



NORTH AMERICAN ROCK GARDEN SOCIETY

The Rock Garden

QUARTERLY

75TH YEAR
SPRING 2017

CONTRIBUTORS

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

Ger van den Beuken lives in Horst in the Netherlands. He is Chairman of the *Nederlandse Rotsplanten Vereniging* (Dutch Rock Garden Club) and is a vice president of the Saxifrage Society. He is well known as an international speaker and has traveled widely with his wife Mariet. Since retiring from full-time work, Ger has more time to dedicate to his specialist nursery for rare alpine plants.

Don LaFond lives and gardens in Pinckney, Michigan, near Ann Arbor. He is a furniture builder and remodeling carpenter and, most importantly, a Mister Mom for two kids. Rock gardening has occupied and competed for his time for 25 years, with daphnes, irises, and dwarf conifers being among his many plant addictions. Don was a NARGS Director 2013 through 2016 and is currently the NARGS Chapter Liaison.

Anna Leggatt was introduced to wild flowers at an early age as her grandfather led 5-mile tramps through the English countryside. Anna lives in Toronto, writes for non-profit newsletters, and lectures on horticulture. She teaches part-time at the Kortright Centre for Conservation. Her garden gets neglected while she travels the world, taking photographs of wild flowers and their native habitats.

Alan McMurtrie lives and gardens in Toronto, Canada, where his work on irises absorbs his time. He has bred Juno irises but most of Alan's work is on the breeding of Reticulata irises. He has a website at <www.reticulatas.com> where his extensive work on breeding these is fully detailed.

Kenton J. Seth is a 30-year-old practitioner of rock gardening who says he owes everything to the generous plant people of Colorado. He lives and gardens in western Colorado and works as a freelance gardener/landscaper. He promotes landscapes that don't need watering, crevice gardens, and wild-flower appreciation, which he documents online at <kentonjseth.blogspot.com>

Douglas Tallamy, Professor of the University of Delaware's Department of Entomology and Wildlife Ecology, is well known as the author of *Bringing Nature Home*. Chief among his research goals is to better understand the many ways insects interact with plants and how such interactions determine the diversity of animal communities.

**Front cover: *Monardella macrantha*, a great plant for the crevice garden
Kenton J. Seth**

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Printed by Allen Press, 800 E. 10th St., Lawrence, Kansas 66044

NORTH AMERICAN ROCK GARDEN SOCIETY		
	<i>The Rock Garden</i> QUARTERLY	volume 75 2
		<i>spring</i> 2017

From the Editor	99
The New Crevice Garden - Defining a Movement, KENTON J. SETH	101
Beyond the Rock Garden: Giving Ecological Purpose to Your Landscape, DOUGLAS TALLAMY	112
A Plant Junkie's Guide to Rock Garden Basics, DON LAFOND	126
Seed Collecting, ANNA LEGGATT	134
Cushion Plants - Part Three: Linum - Pycnophyllum, GER VAN DEN BEUKEN	138
Reticulata Iris - Getting to Market, ALAN McMURTRIE	154
Book Shelf: <i>Rock Garden: Reimagining a Classic Style</i>	166
Verna Pratt: 1930-2017, BRENDA ADAMS	168
Nominations for 2017 elections	170
Bulletin Board	174

The Rock Garden
QUARTERLY

(ISSN 1081-0765; USPS no. 0072-960)

is published quarterly in January, April, July, and October by the
North American Rock Garden Society, c/o Bobby Ward, Exec. Sec.,
214 Ashton Hall Lane, Raleigh, NC 27609-3925
a tax-exempt, non-profit organization incorporated
under the laws of the State of New Jersey.
Periodicals postage is paid in Raleigh, North Carolina, and additional offices.

POSTMASTER: Send address changes to
Rock Garden Quarterly, Executive Secretary NARGS, PO Box 18604,
Raleigh, NC 27619-8604

EDITOR
Malcolm McGregor
16 Mill St., Hutton
Drifffield, East Yorkshire YO25 9PU, U.K.
<mmcg@mmcg.karoo.co.uk>
0044 1377 270717

Any queries relating to the next issue should be addressed to
Joseph Tychonievich
2731 International Drive., Apt. 1724a
Ypsilanti, MI 48197-3131
USA
<gsparrowgardens@gmail.com>

Submission deadlines are
February 1st for SPRING issue
May 1st for SUMMER issue
August 1st for FALL issue
November 1st for WINTER issue

Membership includes a subscription to *Rock Garden Quarterly* and
participation in the seed exchange, as well as other benefits.

Annual dues: US \$40 for members in USA and Canada, US \$45 for all other countries. Payment
by check on a US bank, International Money Order in US funds, or credit card (Visa, Mastercard).

Membership can also be paid online with PayPal at
<www.nargs.org>

Membership inquiries, dues,
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Executive Secretary, NARGS, PO Box 18604, Raleigh, NC 27619-8604.
<nargs@nc.rr.com>

From the Editor

THE WORLD OF rock gardening encompasses so many things. For many of us it's all about the plants: growing mountain, woodland, or steppe plants from across the world in our own backyards. Cyclamens and crocuses from the Mediterranean may rub shoulders with phloxes, lewisias and paintbrushes from the American West, irises and tulips from Central Asia, trilliums from the Appalachians, primulas and meconopsis from China. But if the plant obsessive lies at the heart of so much of what we do then it is allied to the practical processes of rock gardening. Just how do we manage to grow all these plants, plus the the rhodos, the lady's slippers, the glacier lilies, and the daphnes?

The answer is that we try all sorts of things. The structures in which we garden are being re-examined with troughs and crevice gardens to the fore. These are not new concepts but they are susceptible to revisiting and there could be no better guides than Kenton Seth and Don LaFond, just two of the scribes of the new movement, masters of the respective arts, allying energy and enthusiasm to an instinctive feel for materials.

But rock gardeners can become isolated in their own worlds and it is very exciting in this, my last, issue to publish Douglas Tallamy's article about the ecological responsibilities that each of us carries. In the tradition of Rachel Carson's *Silent Spring*, Tallamy writes about issues which can change the face of our environment. In passing it is worth pointing out that the yellowwood, *Cladrastis kentukea*, to which Douglas's article refers was, according to Wikipedia, chosen by the Society of Municipal Arborists as Urban Tree of the Year 2015 – pest-free but environmentally sterile, and an indictment on their judgement. But then how many of us are planting magnolias rather than oak trees? Douglas Tallamy challenges exactly such thinking in each one of us.

A different sort of challenge is offered by our other contributors Ger van den Beuken and Alan McMurtrie. Ger continues his series about that most intriguing group of plants, cushion plants, while Alan McMurtrie presents the problems and pitfalls facing plant breeders in trying to get their productions into the mass horticultural market.

Finally it's a pleasure to have had the chance to be able to review Joseph Tychonievich's new book *Rock Gardening: Reimagining a Classic Style*. Just as Don LaFond and Kenton Seth are exemplars in their arts, Joseph, who will be taking over as editor of the *Quarterly*, is surveying our whole field of activity.

As I say, this is my last issue as editor. The last seven years has been enormous fun. Monica and I have seen more of North America, seen more wild places, met more people and made more friends than I could possibly have anticipated. Thanks to all the contributors but most of all to my two proofreaders, to whom my very best wishes are due, Joyce Fingerut and Bobby Ward, without whom I would have sunk some time ago. 



The New Crevice Garden

- Defining a Movement

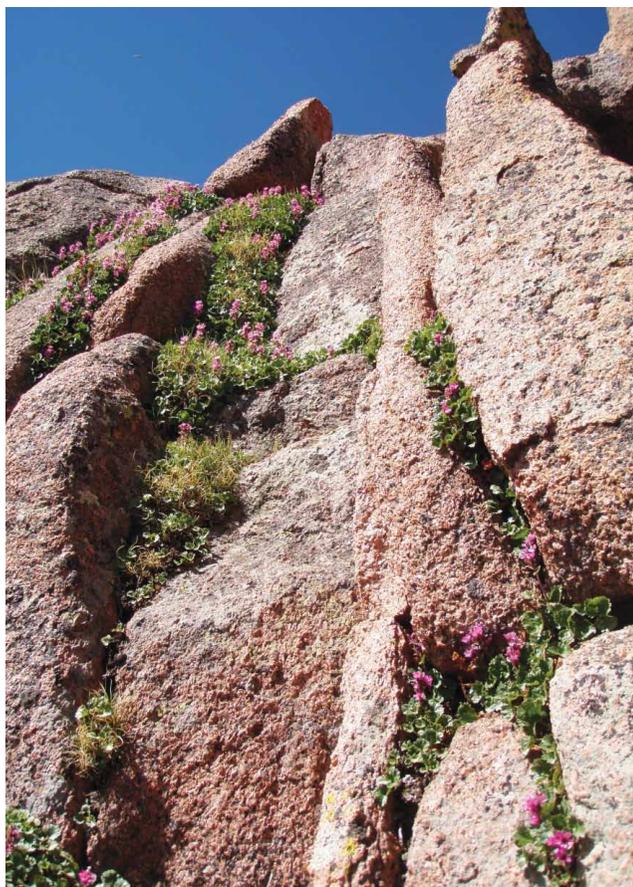
KENTON J. SETH

FACEBOOK, PINTEREST, AND whatever: there is a snowballing interest in crevice gardens on social media. I rely on my friends to point me to new gardens and people who show up on these because I'm pretty old-school for thirty-something, and on my most cynical days, I think that Pinterest is for people who like to think about home projects more than execute them. Anyhow, the worldwide device of the internet has spread and exposed crevice gardening to the world. But where did the idea start? And what is it?

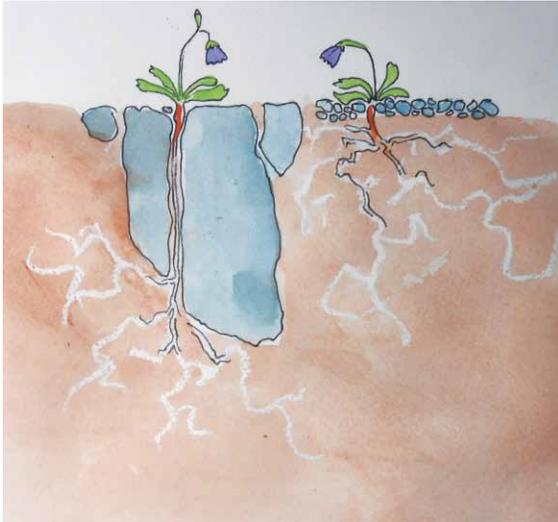
Saxatile plants are ones that in the wild grow in or among rocks. A crevice garden is a rock-intensive construction meant to simulate the tight growing spaces where such saxatile plants grow. This construction may have practical intentions (of being able to grow certain plants, or grow them better) or have aesthetic ones (to mimic the dramatic look of mountains or cliffs). Most rock gardeners aim for both.

The stones are placed close together, there is soil between the stones, and plant

Telesonix (Boykinia) jamesii is a natural chasmophyte in the crevices of Pike's Peak granite in Colorado



Opposite: *Agave parryi* and *Heterotheca jonesii*, both naturally desert/mountain crevice dwellers, take well to the same position between rocks in the unirrigated crevice garden



Crevices allow and force roots deeper, extending the separation between above and below ground parts

roots pass through that narrow space, finding a cooler root run and simultaneously a warmer, drier surface for their above ground parts. Think of this: plants are basically bi-polar creatures. There is an organism on top which wants warmth, dryness, and sun. It is attached problematically to an organism below which wants darkness, moisture, and coolness. Now, the saxatile, naturally rock-loving, plants tend to have higher needs for both of those sides. A crevice garden creates a stronger,

more extreme threshold to separate those two attached creatures which can't agree with each other. Or at least I like to think of it that way.

