimizing the amount of airflow across the leaves. This in turn minimizes water loss.

Greenroof plants here must endure shallow soil (3/4 inch, 1.9 cm), frost-heaving, overflow flooding, drought from canyon winds, and summer heat. The clay tiles absorb heat during the day and continue releasing heat after the sun is gone. Thus, plants growing next to the tile are oven-baked at night, a time when plant metabolism normally slows down. Part of assessing a plant microenvironment is noting the surrounding building materials, whose varying properties of absorption and reflection alter the growing conditions.

To achieve dense groundcover amid the pavers, I trialed several new species, planting them as plugs en masse. In sun, *Lavandula* 'Phenomenal' and *Geranium macrorrhizum* 'Album' were excellent in both dry and poorly drained areas. *Juncus tenuis* thrived in a full-sun area prone to flooding. *Sisyrinchium* 'Lucerne' in the same area survived the flooding but not the drought. In an area with more shade, hot tiles and very high winds, I successfully used *Anemone sylvestris*, *Anemone canadensis*, and *Phegopteris decursive-pinnata*. *Anemone sylvestris* has endured in spite of phytophthora. Installing plants as young and small as possible seems key for perennial success where root space is limited.

Top: *Tricyrtis* 'Sinonome' has formed a dense groundcover growing directly in the roof tile.
Bottom: *Geranium macrorrhizum* 'Album' forming a groundcover around troughs.

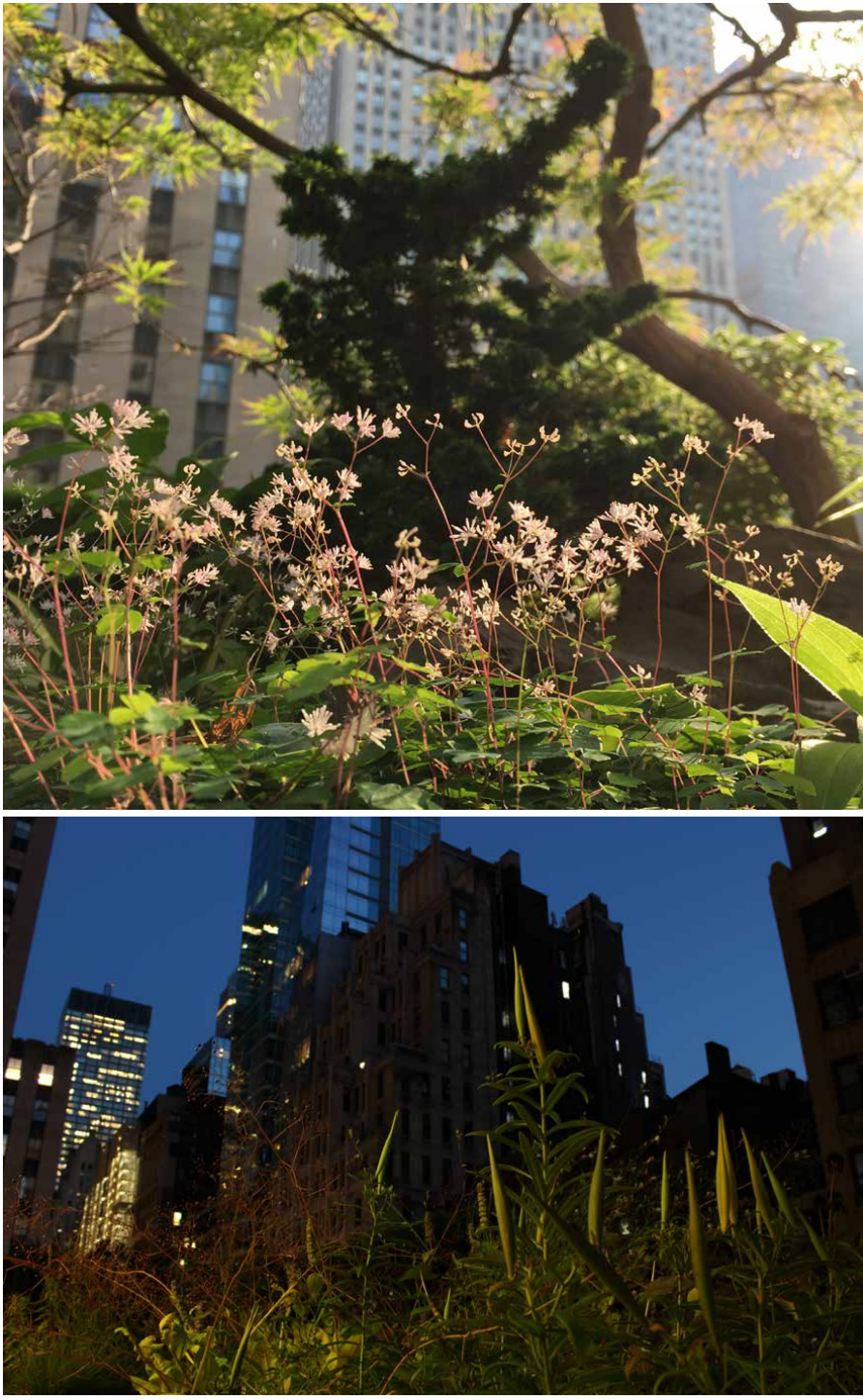
Hamamelis virginiana, *Illicium* 'Woodland Ruby' and *Cercis* 'Forest Pansy'

In a nod to the New Jersey pine barrens, I've trialed *Quercus ilicifolia*. It has survived long enough in nine inches (23 cm) of soil to produce acorns in the diamond district.

In a nod to David Hosack who started the first U.S. botanical garden on this site in 1801, I trialed *Hamamelis virginiana* and a few other species from his collection list. Hamamelis does well in nine inches (23 cm) of soil in high winds, providing a top layer to this plant community cluster. It is a favorite bird perch. *Illicium* 'Woodland Ruby' served to shelter other species from the wind but succumbed after two winters. *Cercis* 'Forest Pansy' does well. I am not a bonsai artist, but I have learned much about the growth dynamics of containerized trees from bonsai forums. I root prune to keep them small, and to encourage new root growth near the trunk. Temperature fluctuates the most at the edge of a container, so hair roots at the edges are most vulnerable to heat and freeze.

Garden form in the built environment is limited by invisible parameters: insurance liability, complex building code, the priority of access to building mechanicals, streetlights and security cameras hidden in the hedges. Window washing must happen regularly, and annually the facade is cleaned of soot. This covers the gardens in a fine dust of Indiana limestone, like snow.

Intermittent and reflected light during the day gives way to artificial light at night. As the sun sets, a flashing glow comes from the digital billboards of Times Square. *Asclepias tuberosa*, home to loud field crickets, is lit from indoors for a few hours each night during office cleaning. The garden is never completely dark.



Top: *Thalictrum kiusianum*
Bottom: *Asclepias tuberosa* seedpods at night.

Closing the Garden Gate

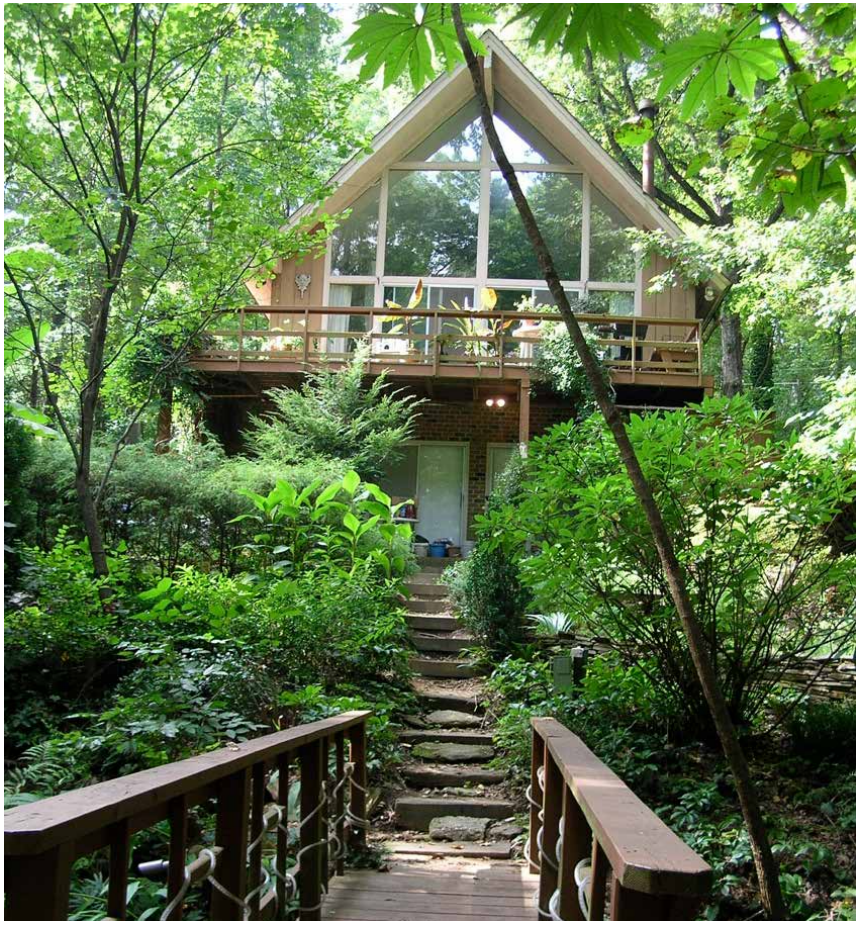
Bobby J. Ward

AS THE NARGS Executive Secretary, a position that includes handling memberships, I often receive notes from members telling me that, because they are downsizing, they will have no space to garden, and therefore are canceling their memberships. I've often wanted to write back, suggesting they reconsider, because apartments and condominiums can still be satisfying spaces for gardening. There are patios, porches, and decks that accommodate plants in troughs, pots, and other containers, as well as the indoors for houseplants. I've recently had success in developing such spaces and I hope my experience will inspire those who are thinking of downsizing.

My spouse and I closed the gate to our garden and home in late May 2016. We sold the property to an exuberant young couple, eager to embark on their own garden adventures while vowing to maintain much of the work we'd done over the past 41 years there.

We moved to the property on a cold day in March 1975, a bank having agreed to make a loan to two young men just starting careers. The first plant I identified along the pathway to the house was the native *Podophyllum peltatum*, and thus we named the property "May Apple." The 0.80 acre (0.3 hectare) wooded lot contained a spring-fed stream that cut through the property, which poured forth cool water continuously, even during the driest weather. The bedrock of the creek was slate aggregate, which provided a melodious trickle, easily heard inside the house with the doors open. The water cascaded in a series of gradual step-downs, serving as a home for snapping turtles, minnows, water snakes, crayfish, and frogs. The wooded land on the north side of the property was pure sand, the result of the creek having deposited sediments as it meandered over the property for thousands of years. The sunny south side, where the house sat, consisted of heavy, Piedmont red clay.

The native overhead canopy primarily consisted of loblolly pine, southern red oak, red maple, and hickory. The garden slowly developed over the years as my various interests in plants changed. Because I had a full-time job, I was limited to weekend work only. An early interest was in hellebores and some of the shady areas quickly became a collection of numerous species and cultivars. Each February for friends and neighbors at peak flowering season, we held a hellebore and garden viewing party with tea or wine in hand. Cyclamen were another interest and they dotted the garden. Numerous bulbs, including daffodils, crocus, and rain lilies filled spots. *Clematis armandii* climbed the deck



The old house and garden.

and provided early white flowers in late winter. There was sufficient space for medium shrubs such as *Edgeworthia chrysantha*, *Calycanthus* x *raulstonii* 'Hartlage Wine', *Clerodendrum trichotomum*, *Mahonia japonica*, a hardy *Schefflera delavayi*, *Corylopsis glabrescens* var. *gotoana* (winterhazel), and *Loropetalum chinense* var. *rubrum*.

I added a Japanese fiber banana (*Musa basjoo*) and a windmill palm, *Trachycarpus fortunei* (a form from northern India sometimes referred to as 'Nainital'), both of which add great height to the garden. A plant that became rampant was *Tetrapanax papyrifera* 'Steroidal Giant' (rice-paper plant). There was plenty of room and shade for trilliums, arisaemas, epimediums, and arums. I added camellias 'White by the Gate', 'Hagoromo' (also called 'Magnoliaeflora'), 'Dr. J.C. Raulston', and 'Shishigashira' ("Lion's Head") and many species of *Cercis* (redbuds).

There was sufficient space for larger trees: *Emmenopterys henryi*, *Magnolia kobus*, *Magnolia* 'Wada's Memory', and *Magnolia denudata* (Yulan magnolia). There were a couple of small *Magnolia tripetala* already on the site, seeds having been dropped there by birds as there were no other ones in the area. I had an interest in variegated plants and there was always another *Daphne odora*, *Osmanthus heterophyllus* 'Goshiki', *Gardenia jasminoides*, or *Fatsia japonica* to plant. I annually enjoyed the yellow winter flowers of witch hazel *Hamamelis mollis* 'Boskoop' and the evergreen poet's laurel (*Danae racemosa*) with its shriveled red fruit. In later years, I developed two raised beds where I grew snowdrops, dwarf conifers, and dwarf hollies, including *Ilex* 'Rock Garden', the dwarf *Gardenia* 'Lynn Lowrey', and various rock garden-type plants. But I never quite mastered a respectable rock garden, except in hypertufa troughs.

Through four decades at "May Apple," we saw many changes, as neighbors' babies grew to college-age adults and left home, while other neighbors moved to retirement homes or passed away. A series of house cats came and went. Generations of gray squirrels grew fat from the winter bird feeders, gray foxes denned under the porch next door, and broad-shouldered hawks nested in the crotch of our southern red oak. We came to accept the sounds in autumn of acorns and hickory nuts ricocheting off the rooftop. Flying squirrels scurried overhead on the shingles at night and shared space in bluebird boxes during the winter. I particularly valued the pair of barred owls I heard regularly as I picked up the morning newspaper before daylight.

However, with the years creeping up on us, it was time to close the garden gate. It was good timing because our subdivision had become a highly desirable area with its location near a major shopping center complex and the interstate. We put the house on the local real estate market's website late one afternoon and had our first acceptable offer two hours later. There had been many teardowns on our street, so we were apprehensive at first that our 1968 A-frame-style house and woodland garden would be razed, but Raleigh's new ordinances regarding setback distances from the creek, neighboring houses, and the street meant a larger house could not be built.

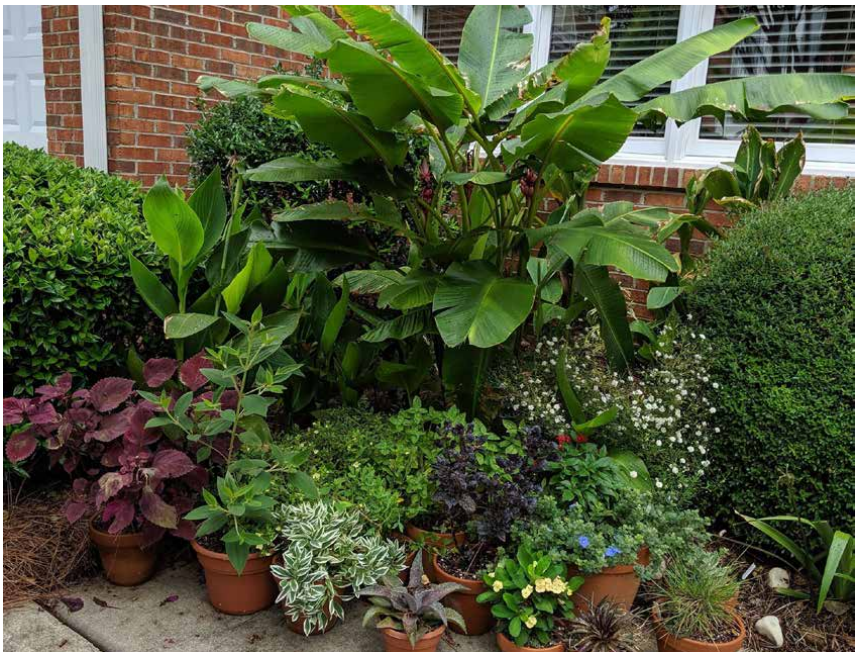
At the new owners' request, I gave them a complete garden tour, identifying plants and offering various suggestions, including a hope they'd protect the resident five-foot-long (1.5 m) rat snake (*Elaphe obsoleta*) that had been on the property for several years, valuable in controlling the vole population. I also warned them to be prepared for the requisite raking each autumn of some sixty 40-gallon-sized bags of leaves from the many large oaks, maples, hickories, and deciduous magnolias. Their continued expressions of delight with the house and garden made it easy to move on to our new place.

Moving to a new house and garden

We moved to a three-floor townhouse with no delusions of having a large garden any longer. As a gardener, I accepted that I would be downsizing and would be limited to small areas for plants. But I wasn't exactly sure how to use these spaces. There was a shady deck facing the northeast; a five-foot-wide (1.5 m) plot in the front of the house facing the southwest with full sun except a bit of noonday shade from a crape myrtle (*Lagerstroemia* 'Miami'); a shaded, somewhat dry 15 x 5 feet (4.5 x 1.5 m) plot behind the house designated as a common area owned by the Homeowners Association (HOA), anchored on either end by a southern red oak and red maple; and a tiny porch entrance to the front door. And, of course, plenty of room for house plants.

I began by planting the common area behind the house, as some of my neighbors had already done, using familiar shade-tolerant plants that I had grown previously. Hostas, cyclamen, arisaemas, asarums, hellebores, ferns, heucheras, and variegated forms of *Rohdea japonica* and *Aucuba japonica* made the list. Also, *Pulmonaria* 'Moonshine', *Acorus* 'Ogon', *Ajuga reptans* 'Golden Glow', *Liriope muscari* 'Okina', *Spigelia marilandica*, *Saxifraga stolonifera*, *Euphorbia amygdaloides* subsp. *robbiae*, and others. Some plants I lost through mismanagement or damage from squirrels that love freshly dug soil. It became a respectable shady nook that I could enjoy through the seasons because the plants were an assortment of deciduous, evergreen, spring ephemerals, and summer dormant.

New shade planting in the new garden.



Planting in the front of the home, flaunting the neighborhood rules.

But there were three things that I was not aware of. The first was that, as fiber optics services became available from two competing companies in the neighborhood, the common area would be dug up and cables buried three times now and counting. The second surprise was that the landscapers hired by the HOA would weekly mow or blow leaves to keep the neighborhood tidy. Autumn leaves were blown onto my planted area, sometimes smothering the evergreen plants in winter. I placed markers where the winter cyclamen and a few other plants were located and kept them uncovered. Lastly, tree trimmers regularly trample the area to remove dead limbs and cut away branches touching the house.