I also like to think that while a domestic pond is a garden's contrivance to grow wetland, lake, or riparian plants, and a greenhouse may be contrived to simulate the jungle for orchids, the crevice garden is the contrivance meant to bring mountains into the garden and support their elusive flora. You could also think of crevice gardens as bonsaied mountains.

The first mention of "crevice garden" in English was, of course, British. In the 1930s there was *Natural Rock Gardening*, a book by B.H.B. Symons-Jeune which in turn helped inspire Zdeněk Zvolánek whose *The Crevice Garden and its Plants* is the only current English-language book on the subject. Some of the first examples of what would lead to crevice gardens were vertical stones meant for their own appeal, without any plants. But in the mid-1900s, especially in the Czech Republic, the idea and device that is the crevice garden solidified and became an institution.

In Soviet times, when physical and intellectual exchange was limited, naturalists and horticultural thinkers in the Czech Republic, wanting the stimulation and challenge of a great garden and plant collection, but living in a small space and limited to local materials, created this culture and art form. The development of the rock garden into the crevice garden meant that the home gardener could nurture a fantastic variety of small but spectacular plants. And the crevice garden

has the advantage that anything built-up has an increased surface area, not to mention the fact that crevice-appropriate plants not only tend to be small, but seem to miniaturize even more in the crevice environment. Further, gardening was also a politically “safe” activity. It was the perfect solution.

I have my own theory about crevice gardens coming to North America: that it was because two Czech gentlemen, Josef Halda, followed by Zdeněk Zvolánek, both English-speakers, regularly visiting North America in the late 1900s, were able to share their innovatory styles through lectures and articles. Those seeds were supplemented by a small number of crevice gardens built by them in North America, and while the next decade or so would see few new developments or news, the idea of a “crevice garden” would quietly seep into the American garden consciousness to mature and re-emerge transformed.

Now, as more and more of us, especially western North Americans, are living in smaller places, we are putting more love into those smaller spaces. And at the same time, we are finally experiencing the reality of

Crevice gardens offer more planting space for tiny plants like here in the Shinn’s garden in Fort Collins, Colorado



limitations of our vast natural resources (like water) and being forced to be more in tune with our local natural histories. We are seeing our own inspirations in the American mountains and the plants in them, from the Appalachians to the Tushars to the Cascades, with our own culture of local plant appreciation.

But it's not just North America. With all those waves of social media sloshing from continent to continent, country to country, there are crevice gardens popping up all over the world, with the highest concentrations in Europe (in Britain, the Czech Republic, the Netherlands, and Germany), and in the United States and Canada. There is a great upsurge of crevice garden throughout the rock gardening world.

It's been a furious passing of years since fate landed me in the backyard of Paul Spriggs, protege of Zdeněk Zvolánek in Victoria, BC, Canada. There I saw my first serious crevice garden – a collaboration of Paul and Zdeněk's – and I think my young artist's heartstrings were not tugged, but eternally chained to a medium that allowed such beauty of nature, such a tying of the botanical world to the greater, deeper, geological world, and all of that in a person's backyard.

Since then (and if the ubiquitous Panayoti Kelaidis of Denver Botanic Gardens hadn't asked, I would not have got around to counting) I have built twenty-eight crevice gardens in six eventful years. My crevice

Eriogonum ovalifolium 'Wellington Form' is long lived in a crevice, and *Mamillaria wrightii* can be pushed a few zones colder than otherwise





The Apex Crevice Garden, in Arvada, Colorado, is a public garden featuring 60 tons of sandstone and 200 taxa

gardens have ranged from half a ton of stone to sixty tons. But I also feel that a crevice garden does not have to be large, that just two rocks jammed closely together with a single plant in-between should qualify as a foray into the style for any home gardener.

Most iterations of a crevice garden present the stones oriented in a unifying compass direction, mimicking a geological bedding plane



Mike Kintgen's children's alpine garden at Denver Botanic Gardens

turned on its side, and the Czech style demands that they are stood more or less vertically. Most crevice gardens are mounded – so that the rocks essentially pave a bulge lifting from the grade of the ground,

Hedysarum sp. from Turkey in dry crevice at the Apex Garden, Arvada, Colorado



and no open soil is visible. Some people take that opportunity to use a lighter (usually more free-draining and porous) soil within that mound.

The classic stone for a crevice garden is a slab with at least two parallel sides, but I think everything but cuboid and spherical stones are perfectly

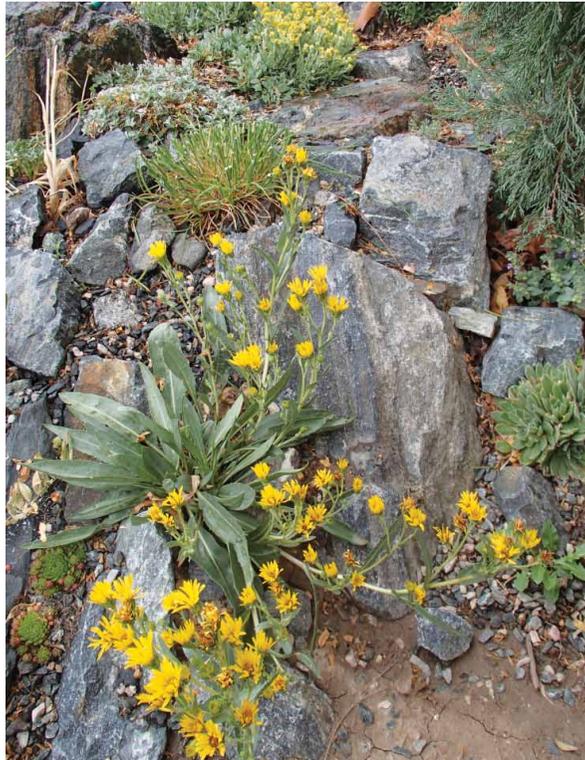
plausible. The actual crevices between the stones can be filled and gravel- or chip-dressed to the brim of the faces of the stones; or sunken slots can be left between them so that plants are tucked down in-between the stones. Both offer different advantages or disadvantages.

It's well known that such a construction, mimicking a mountain itself, offers microclimates of aspect, creating shadow and air movement as well as moist and dry spots, where cactuses may live on its south face, saxifrages on its north, lewisias on the east, and eriogonums on the west (at least, in the Northern hemisphere!). It lets us draw in a wider range of glorious tiny plants, a kaleidoscope from more and more exotic places as well as elusive local places – to have and enjoy in our gardens. Wetter climates can accommodate plants from drier habitats, and drier climates can enjoy cool-loving alpine plants thanks to the function of the crevice.

Mike Kintgen, also of Denver Botanic Gardens, points out that raised crevice gardens lift tiny plants (which might otherwise get lost) physically closer to the viewer. For the institution, this is great and in some cases may mean they are more accessible to the gardener as well as the viewer. And, of course, raising a crevice garden provides enhanced in-soil drainage as well as surface drainage. What is more, the new soil used can be engineered to further expand the plant palette.

Don't forget that crevice gardens look cool. Really cool. Remember – these are little mountains sticking out of gardens! I'll approximate broadly that among those for whom I've built crevice gardens, there is somewhat more

An accidental harmony of gold with *Pyrrocoma lanceolata* and *Helichrysum armenium* among naturalistic crevices





Crevice mounds repeated along a meandering path contrast the flatness of the path, smoothing the stones into the garden at large, don't look like a fractured meteor which fell from the sky into the garden, and bring plants close to the viewer.

interest in one's dramatic statement than the new plants which will be attainable. Rocks themselves are so diverse: think of the variety of flavors and effects that can be achieved just through them alone! Size, shape, color, surface, and pattern vary so much that fresh effects happen before any plants are added at all. The emotional contrast of ephemeral, moving, seasonal plants literally set against the hardness, permanence, and opacity of stone is not a new juxtaposition. As young as crevice gardening may be, it is already timeless.

Most folks like to have their crevice gardens close to a frequented walkway so they can look often and closely at their most intense and tiny jewel box of floriculture. These rock gardens often get the "high-dollar real estate" in a property's garden. Often, they are embedded in a larger rock garden, too, as the unofficial bun/cushion collection area, while larger herbs or pillowy cushions occupy the rest of the surrounding rockery.

Generally, whether purchased or home-grown, plants are bare-rooted upon planting. This ensures the roots aren't bound into an unsuitable growing medium, but also because it makes sure that the roots can be eased into the cracks between the rocks and ensures perfect soil-to-root contact. These bare-rooted plants, tend to stay smaller, grow in character, and live longer.



Astragalus spatulatus miniaturizes and lives for years in a naturalistic crevice while those in open gravel have been short lived.

One of the wider discoveries has been among the dry-habitat western American gardeners, who have found that their hitherto difficult natives can be better accommodated – it was paintbrush, *Castilleja*, for me – and their local desert/steppe landscapes can be honored with xeric crevice gardens. But these rock garden cowboys are prospecting new frontiers entirely: from John Lawyer’s highly naturalistic and plant-romancing tilted construction in Colorado





Springs, Colorado, to Stephanie Ferguson's layered and sculpted mineral soil profile in Calgary, Canada, which shocks visitors by growing an intercontinentally diverse collection of the most famously challenging plants like *Oncocylus Iris*, *Dionysia*, alpine rhododendrons, desert cactus, and rosulate *Viola*.

There is a broad and expanding vanguard of crevice gardening. One example is a sub-culture of tufa crevice gardeners who have appeared in Canada, the US, the Czech Republic, and the UK. But there are others. Mike Bone, in Denver Botanic Gardens' Steppe Garden, has overseen the creation of formalized, mortar-boned crevice structures in which soil slurries were delivered into very fine cracks. This is at once a mix of some recent approaches and something brand new.

Further, there has been too little use of broken concrete as a crevice garden material to say it's been fully explored. The spherical crevice gardens of broken concrete at Utrecht in Holland should inspire more experimentation. I challenge someone to create one which is a tilted cube – designed, man-made, artificial, non-naturalistic and modern – it would be the exact opposite of what I build so I know I'll never do it. How about a waterfall/crevice garden mashup? How about tropical or windowsill crevice pots? And a crevice garden can blend into an existing rock garden, a fade by either dipping underground humbly or crumbling dramatically in a faux scree.

This versatility has something to offer everyone, a trough or old rusty bucket can be crowned with an unintimidating and very fine miniature crevice feature, or an entire home can be enveloped dramatically by a stony wonderland which conjures up the talus of the top of an exposed mountain peak. Such a laboriously acquired and built use of stone is not the silver bullet for every garden problem, and is not the ideal solution for every gardener, but perhaps it fills a need which we feel in our hearts every time we visit the mountains but did not ever imagine we could explore domestically. It is no wonder that botanical institutions, public parks, private estates, and the entrenched seasoned rock gardener are taking up the new crevice garden.

Stephanie Ferguson on her crevice garden in Calgary, Canada: a curated miracle of structure and function.



Female and male eastern bluebirds bringing food to their nest

Beyond the Rock Garden: Giving ecological purpose to your landscape

DOUGLAS W. TALLAMY

AS THE HUMAN footprint continues to expand at the expense of the natural capital that sustains us, there is a growing need and increasing demand for residential, corporate, urban, and suburban landscapes that generate natural resources rather than destroy them. At our current

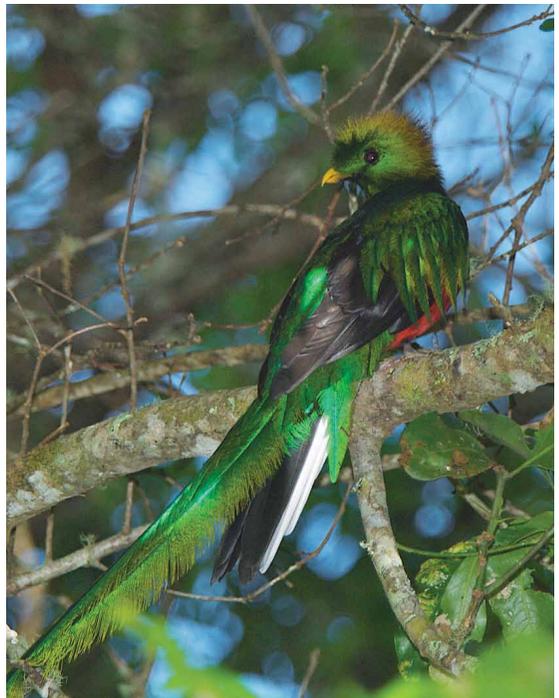
population levels, a culture that segregates humans from nature is not a sustainable option and by whittling away at functional ecosystems, such a culture has led to a reduction in the earth's ability to produce essential renewable resources (aka ecosystem services) by more than 60% (2005 Millennium Ecosystem Assessment). To believe there will always be sufficient oxygen, clean air and water, carbon sequestration, pollinators, and the biodiversity that produces these resources, regardless of how we treat local landscapes – or to suggest that technology can effectively replace them– is folly in its most misguided form.

Fortunately, we already have the knowledge required to integrate human habitats with the natural world. Indeed, the concept itself is ironic because humans are products of the natural world – one of millions of life forms that natural systems sustain every day – and we have never been even partially independent of earth's bounty. What types of landscapes are capable of sustaining humans and nature simultaneously? Ones that feature plants that interact with the species around them. Such plants are the key; every ecosystem service required by humans (and most other animals as well) is created either directly or indirectly by plants. We have degraded ecosystem function by removing plants from local ecosystems, or by assuming that all plants function equally well in every environment. It follows that we can quickly repair the damage we have inflicted on the typical built landscape simply by putting the right plants back. And who better to lead the way in this most noble endeavor than gardeners who know and love plants.

Nature equals specialized relationships

A pattern is emerging from conservation efforts around the world: if you want to save a particular species, you have to save the specialized relationships that support that species. If, for example, you want to save the resplendent quetzal (a gorgeous but endangered bird in Central America), you have to restore populations

Resplendent quetzal



of wild avocado trees, because the fruits of that species are an essential component of the quetzal diet. If you want to save jaguars, you need to protect large populations of palm species that make small palm nuts (as opposed to coconuts). Why these palms? Because palm nuts sustain peccaries, the wild pigs that are jaguar prey. If you want great green macaws in the future, you need to restore populations of wild almond trees because they are the only trees those birds will nest in. Such specialized relationships are so common in the tropics that they are the rule rather than the exception.

What surprises many people, however, is that specialized relationships, particularly involving food webs, are also the rule in the temperate zone, and we cannot create living landscapes if we exclude them. If you want your may apples to spread by seed, you need a population of box turtles. May apple seeds germinate best after passing through the gut of a box turtle that has eaten the may apple fruit. If you want pileated woodpeckers in your neighborhood, you need trees that harbor large colonies of carpenter ants, because carpenter ants are what these birds feed their young. If you want your *Phlox divaricata* to produce viable seed, you need the plants that support the larval development of day-flying sphinx moths (such as the snowberry clearwing moth pictured below), for these moths are the primary pollinators of *Phlox*.

Even species that do not seem to depend on specialized relationships often do, especially during reproduction. The Carolina chickadee is an

Snowberry clearwing moth pollinating *Phlox divaricata*



excellent example. As anyone with a bird feeder knows, chickadees are seed eaters during the fall, winter, and early spring. When it comes time to feed young, however, chickadees join the 96% of the terrestrial birds in North America that rear their young on insects (Dickinson 1999).

And not just any insect: chickadees feed their nestlings caterpillars. Chickadee parents could feed their young other insects, but the overwhelming majority of their prey during reproduction is caterpillars. And not just any caterpillar, but those that are not covered in hairs or spines. Because chickadees rear their young on caterpillars, there will be no chickadees where there are not enough caterpillars to bring a clutch of eggs to independence from parental care.



Carolina chickadee bringing caterpillar to nest

How many caterpillars is that? Carolina chickadees bring somewhere between 390 and 570 caterpillars to their nest each day, depending on the number of chicks in the nest (Brewer 1961). Parents feed nestlings in the nest for 16 to 18 days before the young fledge and then for 30 more days after fledging. If we focus only on the caterpillars required to reach fledging, it takes 6,240 to 10,260 caterpillars to fledge a single clutch of chickadees: an astounding number, even to those who study bird behavior. No one knows how many more caterpillars are required during the 30 days after fledging. What's more, chickadees are tiny birds; a Carolina chickadee weighs 1/3 oz, the equivalent of four pennies. In comparison, a red-bellied woodpecker, which also rears its young on insect larvae, weighs eight times more than a chickadee. How many larvae are required to create a red-bellied woodpecker? How many insects are required to sustain an entire population of chickadees and woodpeckers . . . and titmice, and orioles, bluebirds, warblers, wood thrushes, catbirds, cardinals, buntings, flycatchers and all of the other birds that signal healthy temperate zone ecosystems? The numbers are mind-boggling.

Consequences of specialization

Suggesting that designed landscapes should produce rather than destroy insects would have been ludicrous, if not heretical, in the past. After all, if plants are simply decorations, we would want them to be forever flawless and untouched by natural processes. In fact, if flawless plantings are really the goal, using silk or plastic plants seems like the

more logical option. If our goal, however, is to create landscapes that contribute to, rather than detract from, local ecosystem function, then we must include “the little things that run the world” (Wilson 1987). Decades of research have shown that insects are essential for pollination, nutrient recycling, pest control, and especially for feeding other animals. A world without insects is a world without biological diversity; and a world without biological diversity is – eventually – a world without humans. If insects were to disappear, humans would not last more than a few months (Wilson 1987). Seen in this light, waging war on insects where we live, work, farm, and play seems counterproductive at best.

How, then, can we design landscapes that support lots of insects but also stay in a balanced equilibrium with the natural enemies that control them? Before we answer this question, we have to consider the most important and abundant specialized relationship on the planet: the relationship between the insects that eat plants and the plants they eat. Most insect herbivores, some 90% in fact, are diet specialists



Prothonotary warbler
Pandora sphinx



restricted to eating just a few lineages of plants. But plants don't want to be eaten, so they manufacture nasty chemicals including cyanide, nicotine, pyrethrins, and tannins to deter plant-eaters.

If plants are so well defended, how can insects eat them without dying? Because insects like caterpillars necessarily ingest chemical deterrents with every bite, there is enormous selection pressure to restrict feeding to plant species they can eat without serious ill effects. Thus, a female moth will lay eggs only on plants with chemical defenses their hatchling caterpillars are able to disarm. There are many physiological means by which caterpillars can temper plant defenses, and they typically come by these adaptations through thousands of generations of exposure to the plant lineage in question. In short, by becoming host plant specialists, caterpillars can circumvent the chemical defenses of a few plant species well enough to make a living, while ignoring the rest of the plants in their ecosystem.

Monarch butterflies provide a perfect example. They are specialists on toxic milkweeds, which they can readily neutralize. The advantage of this relationship is obvious for the monarch, especially when milkweeds are plentiful, but there are also risks to specializing, especially in today's world. Unfortunately for the monarch, the ability to detoxify the cardiac glycosides that defend milkweeds does not confer the ability to disarm the chemical defenses found in other plant

Adult monarch butterfly





Purple milkweed - *Asclepias purpurascens*

lineages. This means that of the 2137 native plant genera in the U.S., the monarch can develop on only one, the genus *Asclepias*. The evolutionary history of this butterfly has locked it into a dependent relationship with milkweeds and if milkweeds disappear from a landscape, so does the monarch. This is exactly what has happened across the U.S. in recent years. A growing culture that favors neat, manicured agricultural fields, combined with an unwillingness to share designed landscapes with milkweeds, has reduced monarch populations 96% from their numbers in the 1970s. Can monarchs adapt to other plant species? In theory, yes, but – in reality – no. Monarchs have been genetically locked into a relationship with milkweeds for millions of years. Adaptation could conceivably modify this relationship very slowly over enormously long periods, but asking monarchs to suddenly (within 30 years!) switch their dependence to an entirely different plant lineage such as, for example, the euphorbias or candytufts in our rock gardens, is like asking humans to develop wings. The number of genetic changes required to make such a switch reduces the probability of its happening before monarchs disappear to near zero.

Please note that monarchs are not exceptions, either in their specialized relationship with milkweeds, or in their current plight. They are typical of 90% of the insects that eat plants: their evolutionary history has restricted their development and reproduction to only the plant lineage on which they have specialized. And as we have homogenized plant diversity around the world by replacing diverse

native plant communities with a small palate of ornamental favorites from other lands, the insects that depend on native species have declined. Data from Europe paint an alarming picture: insects in Germany have declined in abundance and diversity more than five-fold since 1989. This includes the extinction of 46 species of butterflies and moths. Globally, invertebrate abundance has been reduced 45% since 1974 (Schwageral 2016). We have caused these declines by the way we have designed landscapes in the past. But we can reverse the declines by landscaping differently in the future.

Making Insects

What type of landscape is capable of producing insects in the numbers required to support viable food webs? A landscape created from the plants that have each developed specialized relationships with a diversity of insect species. A landscape occupied by organisms that have interacted with each other over evolutionary, rather than ecological, time spans. A landscape that showcases specialized relationships rather than ignores them. As we have seen, diet specialization is the rule among insect herbivores, not the exception. Without the plant lineages that support insect herbivores, there would be no insect herbivores. If there were no insect herbivores, all of the creatures that depend on insect herbivores for their nutrition - that is, the insectivores of the world - would also disappear. A world without insectivores would be a world without spiders, insect predators and parasitoids, frogs, toads, and other amphibians, lizards, bats, rodents, skunks, opossums, raccoons, and mammals we don't think of as insect eaters, such as foxes and black bears, both of which get a quarter of their nutrition from insects. And let's not forget that a world without insect herbivores would also be a world without most terrestrial bird species; with the exception of doves, finches, crossbills, and our largest birds of prey, terrestrial birds rear their young on insects (and the spiders that ate insects to become spiders). To reiterate, a world without all of these creatures would not only be a world without biological diversity, it would be a world in ecological collapse that is incapable of supporting humans.

Biodiversity and Ecosystem Function

Research over the decades has tied the number of interacting species in an ecosystem to both ecosystem function and ecosystem stability. Let's first consider ecosystem function. We can define ecosystem function in several ways: the ability to hold energy captured from the sun within biological systems before it escapes back into space; the ability to produce products or perform services useful to humans and other species; the ability to create living and dead biomass; and so on.

In 1955, famed ecologist Robert MacArthur predicted that ecosystem function would increase linearly as the number of species within an ecosystem increased (MacArthur 1955). Diverse ecosystems with many equally abundant species would be more productive than species-poor ecosystems dominated by one or a few species. Although no one had tested this prediction, it was logically appealing and soon came to be known as the Law of Nature.

It was not until 1981 that MacArthur's Law was challenged by an analogy between species populating an ecosystem and the rivets that once held airplanes together (Ehrlich and Ehrlich 1981). In their rivet hypothesis, Paul and Anne Ehrlich suggested that ecosystem productivity was indeed tied to the number of species in an ecosystem, but only to a point. Their hypothesis introduced the concept of species redundancy; the Ehrlichs reasoned that there was redundancy in the species performing particular roles within ecosystems just as there was redundancy in aircraft rivets. An airplane could lose some rivets before a wing fell off the plane, and an ecosystem could lose some species before it suffered a measurable loss in productivity.