Approval is required by the homeowners' association to plant in the front of the house, and the number of porch planters is limited, but I mostly have ignored those rules, so far with no complaints or fines. The plot in the front of the house had been previously planted with three species of evergreen hollies, which provide greenery year-round: *Ilex vomitoria* (yaupon), *Ilex cornuta* 'Needlepoint', and *Ilex cornuta* 'Carissa'. They were large and couldn't be removed without attracting attention. The hollies were pruned and shaped seasonally by the landscaping crew and I became friendly enough with them to help direct their pruning—a little bit more each year so that I could get easily to the water hose hidden by the overgrown 'Needlepoint'. There was also a spot four feet wide (1.2 m) with old yellow-flowering cannas that die back after frost. I dug some of the cannas, but removing them all became impossible.

Kalimeris pinnatifida 'Hortensis'

So, I just clipped them back every month or so during the growing season. I planted a variegated form of *Poncirus* (*Citrus*) *trifoliata* 'Flying Dragon' and a hardy pink banana (*Musa velutina*), native to northeast India. It was one-foot (0.3 m) tall when I put it out and it grew to about five feet tall (1.5 m) in the second season and bloomed. The neighbors think it's an overgrown canna and otherwise ignore it. When it and the canna die back in the autumn and winter, it's a nice sunny spot for bulbs, such as *Sternbergia lutea*, crocus, daffodils, rain lilies, lycoris, and last fall I added the hardy x *Mangave* 'Whale Tale' and *Iris* 'Beverly Sills'. I also planted the much-passed-along plant in the Southeast, *Kalimeris pinnatifida* 'Hortensis' written about by Elizabeth Lawrence, which she referred to as the "Japanese double aster."

In front of this area, there is also sidewalk space that dead-ends into the *Ilex* 'Carissa'. An assortment of tender potted plants occupies that space during the growing season, requiring me to tiptoe around them to get to my allotted parking space. Last summer the pots contained coleus (*Plectranthus scutellarioides*), *Tibouchina urvilleana* 'Edwardsii', calibrachoa, variegated *Alstroemeria* 'Princess Fabiana', x *Mangave* 'Mayan Queen', coleus 'Shiny Shoes', euphorbia, dyckia, *Pennisetum* 'Burgundy Bunny', *Agave* 'Kissho Kan', *Evolvulus* 'Blue My Mind', *Pentas* 'Red Velvet', also lovage and basil for kitchen use.

Front porch trough of xeric plants.

On the small porch entrance, I have added a hypertufa trough containing only xeric-type plants, the suggestion from a friend, Mike Chelednik. The plants consist of *Pleopeltis lepidopteris* 'Morro dos Conventos', the Brazilian hairy sword fern; *Ochagavia carnea*, a terrestrial bromeliad from Chile; *Agave parryi* subsp. *huachucensis* 'Excelsior', from Mexico; and *Sempervivum* 'Pacific Blue Ice' (Berry Blue™). These plants receive full sun in the morning through the afternoon and are protected from rain by the house eaves. And don't forget there is always room for house plants, such as African violets, winter-blooming bulbs such as amaryllis (*Hippeastrum* sp.), and many plants that can tolerate low light conditions.

On the somewhat shady back deck that receives only morning sun, I have several hypertufa troughs. I constructed a few in classes held for members of the Piedmont Chapter of NARGS. Then I had to purchase a couple more troughs because I had too many plants needing a home, results from over-zealous impulse buying at local nurseries, egged on by a gardening friend (you know who you are). Currently, there are eight troughs in which the majority of plants are evergreen. A couple contain summer dormant cyclamen, sternbergia, snowdrop, and hoop

petticoat daffodil. There are conifers including, *Cedrus deodara* 'Snow Sprite' and *Chamaecyparis obtusa* 'Butterball'. Also, *Rohdea japonica* 'Shishi', *Buxus sempervirens* 'Variegata', and *Ilex crenata* 'Dwarf Pagoda'. I have two asarums, *Asarun splendens*, an evergreen, and the deciduous *A. canadense*. Because of the troughs' location on the deck near the kitchen, they are the plants I see most often and probably get the most attention. It's also the only place that our two black cats, Cato and Pepper, are allowed to roam outside. Thus, I also put a pot of catnip there each spring for them to enjoy while squirrels overhead chatter at them.

In addition, I now have two miniature crevice gardens in half-barrels made of plastic resin, one on the back deck, and another out front on the sidewalk. They were constructed and planted this past summer with the help of two gardening friends. A separate article about the preparation of these two barrels is next in this issue (page 330).

As difficult as it may be to leave a beloved garden when downsizing, I hope I've convinced you that gardening can continue, even in the smallest of spaces.

Shade-tolerant troughs on the back deck.

Constructing a Container Crevice Garden

Jeremy Schmidt and Bobby J. Ward

Jeremy Schmidt:
In early 2020, Bobby Ward asked if I would like to build a tiny crevice garden in each of two half-barrel-sized outdoor containers. "Sure!" I said.

Having seen several examples of trough crevices online, I knew I had to think much smaller (and thinner) than when constructing large scale crevice gardens, like the 400' (122 m) long botanical megalith at Juniper Level Botanic Garden. I made a trip to the local stone yard and purchased a pallet of one- to three-inch (2.5 to 7.5 cm) thick "Shiloh Select Thin," the thinnest naturally weathered stone they offered.

Thanks to a recently deceased front-load washing machine, I had a stainless-steel tub available to tumble my ideas. My initial stainless-steel container crevice looked awful; but much like disassembling a washing machine in the front yard, this was an exercise in learning—not aesthetics. In the trial run, I discovered that my stone selection was too thick to afford any intricacy or flow. Fortunately, the sedimentary flat fieldstone could be split into thinner fragments. Using a $2 flathead screwdriver and an equally cheap carpenter hammer, I bisected a couple dozen choice stones, picking rocks displaying universally useful angles, like long isosceles triangles or trapezoids with concave edges.

With 300 lbs. (about 136 kg) of selected split stone, and enough 75% Permatill™/25% compost soil mix for Bobby's two containers, it was time to stack.

Splitting stone for the container.

Top: Materials ready to assemble the container.
Bottom: Jeremy Schmidt placing stone.

For the sun container, my objective was to stop the eye from looking past the container. I also wanted to disrupt the symmetry of the container's rim with some sort of functionally off-balance, overlapping feature. A primary vantage point simplified the design—I only had to make it great from one direction. In an attempt to prevent the eye from speed-reading left to right, all the stones' elevation was confined to the back left "corner" of the container, promoting front-to-back observation over each horizontal planting crevice.

The second crevice container lives on a shady deck, with primary observation from above. Although functioning as a crevice garden, my goal was to represent the verdant and timeless simplicity of a mossy mountain forest. Hoping to trick the eye into seeing a round boulder resting near exposed rock strata, the mossiest and thickest stone on the pallet was selected to contrast the thinnest slivers of split stone,

Container crevice garden ready for planting.

separated by clear space in between. A second, thick stone was added at an off-angle (top-center) to support the boulder narrative—perhaps they rolled to a stop some time ago. Of course, no ancient forest floor is complete without a celebration of ancient trees. The most difficult part about incorporating deadwood into a container crevice is finding one small enough to fit. This was not the first piece of wood we tried to fit into this container!

What a great project! I had fun with this one. I feel anyone can build a crevice container. The material cost is significantly lower than an in-ground crevice garden, and the stones are all less than 25 pounds (11 kg) each. And if a crevice "draft" is unsatisfactory, one can simply dismantle it and start over. The containers are semi-mobile if set on strong castors or if a hand cart is available. I estimate Bobby's finished containers at 200 pounds (90 kg) each.

Shade crevice container freshly planted.

Bobby Ward:

The half-barrels are made of a plasticized high-density resin and were acquired online in the fall of 2019 from Costco, an American-based membership club that operates around the world. The dimensions of the half-barrel are about 20 inches (51 cm) in diameter by 15 inches (38 cm) deep and they cost about $40 U.S.; the color was listed as brown cedar. I placed one on the sidewalk in front of the house, planting it with pansies, a mixture of *Viola* x *wittrockiana* that provided color all winter for several months till warm weather began in March of 2020. I did not plant the other half-barrel, but I kept thinking about how I might eventually use both. Searching the internet, I found crevice tubs on a Facebook site called Modern Crevice Gardens. That was my "Eureka!" moment as I decided that I would use the two half-barrels as crevice gardens, one in the sunny front of the house and the other in a somewhat shady space on the back deck.

I had no experience in building a crevice garden but I had seen the work that Jeremy Schmidt had done using recycled concrete ("urbanite") at Juniper Level Botanic Garden for Tony Avent. I knew the garden well from many visits to see the evolution of Jeremy's work, particularly when I shopped at the adjacent Plant Delights Nursery. I contacted Jeremy and he accepted the challenge to try his hand for the first time in a small-space crevice garden. The COVID-19 virus slowed things down in early 2020, so it was not until June that Jeremy was able to complete the two half-barrels. For the sunny crevice, Tony Avent gave me small cell packs of plants that would work in the tight spaces of the sunny crevice, and separately I acquired plants from the JC Raulston on-line plant sale and from other area nurseries for the shady crevice half-barrel.

Because of the weight involved, Jeremy decided it was best to build the half-barrels at my house over two visits, so I could see the construction and make any comments, and also avoid the need to load and transport them to my house 45-minutes from where he lived. Once the stones were installed to our satisfaction, my friend, Mike Chelednik, volunteered his eye to design the layout of the plants among the stones and to plant them. For the sunny half-barrel, we used seventeen plants that included *Draba kitadakensis*, *Erysimum helveticum*, two species of *Escobaria* (cactus), *Globularia valentina*, *Echinopsis backebergia* (syn. *Lobivia beckerbergiana*), *Saxifraga cotyledon*, *Campanula rotundifolia*, *Silene zawadskii* and *Agave bracteosa* 'Squidget'. The crevice receives mid-morning, direct sun from the south and afternoon sun from the southwest. In the first month after the planting, despite temperatures in the 90s F (30s C), I lost only one plant, an acantholimon, and it was replaced with *Escobaria guadalupensis*.