Generalist pollinators provide an example of species redundancy. A black-eyed Susan (*Rudbeckia* sp) needs to be pollinated before it can produce seeds, but many species of bees, moths, butterflies, beetles, and even ants are capable of doing the job (although not all do it equally well). The redundancy in black-eyed Susan pollinators implies that one or even several of these pollinator species could disappear from the system without a reduction in seed set in black-eyed Susans. Similarly, landscapes that produce dozens of species of caterpillars are far more stable in the eyes of reproducing birds than landscapes that produce just a few. In years with weather unfavorable to caterpillars, there would not be enough food to rear young in landscapes with only a few caterpillar species. In those with many species, however, several caterpillar species in combination would yield enough food so that birds could reproduce every year, regardless of the weather. Thus, caterpillar diversity in the landscape creates food web stability.

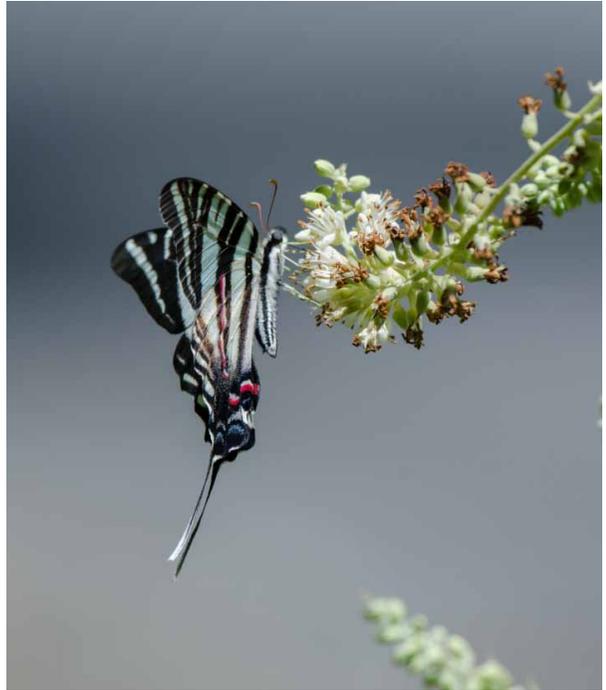
The rivet hypothesis was somewhat comforting to ecologists because it predicted that the local or global extinction of some species would not send ecosystems spiraling into collapse, at least not right away. Replicated studies of entire ecosystems in which distracting variables are controlled are extremely difficult to conduct, and so the compelling logic of both MacArthur's Law of Nature and the Ehrlich's rivet hypothesis remained untested for many years after it was proposed. In 2012, however, three studies were published that support MacArthur's predictions over those of the rivet hypothesis (Maestre et al. 2012, Reich et al. 2012, Naeem et al. 2012). As the number of species in an ecosystem goes up, so does ecosystem function and stability. Redundancy in the

roles species play within ecosystems surely exists, yet studies now show that it does not buffer ecosystems from a loss of productivity every time a species disappears from the system. Not good news. If this relationship is borne out by additional research, we can no longer be complacent about the loss of species from local ecosystems.

New evidence suggests there is an important caveat to MacArthur's prediction. Lee Dyer and colleagues are showing that it is not actually the number of species in an ecosystem that controls ecosystem function, but rather, it is the number of interactions among species (Dyer et al.

2010, Scherrer et al. 2016). This explains why invasive plants are decreasing rather than increasing ecosystem function around the world. When a plant from outside of a local food web moves into a new ecosystem, it either displaces native plants species, reducing the total number of species in the area, or it joins them without significantly reducing species richness. In either case, the number of interactions among species declines. Non-native plants are just meeting the plants and animals in the "novel" ecosystem for the first

time in evolutionary history (Hobbs), which means they have not had the time to develop the adaptations required to interact with many of the other species in that ecosystem. That is, species dependent upon specialized relationships with particular plant lineages either become less abundant or disappear altogether if their native plant lineage is competitively excluded by the invasive plant. When bush honeysuckle from Asia, for example, displaces native spicebush in the understory of eastern forests or in our designed landscapes, the spicebush swallowtail loses some or all of its host plants and the number of interactions in that space decreases. Such losses are multiplied every time a native plant is pushed from a landscape.



Zebra swallowtail



White oak

Which plants should we use?

If non-native ornamentals do not support the relationships required to restore ecosystem function to our landscapes, which plants do? Simple logic tells us that using a palate biased toward native species should be sufficient to support robust food webs in our landscapes. However, comparisons among plant genera of host records for moths and butterflies, the backbone of most terrestrial food webs, reveal two striking patterns that suggest this conclusion needs to be refined (Tallamy and Shropshire 2009). First, there are huge differences among plant genera in their ability to make caterpillars and thus support other creatures. Oaks (*Quercus*) in the Mid-Atlantic states, for example, serve as host plants for 557 species of caterpillars, tulip poplars (*Liriodendron*) only feed 21 species, and yellowwood (*Cladrastis*) is not used by any caterpillars at all. These are order-of-magnitude differences among plant genera that are all native to eastern North America. Second, a mere 5% of the native plant genera in any North American ecosystem support 73-75% of the caterpillar species. Stated in reverse, 95% of the native plant genera support only 25-27% of the caterpillars that drive local food webs (Tallamy and Shropshire *in prep.*). We cannot build ecologically rich landscapes if we do not include the core genera – those top 5% – that create the majority of food-driving local food webs.

We don't yet understand why some plant genera are responsible for

so much of the life around us, while most pass on minimal energy, and some none at all, to local wildlife. But we do not need to understand the basis of the relationship to use it effectively in landscape design. This pattern is consistent across all bioregions of North America and is not changed by latitude, longitude, or plant diversity levels. Wherever we are in the U.S., we can create plantings that sustain birds, reptiles, amphibians, and mammals by generating tens of thousands of insects. Landscape designers and architects, land managers, restoration biologists, and above all home gardeners can learn which native plant genera contain core species at the National Wildlife Federation website under "Native Plant Finder" at <http://www.nwf.org/NativePlantFinder/>.

Enter your zip code, and a list of plant genera found in your county, ranked from most to least productive, will appear.

Creating trophic balance

Because our past goal in constructing built landscapes has been to create beauty using plants rather than ecological integrity, a primary concern has been the aesthetic appeal of the plants themselves. A perfect specimen unmarred by insect damage has been the ideal. As we have seen, though, a perfect plant is one that has not interacted with other species in our landscapes, and a landscape full of perfect plants is an ecologically barren space devoid of animal life. Is it possible to choose plants that are simultaneously beautiful and productive, plants that can pass some of their energy on to the insect herbivores that then support a vibrant

community of other species? Indeed it is, but to do so we must attract even more species to our landscapes.

When species interact over long periods of time, a balance among plants, herbivores, and natural enemies (predators, parasites, parasitoids, and diseases) emerges that

Assassin bug eating treehopper





Black-throated blue warbler feeding young

typically keeps any one species from eliminating the others. This is the ideal that we should strive for in our built landscapes. If we use native plants that support dozens of species of insect herbivores, we will create a food resource for hundreds of species of the natural enemies of those insects, so they too will become residents in the landscape and will keep insect populations below the aesthetic injury level. The spiders, assassin bugs, damsel bugs, ladybird

beetles, lacewings, predatory stink bugs, digger wasps, parasitic Hymenopterans, bluebirds, tree swallows, cardinals, hummingbirds, catbirds, and many other insectivores all kill tens of thousands of insect herbivores before plants suffer noticeable damage. But natural enemies will not be in our landscapes if there is not enough food to support them. Fortunately, we have some wiggle room here, for studies have shown that people do not even notice insect damage until about 10% of the leaves have been eaten (Sadof and Raupp 1996). Most plants are viewed at a distance; even the oak tree that supports hundreds of caterpillars looks untouched from 20 feet away.

Using more plants

Creating vibrant landscapes that become functional extensions of local ecosystems can only happen if we use the plants that drive those ecosystems. Choosing the right plants is a necessary first step, but we must also put enough of those plants into the landscape to achieve the ecosystem integrity we desire. Today our built landscapes are dominated by turf grass. For example, 92% of the area that could be landscaped in residential neighborhoods in northeast Maryland, southeast Pennsylvania, and Delaware is lawn. Moreover, 90% of the trees are gone from these landscapes, and 79% of the plants that are there are from Asia (Tallamy et al. in prep). We have favored large





Barren landscape

lawns bearing few plants for two reasons. First, we prefer savanna-like landscapes, presumably because we feel safer in such environments (Falk and Balling 2009). Second, large, flawless lawns have been a status symbol of the rich for centuries. Such landscapes may have met our physical and social needs when we were hunter-gathers, but they are an environmental disaster in today's world of 7.5 billion people. We are converting most built landscapes into lawn-dominated spaces that do not support ecosystem function. We now have over 40 million acres of lawn in the U.S. and we are adding 500 square miles more lawn each year (Milesi et al. 2005, Kolbert 2008).

Raising the bar

To achieve a sustainable relationship with the earth, we must raise the bar for what we ask of our built landscapes. In the past we have asked that they be attractive, well-tended spaces. We have achieved this in grand style. But our need for ecosystem services is now so great that we can no longer rely on the remaining degraded and fragmented "natural" spaces to produce enough. We must now design beautiful

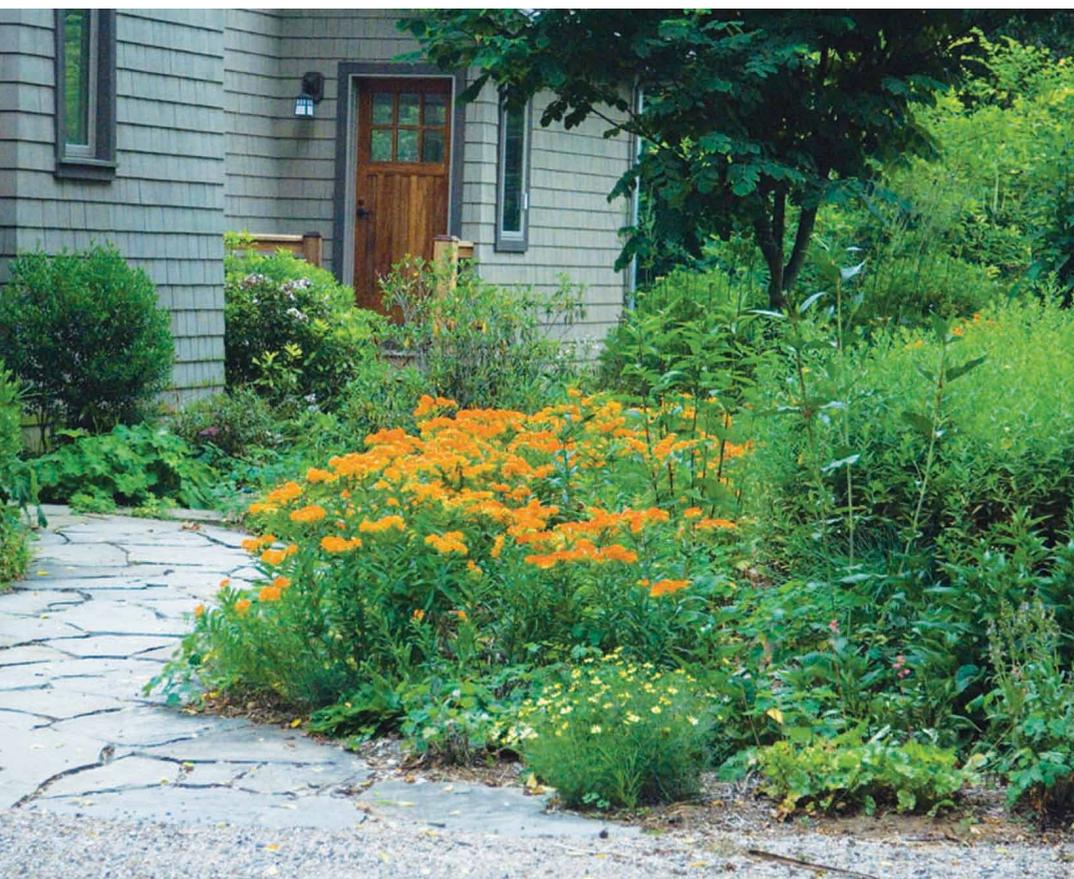
landscapes that also support complex food webs, which in turn support the biodiversity that runs our ecosystems. We need landscapes that sequester carbon: lawn sequesters 27 times less carbon than a meadow and 32 times less than a forest (Schwartz 2014). We also need landscapes that clean and manage water. A lawn-dominated landscape impedes infiltration, creates disastrous storm water runoff, and adds nutrient and pesticide pollutants to aquatic ecosystems. Finally, we need to design landscapes that support diverse pollinator populations. Pollinators across the US are in steep decline due in large part to the loss of nesting sites and seasonally abundant forage (Kremen et al. 2007). Manicured lawns provide neither resource. Pollinators, including the 4000 species of native bees that did all of the pollination in North America before the introduction of the honeybee, are not optional. They pollinate 80% of all plants and 90% of all flowering plants. If we were to lose pollinators, we would lose 80-90% of all plants, including 1/3 of our crop species.

Homegrown National Park

We have it in our power to create a new national park of sorts simply by redesigning the landscapes in which we live, work, and play. If we were to replace half of the area now in lawn with 3-dimensional plantings of powerful native plant communities, we could create over 20 million acres of spaces that generate, rather than destroy, ecosystem services. Our “Homegrown National Park” will be enormous – bigger than all of the major national parks combined – and it will provide us with many of the benefits we derive from visiting our official national parks. Just 15 minutes in the solitude of a well-planted garden can lower blood pressure, reduce stress (cortisol), improve attention span, raise immune responses, and provide unlimited entertainment as we observe the life around us (Louv 2005, 2014, Wolf 2014). We will no longer lament our disconnect with nature because we will be living in its midst. Our new plantings will fill the gaps between fragmented natural areas, creating biological corridors that reconnect them. If habitat fragments are reconnected, they will support populations that are large enough to withstand normal fluctuations without disappearing. Our new park will not perfectly replicate the plant and animal communities that once existed on these sites, but it will reassemble many of the local relationships between plants and animals that coevolved over the eons and that are necessary for ecosystem function. To be sure, this is an optimistic view of our future but it is also a feasible one and will yield enormous ecological payoffs both for humans and our fellow earthlings.

Does contributing to Homegrown National Park mean you have to give up rock gardening? Not at all! A living landscape rich in productive





Productive landscape

native plants can also include less powerful plants and even plants that are strictly decorative. Informed selection of the canopy and understory trees on your property typically meets the needs of most local wildlife, leaving plenty of room for the perennials and annuals we love so much. Designing a landscape with ecosystem stewardship in mind will not diminish your rock gardening experience; it will enhance it!

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Crecopeia moth caterpillars





An eclectic mixture of troughs.

The Plant Junkie's Guide to Rock Garden Basics

DON LAFOND

ROCK GARDENING ISN'T about trying to grow what's hot now – if you want to be hip grow a fiddle-leafed fig! A typical rock gardener isn't only a grower of plants under 12 inches tall from mountains or deserts, although a true rock gardener will aspire to grow these plants. She is most likely a collector of plants. She will collect plant species that either have a particular interest to her, or more sanely collect plant species that grow well in her garden. Balancing what does grow well in the garden the gardener wants to grow what doesn't grow well in that same garden. And arranging this collection of plants to look like a garden is a rock gardener's biggest challenge. Most of the gardeners I know struggle to do both but the best do both very well. That's what a rock gardener is and what a rock garden can show the world.

As was clear in the last issue I love books and love to recommend them and I would always recommend for you rock gardeners to read a book. A good start would be Geoffrey Charlesworth's *The Opinionated Gardener* and if you like that then there is his second book: *A Gardener Obsessed*. He explained how rock gardeners come to this somewhat obscure but extremely gratifying hobby with wit and humor and you will learn something as well.

There is an idea out there that a rock garden doesn't need rocks. That's true and OK, but how boring. If you don't like rocks in your garden that's fine; maybe you're more of a perennial gardener. Yes, a garden is a place for plants but plants love rocks, and I do, too.

You know you might be a rock gardener when you get an adrenalin rush from seeing the seeming impossibility of a plant growing out of a rock. What you need to do is to make a trough. This is an easy way into rock gardening with just a small investment of time. All you need is a container, sand, and some interesting rocks. What's more, if you live in an apartment, instead of houseplants on the balcony try a trough with some alpine or desert plants. That way it won't be necessary to make room for them in the house, they will be fine outside.

First the container. I believe the trough can literally be anything that can hold sand and rocks. I use everything from eroded rocks with holes in them, old rusty water tanks, rusty steel scrap holders, pots, pans, sewer pipes, and hollowed out logs. Hypertufa troughs are welcome as well. Just make sure the containers don't hold water. The traditional

If it rusts, fill it with sand.





A group of hypertufa troughs

trough is a stone trough. Then because of the scarcity of stone sinks, troughs for gardens morphed into hypertufa troughs. Hypertufa is a manmade substance that mimics tufa, a natural material that is a subject that deserves its own article. I use hypertufa troughs but I also use any interesting container for a trough; tradition be damned.

Second is the growing medium: sand. Although not any sand will do. Don't use mason's sand, that's the stuff that is used to lay bricks and blocks. Not bagged play sand either. What works best is builder's sand or N2S sand. This is sand that has all the rocks from pea size and up sifted out. I have an entire yard of the stuff and it works great. You can also add a bit of compost to the mix if you want, but not more than a quarter by volume. Life is easier if the compost doesn't have weed seeds in it (more about compost later). This mix works great for most full-time- to part-time-sun plants.

If your trough will be situated in the shade this often means you want to grow ericaceous or acid-loving plants and this will require a different mix. It's okay if your yard doesn't consist of acid sand – just use a fine grade of silica sand. This is sand that is used for sandblasting. This will also grow any shade-loving plant whether it's ericaceous or not. Some pits naturally have acid or neutral sand and commercial pits know the pH of their products. Just ask them. Once you locate some acid sand, mix it with sphagnum peat, about $\frac{1}{3}$ peat, $\frac{2}{3}$ sand. These are both acid mediums and will do a good job of growing little woody

Opposite: Antique glazed sewer pipe with tufa, stone troughs in the background





treasures. If you have leaf mold, or some well-rotted wood from an old stump, adding that to the mix works even better.

So now we have a container and we've figured out where it will go in the garden or apartment or allotment. We have filled it with our chosen mix. Now the fun, fussy stuff starts: arranging plants and rocks. It's easier to have all your plants and rocks ready for a trough at the same time. On the other hand all your plants won't die at the same time so you will have to add plants to the trough over time anyway.

As an aside, gardeners must get used to the idea that plants die, possibly more so for a rock gardener because the plants we like to grow come from extreme conditions compared to typical garden conditions. Think of its lifespan with you as a success, rather than its expiration as a failure. Besides, where else will you put all the seedlings you're going to raise from your share of the seedex?

I think the best way and certainly the most enjoyable way to figure out how to arrange the



Industrial terrazzo sink trough during landscaping and (below) finished and planted.



Opposite: Old washing-machine tub ready for planting.



Crevice trough

rocks and plants is to visit the places where you can see the plants you would like to grow: mountains, deserts, woods, and bogs. You can just remember such things, but most of us need to take pictures of interesting vignettes or, if you're an artist, draw them. In your trough you only need to arrange a small vignette of nature and in nature almost any arrangement will be found.

There are a few rules rock gardeners follow. Like don't mix different types of rock, although one side of a mountain could be limestone and right next to it could be granite. Mother Nature can be a fickle girl, and she can get away with it. My advice is fairly simple: save the unusual or the avant garde for the container and copy nature for the plants and rocks. In nature we see it's not unimaginable to



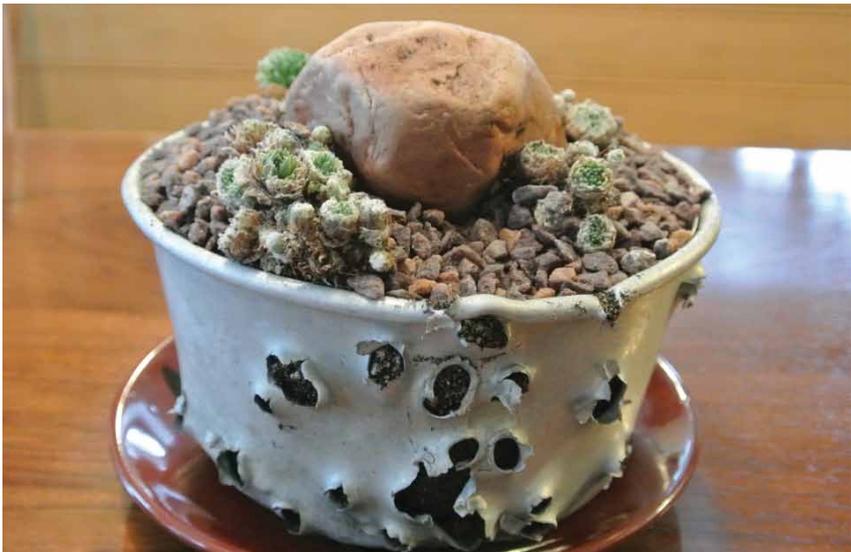
mix types of rock but I would caution, in arranging a trough, not to mix round rocks with angular rocks or flat slabs. I like the old saw that says you should use odd numbers of plants: it holds true with stone as well, particularly if you are only using a few pieces.

My favorite word to describe a good trough is “drama.” Give your trough height, using the stone. You want your trough to sing not whine. Over fill the trough with mix and use the stone to hold the mix in. Pack it down fairly well. As you work at setting the stone in the trough, there may be narrow gaps at the open ends. Fill these open ends with thin pieces of stone or small wedges of angular gravel packed into the gaps. This will stop the mix from washing out when watering. It’s good to have all the stone wedged inside the trough tightly, although sometimes a good stone or a grouping won’t fill the whole container, that’s OK too and can give it’s own sense of dynamism.

Plant your plants as you go, and don’t forget to keep the roots of plants covered when you change your mind about the placement of the plants and rocks. Try to use the same type of rock to mulch the trough as that you use for the bigger rocks. This may involve getting a couple of hammers, some safety glasses, and inviting the neighborhood kids to break up some rocks (just don’t let them turn the rocks to dust). In a shade trough don’t forget you can use interesting wood just like in the forest. Really the only other advice I have is if the rock arrangement looks jarring or just doesn’t feel right, it probably isn’t.

Next time, the Maniac talks about the plants for your trough.

... and your trough can never have too much drainage





Seedheads of *Ligularia* 'Britt Marie Crawford'

Seed Collecting

– a fun way to learn more about plants and increase your garden's biodiversity.

ANNA LEGGATT

Why grow from seed?