For the shady garden, Mike and I made visits to local nurseries to find additional plants that would complement Jeremy's concept of a mountain forest crevice. Because some of the stones that Jeremy used are larger than those in the sunny crevice, we could only accommodate eleven plants. These included *Cheilanthes distans*, *Erodium reichardii* 'Flore Pleno', *Ficus pumila* 'Dorte', *Hosta* 'Pandora's Box', *Sedum nevii* 'Silver Frost', *Sempervivum* 'Gold Nugget', *Sedum japonicum* 'Tokyo Sun' and a fern *Astrolepis sinuata* 'Jo Levy'. This half-barrel receives filtered morning sun and bright shade for the rest of the day. Jeremy had envisioned a piece of gnarly deadwood for the forest setting, but it took up too much valuable planting space and was omitted in the final design and plantings.

Working on this project with Jeremy, Tony, and Mike was great fun and educational, and I thank them for their assistance. It's also a project that can be replicated by others who have moved to an apartment, condominium, or townhouse and have limited space to garden.

Sun crevice container freshly planted.

Bonsai Techniques for Conifers in Troughs and Rock Gardens

James Hughes

BONSAI AND ROCK garden enthusiasts often grow conifers because of their year-round color, texture, and form. They show rich greens, vibrant blues, glowing golds, come with varied textures and foliage and grow in upright, weeping, and globular shapes. Keeping miniature conifers, those growing an inch (2.45 cm) or less per year, small enough for the rock garden is not difficult. However, the unchecked growth of dwarf varieties and straight species can lead to challenges. The bonsai container or rock garden trough becomes too small, nearby plants become crowded and what started as proportional and aesthetically pleasing becomes untenable. Before that happens, steps can be taken to keep conifers small, or at least minimize their size. Bonsai artists have been doing it for thousands of years.

A collection of bonsai trees and troughs

Left to right back to front: gravel, pumice, lava, akadama, haydite, granite

Growing Medium

In both bonsai and rock gardening, horticultural success starts with an appropriate growing medium. Effective bonsai soil mixes for conifers drain well and include a limited amount of organic matter. Pumice, crushed granite, haydite, lava rock, and akadama (a naturally occurring, granular clay-like mineral imported from Japan) are commonly used for conifers in the bonsai community. All of them are good components of a soil mix for a rock garden or trough, also, since most rock garden soil mixes traditionally drain well and are on the lean side. In both cases, the gardener wants a mix that will provide a moist environment with excellent drainage, oxygen for the roots, and an environment that nutritionally encourages slow, steady growth. Organic fertilizer rather than inorganic fertilizer is recommended for bonsai to give a slow-but-steady release of essential nutrients. Both rock gardeners and bonsai artists want healthy conifers but not ones with rank growth. If you've had problems with raccoons and other critters being attracted to past use of organic fertilizers, consider products like OOF (Odorless Organic Fertilizer).

Sunlight

Most conifers trained as bonsai, and conifers growing in troughs and rock gardens, benefit from full to mostly full sun. Because they are grown in pots, conifer bonsai can be rotated so all sides of the plant get maximum exposure to sunlight. Bonsai at the National Bonsai & Penjing Museum at the U.S. National Arboretum in Washington, DC are rotated weekly. Many troughs containing conifers will also benefit from periodic rotation. Conifers need to access light and ample air circulation from all sides to maintain balance and healthy foliage, so bonsai, troughs with conifers, and confers in the rock garden should not be crowded by other plants.

Varieties

Conifers come in all sorts of cultivars and varieties, and dwarf varieties are particularly useful for troughs and rock gardens. For example, 'Bridget' is a dwarf variety of *Chamaecyparis obtusa*. Japanese black pines like *Pinus thunbergii* 'Kotobuki' and 'Callie Jane' are available with shorter needles and denser growth than the species. 'Paul's Dwarf' and 'Mops' are popular dwarf mugo pines. *Pinus parviflora* 'Adock's Dwarf' is also popular. Dwarf or semi-dwarf varieties are advantageous for both bonsai growers and rock gardeners, with complex branching and dense growth. This provides for more aesthetic choices when pruning and helps manage the size of the conifer. However, dense branching shades the interior and lower branches of the plant. Remember the need for abundant, direct sun? Timely management of that dense foliage helps maintain healthy specimens.

Clean up

Most conifers are never without some foliage which lasts for more than one growing season. The most common deciduous conifers that drop their needles every fall are bald cypress, larch, and dawn redwood. Because conifers hold their needles for more than one season, we call them evergreens. This foliage does not, however, last forever. For example, needles on pines last for about 18 to 24 months and then turn brown. Foliage on chamaeycyparis also turns brown after being on the plant for about 18 months. When foliage turns brown it no longer provides any use for the conifer, in fact, it is detrimental since it

Dead foliage and debris need to be removed annually to allow light into the plant.

New growth in the interior of this chamaecyparis allows old branches to be pruned back, keeping the plant small.

prevents light from getting to the interior of the plant. Removing dead foliage from conifers trained as bonsai is an important practice and should be a common practice for the rock gardener, too. Dead foliage can be removed any time, but the fall is when much aging foliage dies. Start at the top of the plant and work down; otherwise, you will be cleaning up lower branches a second time from debris falling from above. Comb through each branch moving from the trunk to the tip of the branch. Deciduous leaves from nearby plants, helicopter seed pods from maples, acorns from oaks, bird's nests, and other debris should be removed also. Do this fall maintenance when the conifer is dry. Gloves are not recommended; if you use bare hands, you will feel the foliage that is dead and crisp. It can be rubbed off easily without damaging the newer, living green foliage. Dead foliage is usually found beneath the new, fresh growth from the current year.

Buds

The removal of dead foliage and debris from conifers in late fall increases sunlight available to the interior of the conifer. That sunlight nurtures interior buds, which have the potential for becoming a new branch. That increases available choices when deciding what to prune. If new growth can be stimulated close to the trunk, the old, longer branch can eventually be pruned off. This is a cycle that can continue for many years. Branches grow out, interior buds form new growth close to the trunk, and the extended section of the branch is pruned back. Available sunlight is the critical component for this cycle to happen and helps keep that conifer small.

Snowflakes

The principle of maintaining sunlight in the interior of conifers impacts the way they are pruned. Evergreen conifers should never be pruned back to a bare branch with no foliage or the branch will die. Knowing this, some gardeners are afraid to prune conifers and just clip their outer tips. This can lead to the "beach ball" effect. Pruning only the outer tips of branches eventually shades out potential interior nodes and weakens lower branches as the outer surface of the conifer gets denser and denser. Instead, gardeners should prune for a "snowflake design" with varying branch lengths and openings that allow light to enter the interior of the plant. Prune back to a secondary or tertiary branch rather than the tip of the branch. After working on an area of a conifer, place a hand under the section pruned. Sporadic spots of sunlight should strike the hand. In addition to letting in sunshine, this also promotes air circulation throughout the tree, minimizing fungal diseases.

Tools

Having the right tool will enhance your chances of pruning correctly. Hedge clippers or pruning shears may be great gardening tools but are not the most effective tool to prune rock garden conifers or bonsai. Hedge clippers tend to remove outer growth and create the beach ball effect. Pruners easily damage surrounding foliage when trying to work in tight spaces. Instead, use bonsai pruning scissors with long narrow blades for light pruning or bonsai branch cutters for thicker branches. These tools can reach into the interior of the plant where branching occurs without damaging the growth tips of the branches that remain on the conifer. These tools are available from many bonsai supply vendors.

Vigor

When pruning, keep in mind that all branches are not created equal. Most of the conifer's vigor is at its apex and the tips of its branches where they get the most sun. As a result, prune more aggressively on top branches and less so on lower or interior branches that are less vigorous. Prune the strong; protect the weak.

Nibbling

Many deciduous woodies, like maples, elms, and hornbeams, can be pruned quite aggressively as they have numerous dormant buds that quickly sprout and begin to form branches to recover. With conifers, however, a branch with no foliage will die. In fact, it is best to prune a little each year rather than a lot every few years. A little pruning each year also prevents rank growth that develops when major branches get pruned. Nibbling annually rather than binging every few years will create plants that look like they got a good haircut instead of being scalped.

Top: A bonsai after its annual haircut.
Bottom left: A properly pruned bonsai is open enough to see your hand through.
Bottom right: Bonsai scissors allow you to make cuts without damaging the surrounding branches.

Multiple candles (new growths) on a Japanese white pine. Remove all but two candles and pinch the remaining candles back to create shorter, more open, growth.

Candles

Pines, popular conifers with bonsai artists and rock gardeners, can be divided into two categories – one flush pines and two flush pines – depending upon their ability to grow more than one set of new shoots, called candles, each growing season. Most pines (including Japanese white, Scots, mugo, and limber) are single flush pines growing one set of candles per growing season. To minimize the size of single flush pines, take part of the shoot off in early to mid-spring before the needles come out. Grasp the shoot with two fingers and snap or pinch it off. Take more off stronger shoots, less off weaker shoots, and none from the weakest ones.