Growing your own plants from seed is cheap and fun. Perhaps you will have a new cultivar which you could develop, or just slight variants in colour or size. Garden collected and wild seed will be more diverse than seed from commercial sources – after all, they have to be consistent to sell!

Many plants are not available commercially but specialist collectors or organizations such as NARGS may have the seeds you really want.

Try to find seeds to collect in your garden or in the wild.

You can donate some to the NARGS seedex. Then your seed order will be prioritized and you will have an extra allowance of seeds.

Collecting Seed

Many seeds are biologically fruit. A grain of corn is a fruit with one seed inside. The fruit skin and the seed coat are fused together. A pea pod is a fruit and can be opened to release the seeds – the actual peas. For simplicity, I refer to single-seeded fruit as seeds. I am also ignoring terms describing fruiting bodies such as achene, drupe, follicle, samara, etc.

Remember to **get permission** to collect seeds in the wild and take less than 10%.

Start looking for seeds in mid-spring. Note any splendidly coloured flower or an unusual form in your garden or in the wild. Mark it and come back for seed later on.

Notice how the plant disperses seeds.

Many fruiting bodies just dry and split open. The stiff stalks rustle in the wind or are knocked by an animal passing by. The seeds are jerked out like shaking a pepper pot. These types are easy to collect. Wait until the stems start to dry out and the pod begins to split open. Then carefully place a paper bag over the stem(s) and cut it. Reverse the bag so the seeds drop out into the bag. Leave in a cool dry place till you are ready to clean the seeds.

Some plants, such as *Hepatica*, *Ranunculus*, *Clematis*, just drop their seeds. These may fall off when still green. Touch them gently, holding a container underneath. Ripe seeds drop easily.

Many seeds are dispersed by the wind. Again, check the plants. The seeds are ripe when they pull off with the slightest tug. I find the heads of *Pulsatilla* have a mixture of fertile and infertile seeds. Good seeds are darker and

Some seeds are really easy to collect in a paper bag - just leave them to dry and fall into the bag





Collecting pulsatilla seed by gently pulling on the "tails"

have a stronger "tail". Hold these and again, give a gentle pull.

Animals may disperse "hitch-hiker" seeds inadvertently when their fur snags the seeds' hooks. Collect these in a bag and the seeds will drop out in a few days.

Birds and other animals also disperse the seeds of juicy fruits. In

nature, the fruit is eaten and the undigested seeds are excreted. Don't wait for this stage, (unless you are collecting the expensive Luwak coffee beans). Get there before the animals and pick the just-about-ripe fruit. Open one – the seeds should be hard and won't squash. Clean these seeds quickly – sometimes they will go moldy. (I once had fruit fly larvae eat all the pulp, leaving nice clean seeds. This is not recommended!)

Other plants spread their seeds by explosion. The pods ripen unevenly, causing tension in the walls. Then suddenly the pod splits, sending out the seeds. I once left some nearly ripe *Viola* capsules in a dish. Next morning the closest seeds were a meter away! *Impatiens* has a common name of "Touch-Me-Not." Get children to touch a ripe pod and it wriggles in their hands as it explodes! *Geranium*, *Hamamelis* and many legumes do the same.

Many spring woodland plants are ephemeral. They will germinate the following spring if they are planted immediately. They will go into deep dormancy if they are allowed to dry out. If you are donating some of these, store them damp and keep in the fridge. *Hepatica*, *Jeffersonia*, *Callianthemum* are examples of these.

Check the seed size and see if it fits the pod. Some seeds do not develop and remain small. *Hylomecon japonicum* is an example of a plant that rarely sets fertile seed. The pod looks fat but the seeds are tiny. Then occasionally there is a fat seed reaching the pod walls. Try to pollinate plants like this yourself. Go round with a paintbrush.

Many plants in the daisy family do not have ripe seeds till the fall. Many don't develop properly. Select the large fat seeds.

Don't collect any seeds from a plant that looks sick, or is moldy or has holes in its pods.

Equipment needed for easy seed cleaning:

Several sieves with differing mesh sizes
Dinner plates, preferably white
Clear plastic dip or yoghurt tubs
Rubber gloves
Bowls
Paper towels
Glassine or coin envelopes

Easy seeds will have fallen out into the paper bag. You need to make sure they are free from chaff, undeveloped seeds and bugs. Move them around in a large mesh sieve. Some debris will remain (discard this) and the seeds and small debris will fall through. Repeat with progressively smaller meshes till you have seeds remaining in the sieve. Some pods may need squashing to release the seeds.

Another messy way is to put the seeds on a flat plate and gently blow. Lightweight rubbish and unformed seeds should move away. Then tilt the plate and good seed will trickle down onto another plate. Some times it is easier to use fingers to move the good seeds to one side.

Dust and small particles may be difficult to separate from fine seed. Get a small plastic yoghurt container. Rub it round with your fingers to create some static. Put uncleaned seeds in and swirl around. Tip out. Much of the rubbish will stay behind.

Berries are usually easy. Use gloves. You may be able to squash then out or peel off the skin. Squashed berries can be put in cool water and swilled around. Then the water + skins can be poured off and the cleaned seeds placed on a paper towel to dry.

Put your clean, dry seeds in a paper or glassine envelope, not plastic. Make sure the seeds cannot leak out. Label with your name and the plant name. Record the details.

Important:

Clean your equipment between each kind of seed so there won't be any surprises on germination!

Look at your seeds as you package them. Many have interesting patterns on the seeds coats. Soon you will be able to identify some seeds at a quick glance.

COLLECT SEED NOW!



Linum carianse

Cushion Plants

Part Three: *Linum* - *Pycnophyllum*

GER VAN DEN BEUKEN

Cushion plants are found in a variety of habitats across the world. High mountain passes, cliffs, screes, and steppe country all provide the alpine gardener with plants that form cushions. Some are straightforward to grow, others extremely challenging. In this third installment there are plenty of examples of both of these, a number of which are monotypic.

Linum

In this large genus two cushion-forming species deserve particular attention here. *Linum aretioides* is the more delicate one, growing in western Turkey on schist and in limestone screes up to 2500 meters (8250 feet). Easy to propagate from seeds, this species is, unfortunately, difficult in cultivation. It prefers alpine-house conditions and a well-

drained limy substrate. The flowers are bright yellow and about 2 cm (0.8 inches) diameter. Easier in the garden is *Linum cariense*, a small cushion-forming species, also from Turkey. It grows on limestone slopes and ridges up to 2200 meters (7250 feet). It's a very good plant outside on tufa with winter protection. Like *L. aretioides* it is easy to propagate from seed. The bright yellow flowers of 2-2.5cm (0.8-1.0 inch) appear during late spring.

Lithodraba

Lithodraba mendocinensis is a monotypic species (the only species in its genus) which makes a hard cushion of 20 cm (8 inches) high and about 60 cm (24 inches) wide in the wild. The species grows on the cold and windy, rocky and sandy summits in Patagonia and you can find it up to more than 3000 meters (10,000 feet) elevation. The sessile flowers are white and about 7 mm (0.275 inches) across. It is a perfect alpine house

Lithodraba mendocinensis



subject but I am also very happy to have had a specimen in the garden for many years. The growth is extremely slow and it does not flower. I have never been able to propagate the plant from cuttings.

Loiseleuria

Loiseleuria procumbens is a mat-forming species, again monotypic, from Arctic regions and the higher parts of the Alps growing on open, stony and peaty slopes. It is not an easy plant in cultivation but if you give it the right acidic conditions in the shaded garden it is worth giving it a



Loiseleuria procumbens

try. It takes a very long time but it's possible to propagate young plants from seeds. A faster way is to take off the rooted offsets and to pot them individually. The pink flowers are about 5 mm (0.2 inches).

Morisia

Morisia monanthos is an ideal plant for the rock garden. Arguably this is not a cushion plant but a rosette-forming species but it is a handsome plant which can form a cluster of rosettes. It prefers sunny and well drained conditions. Endemic to Corsica and Sardinia, this monotypic species grows on sandy shores as well as inland. It is spectacular and very easy to propagate from root cuttings. It is also possible to take

off some rosettes and use them as cuttings. Cold hardiness is not a problem but sometimes it suffers from long wet weather. The flowers are bright golden yellow and stemless. The form 'Fred Hemingway' has larger flowers.

Myosotis

There are many species in this great genus but one stands out: *Myosotis pulvinaris* from the Pisa range in the mountains of Otago on the South

Island of New Zealand where it can make a wonderful cushion with silky hairy leaves and stemless crystal-white flowers. The plant can reach 10 cm (4 inches) diameter in nature but in cultivation there have

Morisia monanthos

Myosotis pulvinaris



been cushions of more than 20 cm (8 inches) displayed at plant shows. It is easy to propagate from cuttings but needs care afterwards. Mold can kill the plants in a few days. This means that it always needs overhead protection and to be grown in a very well-drained low pH substrate. Cold hardiness is not a problem.

Nassauvia

During all our trips in Patagonia we have seen several species from this genus but the one which has stolen my heart is *Nassauvia lagascae* var. *globosa* with its large round white-to-pink inflorescences up to 5 cm (2 inches) across. This variety lives in the southern part of Patagonia, but the species occurs in Argentina and Chile in many places on volcanic lava and in scree up to altitudes of more than 4000 meters (13,200 feet). It is a very attractive species with more or less open rosettes forming a hard cushion. Cultivation is difficult in our Dutch climate and the results therefore are often open cushions unrecognizable from plants in nature. An open well-drained gritty substrate is a must and it needs to be grown in deep pots protected from rain and snow. Propagation is from seeds if available. Two other attractive species are *N. juniperina* and *N. ameghinoi*, both from the dry steppes in Patagonia.

Nassauvia lagascae var. *globosa*





Nototriche compacta

Nototriche

This South American genus is mainly from the high Andes in Argentina and Chile northwards to Peru. During our expeditions in South America we found the silvery-white cushions of *Nototriche compacta* with stemless white flowers in the Cordillera Santiago on pure lava rock at an altitude of 3400 meters (11,200 feet). *Nototriche meyenii* we met on fine sandy screes of the Volcán Taapacá in northern Chile at an altitude of 5300 meters (17,500 feet). It is a wonderful species with hairy leaves and big white stemless flowers. A bit lower at 4200 meters (13,850 feet) on the shore of the Lago Chungara was an unnamed *Nototriche* sp. growing in pure sand. Not as attractive but interesting to



Nototriche meyenii (above)

Nototriche macleanii (below)



see the difference in habitat. As far as I know there is just one species in cultivation, namely *Nototriche macleanii* which is endemic to the south of Peru. It's a really stunningly decorative plant with large violet-blue crocus-like flowers sitting on the grey cushion. The plant is completely hardy but needs all-year protection from rain or snow. The substrate I use is a mix of lava sand mixed up with perlite and a very small amount of peat. Low pH is a must. The plant makes new rosettes that can be used as cuttings. This is the only way of propagation as it does not produce seeds in cultivation.

Oreopolus

Oreopolus glacialis (syn. *Cruckshankia glacialis*) is a mat- or cushion-forming species endemic to the south of Argentina and Chile. The plant grows with a long taproot in sand and volcanic conditions and can

Oreopolus glacialis



sometimes be more than 1 meter (3 feet) across. We have seen this plant at low altitude in Tierra del Fuego but also in the north in the province of Mendoza at more than 3000 meters (9900 feet) elevation. The flowers grow in stemless clusters in a colour range from bright yellow to pale yellow or cream. As far as I know it is not in cultivation but sometimes it's possible to purchase seeds.