Japanese black and red pines are multiple flush pines. In the bonsai world, the growth of multiple flush pines is minimized by decandling. Decandling means cutting off the entire candle or shoot in early June in the Washington, DC area, (a week later farther north and a week earlier farther south) unless a branch is weak. A second flush of candles will appear with shorter needles later that year. Decandling is only done if

the tree is healthy, vigorous, and growing in full sun. Never decandle a one flush pine since they will not be able to create a second flush of candles during that growing season, severely weakening the tree. Instead, pinch them and leave some needles to grow that year. Pinching and decandling are two valuable techniques to keep pines in bonsai containers and rock gardens from getting too large.

Multiple candles of new growth often emanate from the same node. If all remain on the tree, the growth will be too dense and needles in the dark will die off. As a rule, remove all but two candles or buds on each growth tip.

Needle Plucking Pines

Some pines, like Japanese black pines, grow so vigorously that needle plucking or removal is done annually, leaving 5 to 7 pairs of needles on each growth tip. Needles are removed more aggressively on top branches and less so on lower or interior branches that are less vigorous. As with pruning, needle pluck the strong; protect the weak. This fall maintenance technique not only allows light into the interior of the bonsai, but also balances growth. If left to its own devices, Japanese black pines would have strong branches growing at the top which will shade out lower weaker branches. Eventually, the lower weaker branches would die. In bonsai that would destroy the design of the tree. The same principle can be used caring for Japanese black and red pines in the rock garden to keep them from getting too large.

Repotting and Root Pruning

Repotting every few years, something done by all bonsai enthusiasts, is one practice that does not easily transfer to rock garden or trough culture, but it is an integral part of caring for bonsai. To maintain the health of the tree, about every two to five years, depending upon its age, health, and species, a bonsai is removed from the pot, its roots are pruned back by about one third, compacted soil is teased from the remaining roots, and it is replanted with fresh soil. This procedure, usually done in early spring just as the tree breaks winter dormancy, keeps the tree from getting pot bound, encourages a healthy environment for its root structure, and keeps the whole plant small. A rock gardener could do judicious root pruning with a garden spade while leaving the conifer in the ground. Even a conifer growing in a trough could have its roots pruned with the proper sized tool.

Start Young

Finally, and perhaps most importantly, it is a good idea to purchase young conifers for troughs and rock gardens. As with children and pets, the earlier they are trained the better. Starting these bonsai techniques and practices while the conifers are young helps ensure that they stay that size longer.

Western China in Autumn

Jeff Wagner

IN JUNE 2018, I had the good fortune to participate in the NARGS expedition to Yunnan with a group of curious and enthusiastic members, led by Panayoti Kelaidis and our Chinese guide-in-chief, Carolyn Gao. This trip was documented in the *Quarterly* by me and several of my fellow plant hunters.

While on that trip, I was not only interested in the alpine flora, mostly above treeline, I was also keenly interested in studying the woody plant flora extending from Kunming at elevation 6,200 feet (1890 m) and latitude 25 degrees north to the Tibetan border of Meili Xue Shan that lies some 500 miles (800 km) to the northwest of Kunming and reaches to 22,000 feet (6,700 m).

We were tantalized on our expedition by a Yunnanese flora at its peak of bloom and diversity; from the lowland *Cornus capitata* in full flower to elegant *Aesculus wangii* with attractive mottled bark, to gorgeous abies, picea, larix, quercus, and too many others to enumerate here. The understory was filled with stunning arisaema, podophyllum, clematis, primula, cassiope, semiaquilegia, meconopsis, cypripedium, and dozens more. There were equally beautiful caragana, deutzia, philadelphus, rosa, and late-blooming rhododendrons. Everywhere we turned there were discoveries to be found and even more that beckoned over the next ridge, or beyond the next fen or meadow. Not only was the Chinese flora richer and more diverse than any we had experienced

before, but the backdrop of western China's titanic Himalayan outlying mountain ranges and the abundance of local cultures and history set it all in its unique and surprising setting. We were all of two minds when we left for our way home, with so many indelible memories, and eager to discover yet more. During our farewell dinner, we unanimously agreed that should time and circumstances allow, we would return for a new experience.

I decided then and there that this country had to be seen at its autumn best. There were so many plants that in a good season would put on a show equal only to their spring best. So in early October, my wife Lisa and I began a trip in Kunming and traveled to northwestern Yunnan, then north into Sichuan, following the mountain ranges and valleys to the Tibetan frontier towns of Yading, Litang, then eastwards toward the famous natural areas of Siguniangshan, Huanglong, Jiuzhaigou, and the renowned Emeishan.

The flora here shares elements of Yunnan's and also of the surrounding provinces to the west, north, and east. Generally, the woody plant flora is more diverse and considerably more tolerant of the colder, drier climate than Yunnan's. Bamboos and deciduous trees such as davidia, magnolias, sorbus, acer, and many more that are sought after in Western gardens form the main forest here. There are also dominant species that are as iconic as some of our eastern North American maples and oaks. At middle elevations, quercus, pinus, sorbus, acer, and others form a mixed forest. In higher elevations these are replaced by abies, picea, and entire mountainsides thick with larix and the extremely beautiful *Betula albosinensis*. These grow all of the way to timberline

Lush forest of larix beginning to turn color for the fall.

Top: *Gentiana veitchiorum*
Middle: *Gentiana stipitata*
Bottom: *Gentiana sino-ornata*

with other plants such as rhododendron, rosa, caragana, juniperus, and more. Open alpine meadows are dotted everywhere with southwest China's most gorgeous gentians, several species that intermingle and dazzle the eye.

We were a bit late in the season and many plants were completely dormant and difficult to spot without spending more time than we had. Recent plant expeditions undertaken by western botanists and horticulturalists arrive in the mountains in early September and usually stay in the field for the beginning to the middle of October. But we had the best of larch in its full glory, the bluest gentians in the plant kingdom, and many other memorable plants, wild and cultivated. Our guides were friendly and helpful and nearly everyone we met was eager to learn more about the United States. The cities and towns and their inhabitants are so out of the ordinary for most of us that each new place we visited was an exciting and picturesque discovery. One highlight was our visit to two panda institutions, one where babies are bred and raised to be passed along to the next where they are kept in royal style as adults for breeding and eventually for release back into the wild, although that has so far proven to be extremely difficult.

If you appreciate Chinese plants in your own and/or others' gardens, exotic and beautiful scenery, a long and tumultuous history as shown by China's beautiful temples, and old architecture, not to mention the storied history of plant hunters in her mountains, then the long trip makes for the experience of a lifetime that will remain with you forever.

Gentiana

Coming upon the high alpine gentians of China in section Kudoa (that includes most of the cultivated alpines, including *Gentiana arethusae*, *G. lawrencei* var. *farreri*, *G. ornata*, *G. sino-ornata*, and *G. hexaphylla*) in full bloom against the backdrop of what Farrer liked to call the Chinese alps is a spiritual experience. There is nothing to compare to the heavenly sky-blue color of the trumpets all striped and spotted in yellow, white, or purple on the exterior and interior. We found some growing in lonely clumps at lower elevations (around 10,000 feet, 3,048 m); others in massive colonies in wet alpine meadows, and at higher elevations (12,000 to 15,000 feet, 3,660 to 4,570m) in gregarious groups of seemingly several species. They grew with allied genera such as comostoma, lomatogonium, and swertia. All of the ones we saw were growing in gravelly soils (Lisa spotted one of the most spectacular growing on a road cut all by itself) with sedges, edelweiss, asters, corydalis, rhododendron, cassiopes, alpine willows, and other plants. There are so many kinds of gentians in China that they can be difficult to identify without a key and some experience of seeing them in the wild. All but a few of the scores of Chinese gentians are endemic.

They are all so mesmerizing that one is tempted to sit in admiration high on a hillside until cold and wind make it impossible to tarry. And one should be counted lucky to be able to sit with them off the beaten track, as those places are rapidly disappearing in China. All of Sichuan's national parks and designated natural areas are overrun by thousands of people every day of the high season in October and into November. They are so numerous that officials have constructed raised plankways several miles long through these areas and anything within a hundred yards (91 m) or so of these is trampled to death.

These gorgeous alpines are a challenge to grow at lower, hotter, elevations so different from their high haunts with cool mountain air, full sun, and ample moisture in the summer, and snow in winter. They are certainly worth experimenting with in the garden and are definitely worth seeing at their autumn best in China.

Betula, Sorbus, and Larix

These three genera really stood out nearly everywhere we went in the mountains of Yunnan and Sichuan. We missed most of the rich diversity of woody plants as the season was far advanced and we lacked time. In fact, we only saw probably one or two species of white-fruited sorbus and no others of the dozens that grow there. Those we saw were mostly bare except for the pearly white (some tinged with dark pink) fruits dangling from the branches like fancy jewelry. They were all attractive multi-stemmed trees.

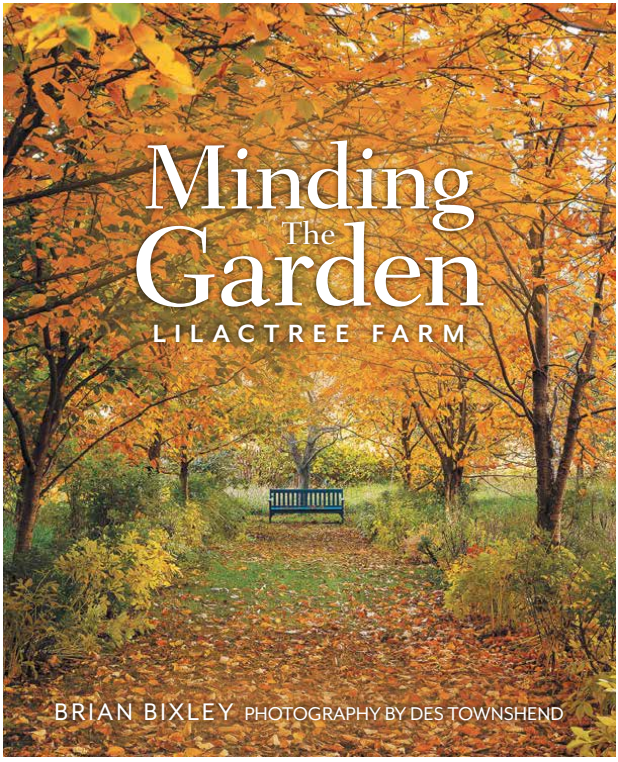
In Sichuan, we saw at least two species of betula, but *Betula albosinensis* is remarkable in its large size (to 50 feet, 15 m or more) and striking coppery red bark that peels in large sheets like *B. papyrifera* and overlain with a white bloom and prominent lenticels. It seems to prefer large river valleys but we also saw impressive trees growing with larch, fir, and rhododendron above 14,000 feet (4,270 m) on a high pass between Yunnan and Sichuan.

Larix is a mountain dweller above all, and the high mountains of Yunnan and Sichuan are its stronghold. We saw one (*Larix potaninii*) of the nine endemic species described in the Flora of China, although trees growing in Siguniangshan were identified as the rare *Larix mastersiana*. Only those lucky enough to live in Asia, the European Alps, or North America's Pacific Northwest or northern Rockies, will know the golden effect of whole mountainsides of larch in autumn. They are such character-filled trees, especially for a conifer. Their soft green needles in spring must also be a sight to behold in China, but in autumn their burnished branches glow. And their tall rigging of branches (as Hugh Johnson writes in his *Encyclopedia of Trees*) loom like old ships at sea in the mist. I've never met a larch that I did not love.

Top: View on the way from Siguniangshan to Huanglong
Bottom left: Larix in fall color.
Bottom right: *Betula albosinensis*

Bookshelf

Minding the Garden: Lilactree Farm



Brian Bixley
2020, FriesenPress
ISBN: 1525555367
Paperback, 244 pages

To set the scene: Brian and Maureen Bixley live and garden in Mulmur, roughly 65 miles (~105 km) northwest of Toronto, Ontario, Canada. Brian is the author of *The Canadian Gardener's Journal*; *Essays on Gardening in a Cold Climate*, and a contributor to local newspapers and regional magazines, as well as *Horticulture* magazine. Lilactree Farm has been the subject and object of many articles and blogs and visits.

The Bixleys began with essentially a *tabula rasa* on former farmland. The building and growth of their gardens (plural) is recounted in a series of essays published over months and years, offering the reasoning – and occasional misjudgments – behind each added feature.

Brian Bixley's reflections and recountings offer us many an "Oh, yes" moment of self-recognition (see #6), as well as instances of "Aha!" following explanations and clarifications (#131). These offerings are presented in prose that is clear, cultured, graceful, and sparked with dry wit.

Perhaps this book is best dipped into and read as originally written: a periodic, episodic sharing of thoughts on gardens, gardening, gardeners... and their interactions with the rest of one's life.

Few of us have only rock gardens, either by geography or by preference. The gems of the rock/alpine gardens are here: x *jankaemonda vandemii*, *Kelseya uniflora*, androsaces... you know them all. But this is also about a gardener's mind reaching into and making comparisons with other arts. Bixley's musings include garden history, as well as analogies with what are generally termed the "fine arts" (architecture, literature, music) and he points out that they have in common a basis in their need for structure and, quite possibly, critiques (#s 85, 87).

Des Townshend's serviceable photographs are fine, as far as they go; but they go no further and simply illustrate, not illuminate, and seem to possess no life of their own. That may be due to the use of matte-finish paper, as we (especially in the *Quarterly*) are used to the snap and precision provided by glossy coated papers.

The occasional runaway sentences might have been better corralled by a closer attention [by an editor?] to punctuation. But then, I'm a nitpicking proofreader.

The upcoming winter months will be a perfect time to spend hours in the land of “What if.” Gardeners are most open to inspiration and stimulation from other sources when they’re dreaming about possibilities, and this book offers a wellspring of original thoughts and potent reminders of why we are all so deeply engrossed in gardening.

For details on plants, and specifics on how to build the gardens to accommodate them, read the rest of this *Quarterly*. But for questions regarding how gardening integrates into the wider world and broader life, this book is both a response and a spur.

Joyce Fingerut

NORTH AMERICAN ROCK GARDEN SOCIETY

Bulletin Board

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President's Message: Summer 2020

Hello fellow NARGS members,

Thanks to all who helped make a success of our gala International Rock Garden Virtual Conference TAPROOT 2020! On June 26th and 27th, we toured some of the most amazing gardens on this continent. And we were treated to spring in Czechia (Czech Republic) as well! It was a source of great inspiration. I know my wish list has doubled, not only in plant lust but also garden constructions. Sure, we all missed the cancelled hikes in Ithaca, New York. But seeing the presentation on the Finger Lakes plants and geology as well as the stream bank restoration made that area a "must visit" at some later date. I, for one, had no idea there were limestone pavement barrens, a type of karst landform, in that region. My first experience with karst was in Czechia but more recently Newfoundland, Canada after the 2018 NARGS conference. The New York habitat had a similar orchid, *Cypripedium parviflorum* var. *pubescens*, to Newfoundland, but also something I never associated with the East: *Castilleja coccinea*! This was an eye opener for me as I learned the breadth of its full range over the eastern half of the continent. Remind me to keep my eyes more open next time I am in Dutchess County, New York, which is not far from my home!

It was quite thrilling to see the Betty Ford Alpine Gardens' new Caucusus garden structure completed. We shall follow their plantings over the years to see how they fare in the crevices. A big thanks to Nick Courtens and the whole staff for giving us such a complete tour. Tony Avent and Jeremy Schmidt infected me with their enthusiasm for building with recycled materials to house new plants in various microclimes that test limits. Now I will try more out-of-my-zone plants in special places thanks to them and their enchanting presentation. And we saw the excellent construction work Mariel Tribby has been orchestrating at the Missouri Botanical Garden in St Louis, Missouri. Kudos to her for cactus selection. Claude Barr would be proud. Newfoundland may have a more condensed growing season, but wow, can

they ever grow meconopsis, which flowered just in time for our conference. Todd Boland gave us an informative tour with a video he shot that very morning! And special thanks to Vojtěch Holubec for his presentation on the Czechian spring. The color variations of *Iris pumila* were especially exciting to me, though others may have swooned at those of the hepatica or galanthus. Our two featured Millstream private gardens, those of Anne Spiegel in New York and David Sellars in British Columbia, were exquisite. The superb plants they are growing are top medal quality. And what diversity between them. It was very kind of them to give us the tours. And lastly a special hand to Don LaFond, who despite a power blackout, was able to show us everything we need to consider when propagating daphne. I know I immediately took cuttings of *D. jasminea*. It was so helpful to know where I wanted to cut. So, a big hand and thank you all panelists! And let's not forget all those behind the scenes: the conference committee: Bobby Ward, Joyce Hemingson, Mariel Tribby, Todd Boland, Richard Lane, Betty Anne Spar, and my co-host Panayoti Kelaidis. Thanks.

On July 15, we successfully held our first virtual Annual General Meeting (AGM) on Zoom. We began the AGM with a report on the status of our society. TAPROOT 2020 was a wonderful financial success, and we thank all of you for your support. Donations from our members have been very generous, and we appreciate it. Awards then followed with a slide show of the recipients (the summary list of this year's awards are shown on the NARGS home page under "Latest News") and elsewhere in this issue of the *Quarterly*. Next came a discussion about our 2020/21 Seedex. To top it off, we had a slideshow preview of our exciting next AGM: Durango 2021, hosted by the Rocky Mountain Chapter. The good news is about all the outdoor hikes in the Four Corners area. Even if COVID-19 continues to darken our doors, one may drive there, stay in an RV, and attend the outdoor hikes. There may be open tents for outdoor gatherings! Of course, the usual lodging and services on the beautiful campus at Ft. Lewis College will be available, too. The best part about a Zoom conference is the recording. If you missed the live broadcast of the AGM, members may watch the AGM now on nargs.org . Go to our homepage and click the banner image in the lower right corner. This takes you to the page where the video resides. Click on the video to play it and adjust for full screen or not. It's about a 90-minute presentation, so you might return at different times to browse various items. Get ready; it's just like being in a lecture hall.

Have a great Fall! Happy planting.

Elisabeth Zander President, NARGS

New and Rejoining Members

Welcome to all those who joined or rejoined between May 1 and July 31, 2020.