Ourisia microphylla

Ourisia

There are many attractive species in this genus but I have picked out the beautiful *Ourisia microphylla* which makes a neat hairless cushion with wiry branched stems. The pink flowers of about 1 cm (0.4 inches) across grow on short stems in great profusion. The plant is common in the southern Andes of Argentina and Chile. The habitat is more or less like what I know from the dionysias in Iran – crevices in vertical overhanging cliffs just receiving the sun for a limited period. I tried to grow the plant in the past as often as seeds were available. Germination

rates were very good but the problems started at a later stage, during winter, when the young seedlings died. Despite this it seems a challenge worth undertaking.

Perezia lanigera

Perezia

Like *Nassauvia* this is a genus from the Asteraceae and I would like to highlight *Perezia*



lanigera: an attractive and neat cushion-forming subshrublet sometimes more than 30 cm (12 inches) across. White flowerheads are sessile and solitary with a pink centre. It's a plant from the southern Patagonia steppe and prefers dry sandy conditions. I never tried to grow it outside but in the alpine house it can make a nice display in a pot. The substrate I use is a mix of fine lava sand mixed up with a little peat. The plant is completely hardy and easy to propagate from cuttings. There are other species that are likely to be challenging.

Petrocallis

Petrocallis pyrenaica is another monotypic species, this from the Alps, Dolomites, and Pyrenees. It grows on limestone rocks and in limestone screes. It's a densely cushion-forming species with pink or sometimes



Petrocallis pyrenaica

white flowers. The species looks similar to a *Draba* (except for the color) and can be used as a scree plant in the rockgarden but is more suited to a trough. It does not need any extra care during winter as it is completely hardy but good drainage and a bright sunny place are essential. Propagate by seed as soon as ripe or, if possible, by cuttings inserted in sand during summer.



Petunia patagonica in the Patagonian steppe (above) and in cultivation (below)



Petunia

Petunia patagonica (syn. *Nierembergia patagonica*) comes from the dry cushion steppe flora in the southern part of Santa Cruz and is a cushion-forming plant to 15 cm (6 inches) high and sometimes up to about one meter across. The flowers are up to about 2 cm (0.8 inches) in a colour range from pale yellow to purple but flowering sometimes skips a year and it can be hard to flower in cultivation. At this time I have three different forms as part of my collection but all without blooming. This is puzzling as I received two of these forms from Carole Bainbridge in Scotland and I have seen pictures of these plants completely covered in flowers. The reason could be the different climatic conditions. The substrate I use is sandy and well drained. With cultivation in the open garden I have no experience but I understand that it is quite possible in a sandbed although again flowering can be a challenge. Propagation is by cuttings.

Phlox

This is a very attractive genus for the rockgarden and alpine house and there are so many nice species. *Phlox albomarginata* is a compact species from Montana and Idaho and grows on exposed rocky slopes. The slightly fragrant flowers are white or rarely pink. The white form I have growing now for the third year in the alpine house was grown from seed. I do not have any experience of growing it outside in the rock garden. Propagation from cuttings is disappointing.

Phlox albomarginata



Another species for my alpine house is *Phlox bryoides*, a very distinctive species with leaves that remind me a bit of *Cassiope*. With me it needs protection all year in the alpine house. This species grows in Colorado on dry clay and gravel slopes.



Phlox bryoides

The *Phlox douglasii* cultivars are very popular open garden mat- or low cushion-forming plants and I have two of them in my collection, 'Ochsenblut' with scarlet red flowers and the most beautiful 'Boranovice' with delicate salmon-pink flowers. These plants do not need any protection and are very welcome plants in a limestone scree for a rich color display in full sun. Propagation from cuttings or division during summer provides you an easy way to acquire young plants.

Phlox 'Boranovice'



A very welcome hybrid species for the rock garden is *Phlox x rugelii*, a natural hybrid between *P. amoena* and *P. divaricata*. The plant needs space as it makes mats of more than 50 cm (20 inches) across and is covered during spring with purple-blue flowers. Another beautiful species I am very fond of is *P. kelseyi*.



Phlox x rugelii

Primula

This is a huge genus divided up into 32 sections. My feeling is that the only species eligible as a cushion (apart from some unobtainable Himalayan species) is *Primula allionii*. In the wild it is found in the Maritime Alps in southern France where it grows on limestone cliffs. The species is very variable and the flowers have a variation in color from white to almost red. *Primula allionii* is frequently seen in the UK on the show table where it can make a great display. Numerous cultivars have been named, many of hybrid origin with other small European species such as *P. hirsuta*. Just two cultivars are part of my plant collection, *Primula allionii* 'Tony' with crystal white flowers and 'Lismore Treasure' with bright purple-red flowers. I have never tried these plants permanently outside and keep them in the alpine house just to protect them from getting wet. Frost does not harm them at all. They

Primula allionii cultivar



need a well-drained compost. The propagation of these plants is easy by dividing them. After taking the parent plant out of the pot you can take many offsets, already rooted, and pot them separately. Mold protection is a must.

Pterocephalus

This is a genus that is found in the Mediterranean, Central Asia and the Himalaya. In the past I grew *Pterocephalus pinardii*, a mat-forming species from the limestone screes and rocky slopes in Turkey with pinnatisect and tomentose leaves. The pink flowerheads up to 3 cm (1.2 inches) in diameter appear during summertime. Cultivation is not difficult at all providing the plants have the brightest and sunniest place in the rockgarden. Propagation is from seed.



Pterocephalus pinardii

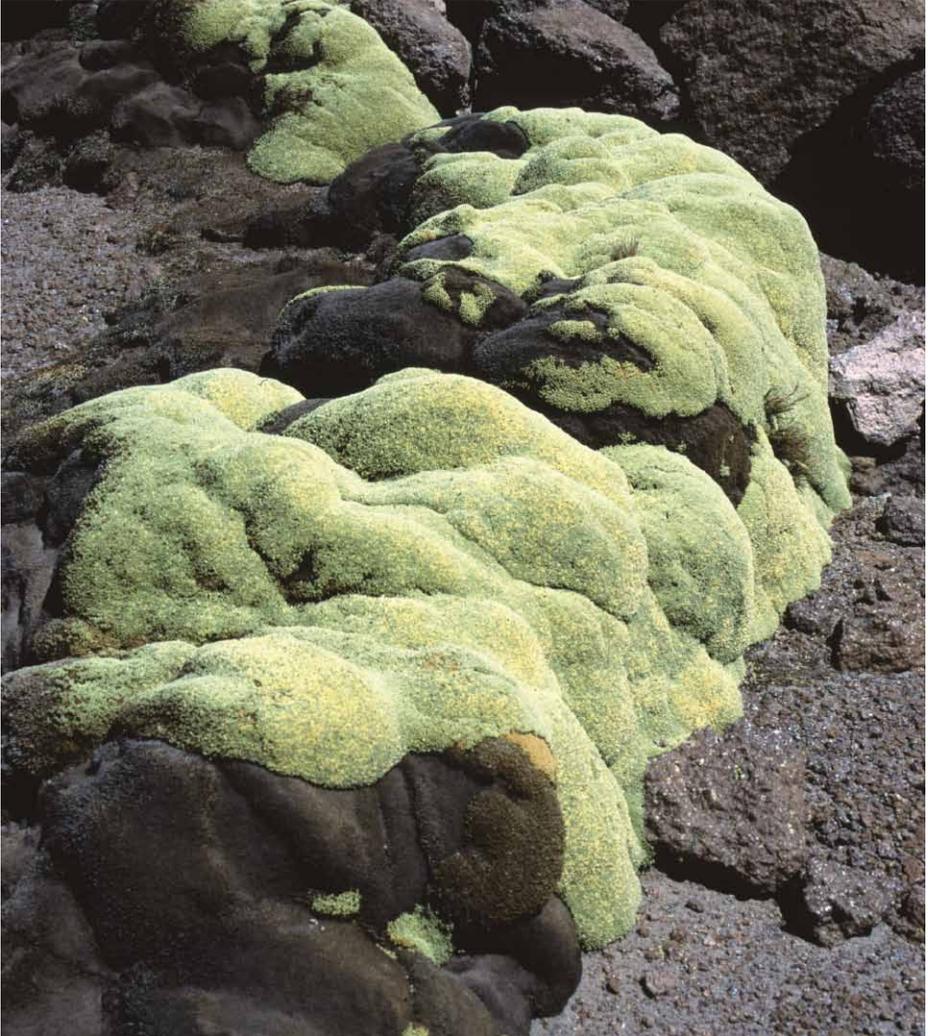
Pterocephalus spathulatus from southern Spain is another very desirable species, this one best in a well-ventilated place in the alpine house. It's another mat-forming species with grey woolly leaves and big deep pink flower heads. A well-drained soil is necessary and propagation is most effective from seeds but you may get results from cuttings.

Pycnophyllum

This is genus from the Andes that is, as far as I know, not in cultivation. We found *Pycnophyllum bryoides* and *P. molle* several years ago in northern Chile on 5200 meter (17,200 feet) high slopes on Volcán Taapacá. *Pycnophyllum bryoides* is a cushion-forming species with

minute rosettes, turning from green to orange and insignificant pale yellow, while *P. molle* makes a soft and smooth cushion made up of tiny rosettes and can cover itself with tiny pale yellow flowers. Both species were growing together in barren lava sand with *Azorella compacta*.

Pycnophyllum bryoides



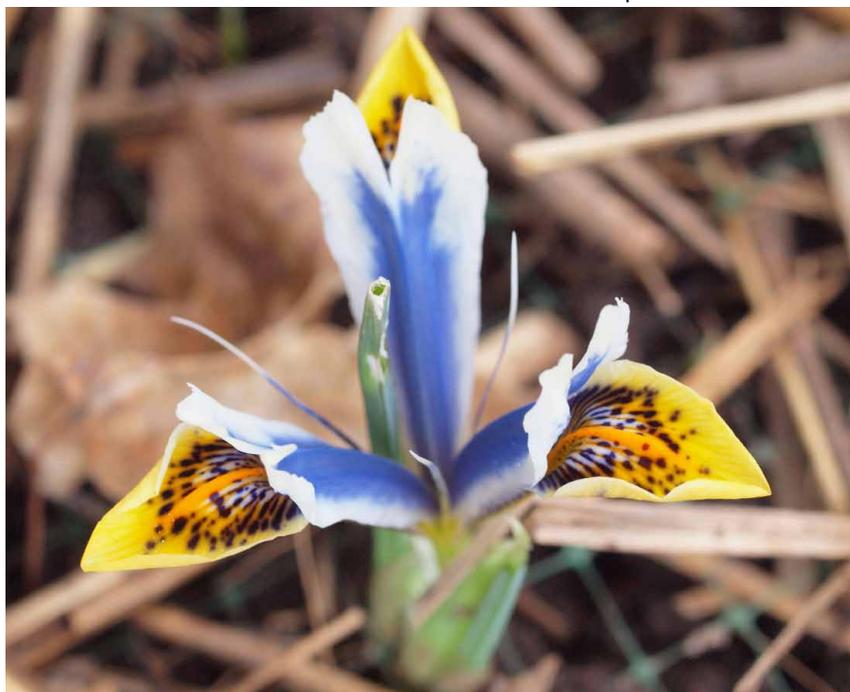
Reticulata Iris

– Getting to Market

ALAN McMURTRIE

I HAVE BEEN working with Reticulata *Iris* for close to 35 years. Thirty-two years ago (1985) I was so keen that I went plant collecting in Turkey with a specific goal of collecting a diploid form of *Iris danfordiae* so I could use it in hybridizing. I was inspired by E.B. Anderson's *Iris* 'Katharine Hodgkin', which is a cross between *I. histrioides* and *I. winogradowii*. Although both parents are $2n=16$ they must be genetically diverse since, like crossing a horse with a donkey and getting a mule, 'Katharine Hodgkin' is a sterile dead end. In the case of *I. danfordiae*, which turns out to be $2n=18$, the commercially available bulbs are triploid. At the time, the only way to get a fertile form was to go to Turkey and collect it myself. I wondered if I could create something interestingly different by using it as a parent. Little did I know where this would lead me ...and that journey is continuing, as you can see by

Iris 'Tequila Sunrise' (09-LE-2)



'Tequila Sunrise', which bloomed for the first time in 2016. I never would have imagined anything like this was possible. In case you don't realize, this is an incredible color break. It's almost like someone took parts from two different flowers and glued them together. I hope people like it as much as I do. The Catch-22 is, it will be about 12 years before there are enough bulbs to start sales. The good news is it exists and does reasonably well. It's a touch on the small side at 45mm (1.75 inches) tip-to-tip, but I have put it into a lab for conversion to polyploid, of which a tetraploid version could be 15-25% larger with slightly thicker petals. Typically I don't come up with a name until we're close to introducing a variety, but in this case 'Tequila Sunrise' just seemed to fit.