Borgen, Katherine S., Denver, CO
Boys, Kay, Richford, NY
Robertson, Lori, Renton, WA
Brown, Raymond, Londonderry, NH
Buchwald, Jennifer, West Roxbury, MA
Cassidy, Mike, Alexandria, VA
Chen, Linus, Oakton, VA
Clegg, Laura, Salida, CO
Cosmany, Nicole, Vail, CO
Culp, Holly, Denver, CO
Daniel, Kathy, Bethesda, MD
Davidson, Bill, Mukwonago, WI
Dronenburg, James, Knoxville, MD
Ebone, Melissa, Avon, CO
Edgren, Margery, Woodside, CA
Edwards, Carol E., Washington, DC
Edwards, Garry, Roseneath, ON
Ellis, Margot, Arlington, VA
Erikson, Nick, Oregon City, OR
Fahs, Jan, Denver, CO
Gallet, Glenn, Oswego, IL
Greene, Stephanie, Fort Collins, CO
Grenfell, Elizabeth, Arlington, VA
Gresham, Cyane, Glenside, PA
Griffoul, Emily, Silverthorne, CO
Guthrie, Ellen, Andover, MA
Harwood, Sandy, Cary, NC
Helton, Melanie, Colorado Springs, CO
Mather, John, Blue Mounds, WI
Holman, Garth, Ann Arbor, MI
Hull, Emiko, Dillon, CO
Hunter, Charles, Smyrna, GA
Johnson, Ethan W., Willoughby, OH
Johnson, Nannette, Golden, CO
Kennedy, Kathleen, Pueblo, CO
McIntyre, Helen, Naples, FL
McManus, Patricia, Green Cove Springs, FL
Kulch, Nanette, Vail, CO
Lane, Ellen, Ithaca, NY
Ledyard, Elizabeth, Lakewood, CO
Lee, Colin, Vail, CO
Leighton, Peter, Jackson, NJ
Lewis, Erik, Durango, CO
Macleish, Jane, Washington, DC
Manzano, Ann, Freeville, NY
Mathew, Murray, Blackheath, NSW, Australia
Michael Bostwick, Lake Oswego, OR
Norton, Margaret, Roseburg, OH
Pakish, Marlene, Golden, CO
Powles, Jeri, Eagle, CO
Reinke, Budne, Silver Spring, MD
Ripley, Nicola, Eagle, CO
Root, Douglas, Roseville, MN
Rosenbaum, Ken, Falls Church, VA
Ryan, Connor, Mentor, OH
Seckel, Ann, Delta, BC, Canada
Shao, James, San jose, CA
Shinkle, Jean Hatty, St. John's, NF, Canada
Simone, Mike, Boston, CO
Slaughter, Sally, Vail, CO
Smathers, Shaunie, Golden, CO
Sorensen, Anne, Lake Bluff, IL
SMC Schultze, Centennial, CO
Stark-Slapnik, Nina, Chevy Chase, MD
Sterrett, Mary, Temple Hills, MD
Stone, Shelia, Ithaca, NY
Sundin, Jane, Broadway, NC
Parsons, Simon, Newbury, NH
Taggart, Theresa, Taos, NM
Title, Lynn, Lanham, MD
Tonthat, Myhanh, Fort Bend, TX
Trimble, Edward, Baltimore, MD
Trudeau, Janine, Chevy Chase, MD
Van Dusen, Rebekah, Madison, WI
Wallace, Michele, Roseville, MN
Ward, William, Middlefield, OH
Warren, Terrie, Breckenridge, CO
Warshofsky, Nancy, Vail, CO
Washburn, Sharon, Bethesda, MD
Wesley, Robert, Ithaca, NY
Williamson, Chris, McLeansville, NC
Wilson, Michael, Denville, NJ
Wolter, Erika, Anchorage, AK
Yoder, Ana, Dallas, TX

NARGS Donations

Donations to NARGS between May 1 and July 31, 2020.

To support the seed exchange, Taproot 2020, *Rock Garden Quarterly*, the general fund, traveling speaker's program, educational tours, and in memory of Iza Goroff and John Bieber.

Betty Ford Alpine Gardens (Colorado)
Potomac Valley Chapter of NARGS (Virginia)
Adams, Daniel Holden (New York)
Adler, Lee Howard (New York)
Bell, Lynne Adams (Oregon)
Botstein, Paula (New York)
Brunjes, Diane (Colorado)
Carr, Darwin (Nova Scotia)
Church, Clara (California)
Clegg, Laura (Colorado)
Cromwell, Cynthia (North Carolina)
Donahue, Maura (Massachusetts)
Edgerton, Graham (New York)
Evans, Barbara (New York)
Gaffney, Kathleen A. (New York)
Gresham, Cyane (Pennsylvania)
Hammerschlag, Richard S. (Maryland)
Hemingson, Joyce (Connecticut)
Horwitz, Lola Lloyd (New York)
Houdek, Robert (Ohio)
Kelaidis, Panayoti (Colorado)
Kinlen, Lois (Wisconsin)
Milano, Phyllis (Connecticut)
Myrick, Valerie K. (California)
Novak, Janet (Pennsylvania)
Pounds, David (Ontario)
Riehl, Deborah (Washington)
Rifkin, Jerry (Pennsylvania)
Rodich, Richard T. (Minnesota)
Rousseau, Margaret (Colorado)
Rugaber, Walter (Virginia)
Schmidt, Loren (Alberta)
Schramm, Nancy (California)
Schueler, Lynn (Washington)
Skulski, Lori (Alberta)
Smith, Anne (Colorado)
Swick, Kathleen (Alaska)
Tondu, Edmond (Washington)
Twining, Eloise (California)
Ulmann, Charles & Mary Ann (Pennsylvania)
Wainwright-Klein, Jennifer (Germany)
Weinberg, Ellen (Massachusetts)
Wolfe, Pamela (New Mexico)
Wulff, Ella May T. (Oregon)
Yates, Richard (United Kingdom)

The following recently became NARGS Patrons:

Anderson, Scott (Missouri)
Caroff, Julie (Michigan)
Gerace, Alex C. (Colorado)
Karl, Patrick (Michigan)
Rousseau, Margaret (Colorado)

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

Evelyn E. Arneson, Bloomington, Minnesota

Jan Balis, Sint-Genesius-Rode, Belgium

Henri LeClerc, Smithtown, New York

Malcolm McGregor, Hutton, East Yorkshire, United Kingdom.

Clifford R. Parks, Chapel Hill, North Carolina

Inger Lise Wiersdalen, Langangen, Norway

Malcolm McGregor

We have learned of the death of NARGS member, Malcolm McGregor, from East Yorkshire, U.K. He was editor of the NARGS *Rock Garden Quarterly* from fall 2010 to spring 2017, taking over from Jane McGary. At the time of his passing he was serving as the president of the Saxifrage Society. Prior to editorship of the NARGS *Quarterly*, he was editor of the Scottish Rock Garden Club's semi-annual publication, *The Rock Garden*. He was the author of a book on saxifrages from Timber Press. Our condolences to his wife, Monica, and family and friends.

Help NARGS and new rock gardeners grow.

Give a gift membership to the North American Rock Garden Society and introduce someone to a world of passionate gardeners.
Give access to the seed exchange, *Rock Garden Quarterly*, tours and adventures, meetings and study weekends.

Recipient information:

First Name: _____
Last Name: _____
Email: _____
Phone: _____
Address: _____
_____

Membership (Circle one):	US/Canada	International
Household	$70	$75
Individual	$40	$45
Student	$15	$15

Mail with check payable to the North American Rock Garden Society to P.O. Box 18604, Raleigh, NC 27619-8604

Or visit nargs.org/join

Seed Exchange

First, we want to reassure everyone that there will, indeed, be a NARGS Seed Exchange for the 2020-2021 season. A worldwide pandemic and onerous seed exporting requirements are not enough to hold us down.

We have two wonderful, capable chapters who will be handling the seed distributions for the next two seasons. The Siskiyou Chapter will not only manage the fulfillment of orders in the Main Distributions, but also the seed inspections for the requisite phytosanitary certificates on all orders going to members residing in Japan, the United Kingdom, and countries of the European Union. Volunteers in the Great Lakes Chapter will handle the orders for the Surplus Distribution. Both chapters have very successfully handled seed distributions in past years.

Of course, we can't hold the Seed Exchange unless and until our generous members send their donations of seeds. With all of the extra time spent safely and productively in our gardens during this lockdown season, we are hoping for record amounts of seed from a record number of donors.

Those who donate a minimum of five different kinds of clean seed of acceptable plants will not only receive 10 additional packets of seed (that's a 200% return!) but their orders will receive priority in being filled in the Main Round, offering a better chance at receiving the most sought-after items. Detailed instructions for Donors are on our website at https://nargs.org/seed-donation-instructions, with additional helpful links at: https://nargs.org/seed-exchange-helpful-links. The necessary donation forms, plus import permits and labels for members outside the US, were included with the Summer issue of the *Quarterly*. If you did not receive them, contact Laura now.

All seeds should be sent to:

Laura Serowicz
15411 Woodring Street
Livonia, Michigan 48154-3029
U.S.A.
seedintake@mi.rr.com or seedintake@gmail.com

Your seeds will need to reach our Intake Manager Laura Serowicz by November 1. To meet that deadline, members from Canada and overseas countries should mail their donations

by October 15, so that they can be cleared by our inspection stations in time. If you think that your seeds might arrive just slightly past the deadline, then send the list of seeds in advance to Laura, so that they may be included in the Seedlist. The same applies to seeds that are known to be late-ripening, like rhododendrons, arisaemas, and some of the native woodlanders: Send the list of seeds now, with your seeds that meet the deadline; send the late-ripening seeds later, but no later than December 1.

As always, the Seed Exchange will be open for ordering on our website on December 15; however, the seed list will appear online a few days in advance, so that you can peruse and research the items at your leisure. Before you do place your order electronically, make certain that you have registered your current email address (which is how the ordering system recognizes you as a member) with our Executive Secretary, Bobby Ward. He can be contacted at nargs@nc.rr.com. Further instructions can be found on our FAQ page: https://www.nargs.org/faq-page.

If you prefer to place your seed order by mail, send a request for the print copy of the Seedlist and ordering form by December 1 to:

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

Be sure to include your mailing address.

We hope that you continue to enjoy your gardens, and certainly good health, throughout a mellow Fall.

Joyce Fingerut, Director
NARGS Seed Exchange

Book of the Month

Do you like to read about rock gardening and horticultural subjects? Please share your useful insights with other members and get a free review copy of the book for your efforts. Reviewers are always sought for the NARGS website Book-of-the-Month feature. In return for submitting a 300-400-word review of the book of your choice, the book will be sent to you free of charge. Select your own title for review or suggestions can be provided. Please contact Steve Whitesell at elysium214@aol.com for more information.

Call for NARGS Nominations for 2021 Officers and Directors

The deadline for nominations submittal is November 1, 2020

The NARGS Nominating Committee announces its call for nominees for the 2021 election of three directors and four officers: President, Vice-president, Recording Secretary, and Treasurer. It is up to all members to consider whom they might nominate. Self-nomination is also acceptable.

Please refer to the By-Laws at <nargs.org/laws> to read a description of the duties of officers and directors.

President, Vice President, Recording Secretary, and Treasurer

New candidates for these positions stand for a two-year term (2021-2023)

Three Directors

Directors serve for three years. Every year three new directors are elected as three directors have completed their term. The directors can be elected for a second three-year term.

The mission of the Nominating Committee is to select candidates for the position of directors and officers who want to serve, have the qualifications to serve, and who fulfill as much as possible the need for geographic diversity between the continuing board members and new members. Geographic diversity can not always be achieved.

We will accept names submitted by any current member of NARGS for these seven positions. The nominee must be a member of NARGS.

Please provide the following information for each nominee:

1. Name, chapter (if applicable) e-mail address, and position for which each person is nominated.
2. Bio of nominee (100 words or less written by nominee)
3. Picture (shoulder length face shot)
4. Note of acceptance from the nominee indicating a willingness to be one of the above officers of NARGS (two-year term) or NARGS Director (three-year term)
5. Your own reason for nominating the person.

Note the bio and the picture will be used for publication in the *Rock Garden Quarterly* and on the NARGS website if such nominee is on the final slate or subsequently stands from the floor. All the above is for use by the Nominating Committee.

Nominations should be emailed to Ed Glover, chair of Nominating Committee: glover@oncology.wisc.edu

Timetable:

The call for Nominations is Stage 1 of the election process outlined below.

STAGE 1: Timetable and call for nominations are published in the fall 2020 issue of the Rock Garden Quarterly. Nominations to Nominating Committee by deadline of November 1, 2020.

STAGE 2: Nominating Committee agree on a slate to be published on website by December 31, 2020.

STAGE 3: From the floor nominations January 1-31, 2021

STAGE 4: Combined list of candidates to be published in spring 2021 *Quarterly* (deadline February 1 for dispatch late March) and on the website by April 1, 2021.

STAGE 5: Election online: Monday, May 3 through Sunday, May 16, 2021.

STAGE 6: Announcement of election results subsequent to ratification at Board Meeting in June 2021.

NARGS Traveling Speakers Program on Hold

Unfortunately, due to COVID-19 virus, the Traveling Speakers program is temporarily on hold. As soon as we have updates, we will post them on the NARGS Web site under "Latest News." Also, you may want to contact your local NARGS chapter leaders for new information when scheduling returns.

---Rosemary Monahan, head Speakers Program

Upcoming NARGS Meetings

Durango, Colorado, June 17 - 20, 2021

Location to be determined, 2022

Nova Scotia, Canada, 2023

NARGS ROCKS

TROUGHS, COAST TO COAST

A VIRTUAL INTERNATIONAL STUDY DAY and PHOTO CONTEST

How to build, plant, display, and celebrate gardening with rock plants in containers

SATURDAY, NOV 14
2:00 EST

See NARGS.ORG for details

Missing your NARGS promotional emails for events and trips?
Go to nargs.org to sign up.

2020 NARGS Awards

Panayoti Kelaidis, chair of the NARGS Awards Committee, has announced the 2020 recipients

Award of Merit:
Peter George (Massachusetts)
Michael Guidi (Colorado)

Linc & Timmy Foster Millstream Garden Award (Special Garden): John Ray (Maryland)

Linc & Timmy Foster Millstream Garden Award (Alpine Garden):
Robin Magowan and Juliet Mattila (New Mexico)

Frank Cabot Public Rock Garden Award:
Tilden Park Arboretum and Botanic Garden (California)

Marcel LePiniec Award:
Esther Benedict (Indiana)

Edgar Wherry Award:
Joyce Fingerut (Connecticut)

Carleton Worth Award:
Joseph Tychonievich (Virginia)

Geoffrey Charlesworth Writing Prize:
Adam Black *Changing Perceptions of Southern Rock Gardens* (Texas)

Norman Singer Endowment Grant:
$6600 to Darwin Carr of Dalhousie University Bicentennial Botanical Garden in Bible Hill, Nova Scotia, to install footings for the alpine house, finish landscape and tufa wall, and prepare plunge beds

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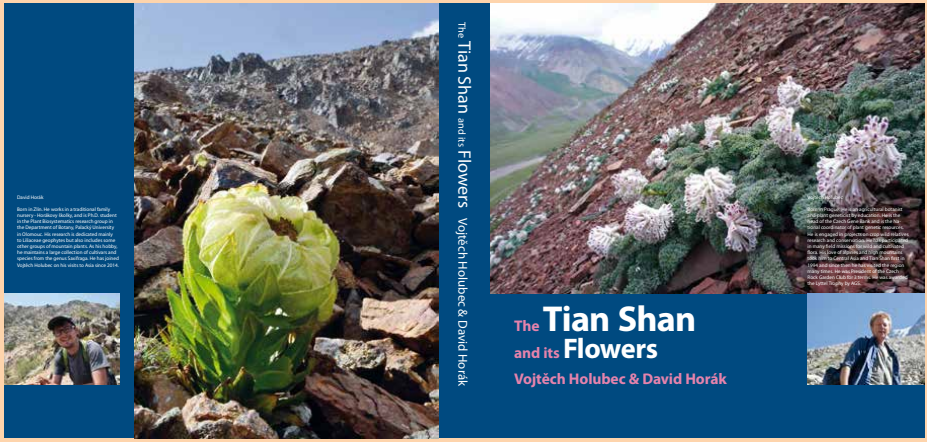

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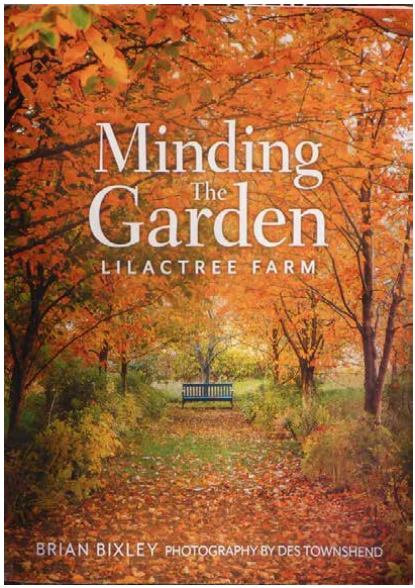

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Minnesota (Minneapolis/St. Paul, MN)	Rick Rodich <rrodich@juno.com>
New England (Waltham/Boylston, MA)	Estelle James <runtyandstel@netscape.net>
Newfoundland (St. John's, NL)	Todd Boland <todd.boland@warp.nfld.net>
New Mexico (Santa Fe/Albuquerque, NM)	Robin Magowan <magowanrobin@gmail.com>
Northwestern (Seattle, WA)	Kendall McLean <kendallforest8@outlook.com>
Nova Scotia (Halifax & Truro, NS)	Roslyn Duffus <roz.lakeside@gmail.com>
Ohio Valley (OH & surrounding states)	Joan Day <jdayham@earthlink.net>
Ontario (Don Mills, ON)	Arie Vanspronsen <arie.v@sympatico.ca>
Ottawa Valley (Ottawa, ON)	Rob Stuart and Jane Lund <president@ovrghs.ca>
Piedmont (Raleigh, NC)	Cyndy Cromwell <cacromwell2000@yahoo.com>
Potomac Valley (Alexandria, VA)	Barbara Rose <roserose@verizon.net>
Québec (Montreal, QC)	Réné Giguère <apulsatilla@netscape.net>
Rocky Mountain (Denver, CO)	Kathleen Stewart <kcstewart1568@yahoo.com>
Sierra (Sonora, CA)	Nancy Piekarczyk <NanPiekarczyk@gmail.com>
Siskiyou (Medford, OR)	Jean Buck <buckjean11@yahoo.com>
Wasatch (Salt Lake City, UT)	Tony Stireman <tstireman@gmail.com>
Watnong (Far Hills, NJ)	Roxanne Hiltz <hiltz@njit.edu>
Western (San Francisco Bay area, CA)	John Tsutakawa <jtsutakawa@sbcglobal.net>
Wisconsin-Illinois (Madison-Chicago)	Damon Smith <damonsmith@hotmail.com>

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	Elisabeth Zander nargspres@gmail.com 127 North St., Goshen, CT 06756-1202
Vice President	Vice President: Panayoti Kelaidis telesonix@outlook.com 1244 S Quince St., Denver, CO 80231-2513
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 27612-2762
Director-at-Large	Brendan Kenney, nycbeard@gmail.com 5 1/2 Jane St, Apt. 4R, New York, New York 10014-6017

Immediate Past President	Betty Anne Spar <bettyannespar@gmail.com> 5051 N Grey Mountain Trl, Tucson, AZ 85750-5942

Directors of the Board

2018-2021	Mariel Tribby, Saint Louis, MO Michael Guidi, Denver, CO Judy Zatsick, Fairfax Station, VA
2019-2022	Cyndy Cromwell, Cary, NC Brendan Kenney, New York, NY Jerry Rifkin, Merion, PA
2020–2023	Ed Glover, Mount Horeb, WI Susan E. Schnare, Andover, NH John Willis, Frederick, MD

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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