During my travels in 1985, I also wanted to collect some genetically diverse material to try to open up the range of possibilities. The diversity of material available at the time was very, very narrow. One that turned out to be critical to my work is the Çat ANMc2175 Retic (which is probably worthy of specific status). Amazingly it turns out that the Çat Retic, *I. danfordiae*, and *I. sophenensis* are all $2n=18$. The Çat Retic has been key for teasing out orange, as well as brown accents (actually dark purple). I had wondered if there might be more $2n=18$ species, but nothing had surfaced until now; or at least none that I realized. It has just come to my attention that 'Halkis' is very likely $2n=18$. Years ago, Brian Mathew kindly gave me some of his BM11026. It seemed quite similar to the Çat Retic, including producing rice-grain size bulblets, and was found some 80 km (50 miles) to the south. However, results of using it in hybridizing with all kinds of crosses were very puzzling. Some seeds were produced over the course of several years, but no plants bloomed. As a result I eventually stopped paying it much attention, and now unfortunately it is gone.

In 2015 I saw Norman Steven's collected Adiyaman Retic for the first time (in Holland). Its coloring was very intriguing. If you didn't have glasses on to see details, you might wonder if you were looking at *Iris pamphylica*. I got to see it and its bulbs up close in England early

Norman Steven's Adiyaman Reticulata



in 2016 and was very pleasantly surprised to see it produces rice-grain bulblets. Could it be $2n=18$? If it is, wow, imagine the possibilities...

I now have 2 other collected Retics from Turkey that produce rice-grain bulblets. Both are purples. They would have bloomed here in 2016, and I completely ignored them; they were just purples. I probably thought they were simply some of my older uninteresting $2n=20$ hybrids. What made me sit up and take notice, was that when I replanted them, I saw they had bulblets. Now I kick myself for not paying attention and hybridizing them.

What I'm looking for is genetic switches, so to speak, to turn on and off enzymes that affect chemicals in a flower's petals, and thus determine what wavelengths of light are reflected back to our eyes. If two plants have blue flowers you can really only expect their children, and their children's children, to also be blue (with some amount of variation in the shade of blue). It's when a blue is crossed with a yellow that things begin to open up (e.g., *sophenensis* x *danfordiae*). You won't see this in the first generation (the F_1 generation) – they are all “just blues.” It's in the second generation that white is possible – blue turned off so to speak, and yellow turned off, revealing an underlying pattern which I refer to as “blue accents” – just as happened in 1999 when ‘Starlight’ (94-HW-1) first appeared. Now something so revolutionary is passé. I have lots of very lovely whites. I should point out it took 10 years to see the results of those two generations, and fortunately I was smart enough to realize I should be intercrossing the F_1 generation.

The reason for wanting more genetic diversity is to open up the range of expression to be as wide as possible. Put simply, if I were only working with *danfordiae* and *sophenensis*, there is no way that I would have been able to create ‘Tequila Sunrise’. The Çat Retic made all the difference. In truth, of course, without all three, ‘Tequila Sunrise’ would not be possible.

It is also about getting at genetic switches to allow expression refinement. I have yellow and I have pale yellow, but what about other shades of yellow to enable a wider color palette; e.g.: when mixed with blues and purples. This for example, affects the range of browns you can get. Currently browns are just dark browns. Up until 2016, hybrids showing that orange was possible were all very similarly coloured (i.e. “warm yellow” tending toward apricot/cantaloupe). Yes I want, and will eventually get true orange (and most importantly, one that is sunfast), but it would be nice to mix the “warm yellow” with various light yellows. Of course it would be really quite something to eventually get pink, just as we now have in bearded *Iris*. Strange to think that after a number of years we'll likely take it for granted and be saying, “well of course.”

As to what expressions will look best is a whole different matter.

Right now the key is to make it possible. Then I'll see where that takes me. One of my current goals is to create a white with cherry accents (i.e., purple accents).

Back in fall 2004 I wrote an article for the *Rock Garden Quarterly* titled "Reticulata Iris: Creating A Rainbow." You can read it by going to the NARGS website <www.nargs.org> and clicking on Publications (bottom left on the home page). On page 281 of that issue (vol.62 no. 4), bottom right, you will see a picture of 98-NP-4. It's taken more than 10 years, but you can now, at long last, buy 'Eye Catcher' and 'White Caucasus', page 279 bottom left, is also available. 'White Caucasus' is a

lovely pure white Reticulata. It is late blooming so it goes nicely with 'Eye Catcher', which is early blooming. In extremely limited supply is 'Orange Glow' (98-OO-1) page 282 top left. 'Sea Green' (97-CQ-1) page 280 bottom left, which got an RHS Award of Merit in 2015, is available also in very limited supply. 'Down To Earth' (94-AT-2) is pictured on page 280 top



Iris 'Eye Catcher' (98-NP-4) - notice the multipetal flowers

right. Incidentally, 'Sea Green' was rejected by three bulb growers! Fortunately the stock, along with several others, was saved by John Amand and they are currently being grown for John by the grower who has the rest of my hybrids. I mention the seedling numbers after each name because they are used as the primary identifier on my website <<http://www.Reticulatas.com>> where you can see parentage, siblings, and progeny:. You can probably guess that the first 2 digits are the year of hybridization. The two letters are the planting order, and the last digit is typically the blooming order. 'Eye Catcher' and 'Orange Glow' have interesting stories that will be revealed in a future article.

My goal in writing that article in 2004, as well as many others for various societies, and giving talks to a couple of NARGS chapters, was letting members know that something wonderful was happening! Reticulata *Iris* were no longer just blues and purples. The difficulty

is that it takes 10 years or more to go from one flower to more than 40,000 (all sizes). 'Eye Catcher' bloomed for the first time in 2003; so there was just one flower in the whole world. Half a dozen small bulbs were sent to Holland that fall. In 2004 there were 2 flowers, and a few more bulblets were sent to Holland. Eleven years later 9,500 were sold, followed by 47,000 in 2016! Plus there were unfilled orders for 10,000 more. As a result of the way orders came in we oversold, so only 26,000 will be available this year. Given the demand, the aim is of course to build the stock, so we need to cut back sales a bit in order to make that happen. One fascinating thing about 'Eye Catcher' is it tends to have extra flower parts, which fortunately adds to its beauty. I don't believe they are consistent from one year to the next.

I want to dispel any illusion you might have about my getting rich off the sale of my hybrids. You see the large numbers, and you see what 10 bulbs retail for in nursery catalogs, or what a pot of flowers in bloom costs. Well it's not me or the grower who are getting rich. As with many farm goods, the price a farmer gets is a lot less than what you pay. A

Iris 'Scent•sational'



retailer can sell the bulbs for half price and still make a profit. Plus there's a middleman looking after packaging and distribution.

In case it isn't obvious, the reason for working with the Dutch was to make my hybrids available to as wide an audience as possible. Holland has ideal growing conditions for *Reticulata Iris* (the long growing season gives excellent bulb regeneration), plus they have a great distribution system that extends worldwide. The idea, once I started to get some interesting hybrids, was to earn a bit of money and reinvest it in polyploids. I also hoped there

would be some left to pay for trips to Holland, to see my hybrids in the field and to liaise with growers.

For the grower there are upfront costs to build the stock over the 10+ years. These start off small. For quite a few years the work is done by hand. Typical *Reticulatas* increase at a rate between 2.1 and 2.4 times per year.



Iris 'Spot On' (87-DQ-1)

Once sales start, other upfront costs come into play such as over €2,000 for Plant Breeder Rights, which protects both the breeder and grower(s), plus the registration cost. The grower takes on a fair bit of risk figuring out how large to build the stock, as well as set prices. In recent years wholesalers/exporters like to wait as long as they can before placing orders with the grower. That way they aren't left holding unsold stock [the grower is]. It can mean that growing costs are €3200 and only €1200 worth of bulbs are sold, for a net loss of €2,000. So in spite of selling 26,000 bulbs you lose money that year – and you can't start paying down the upfront costs. This is where it becomes critical to tightly control stock vs. demand. It is no good if you have a customer buying 300,000 bulbs of a variety one year and none the next!

Back in 1997, I started working with a Dutch grower who stopped off in Toronto, Canada, to see my *Reticulata* hybrids. He and his wife were on their way to California to look for *Calochortus* during bloom. At the time the grower wrote up a Test Agreement, which we signed. I sent him 2 bloom-size bulbs each of 21 of my hybrids including 'Scent•sational' (87-BB-1), 'Spot On' (87-DQ-1), and 'White Caucasus'.

A couple of years later two other growers came onboard independently. They knew about each other. The idea, if it turned out they were interested, was to partner with them and give them an opportunity to introduce more of my hybrids in the future, and that we would all work together as a co-operative. For bulbs it's important to have at least two growers of a variety in case of crop failure [this actually happened in 2016 due to flooding at the end of the field a grower rented and where he had planted my small stocks – it didn't drain properly and we didn't have backup growers]. That way wholesale customers can still be supplied with bulbs for their retail

customers (orders won't be filled 100%, but certainly more than if there was just one grower).

In Fall 2004, one grower sent everything back in a large box. The other turned the bulbs he was testing over to the original grower. As a result, I started working with a middleman. Yes, he would share in the profits, but I needed a backup in case the original grower also decided



'Sea Breeze' 'Mars Landing' 'Splish Splash' 'North Star' 'Sunshine'

to call it quits. As it turned out, this was very prudent – it meant I was able to introduce 'Sunshine' (00-HW-1) in 2015, and 'Mars Landing' (00-KV-3), 'North Star' (00-BC-1), 'Sea Breeze' (00-KN-5), and 'Splish Splash' (00-KN-6) in 2016.

Since 2005, some of my hybrids have been available through Janis Ruksans in Latvia. Initially these were primarily my F₁ *sophenensis* x *danfordiae* "Just Blues." *Iris* 'White Caucasus'



They had been rejected by two Dutch growers, but I thought some enthusiasts might be interested in them. You will eventually hear a bit more about this in another article, but for now the key thing is, from my point-of-view I wouldn't say I was successful even though I eventually had Janis release some important varieties that the Dutch rejected (in total Janis introduced 37 of my hybrids). It didn't appear

to me that people were sitting up and taking notice.

In 2009, I started noticing some problems with the original Dutch grower who didn't seem to be properly testing my hybrids. Other problems about sales then led to a legal battle that was finally concluded in fall 2014.

In 2013, the middleman I'd also worked with dropped out and I started working directly with the grower who had been growing my hybrids for him. However, not everything was so problematic. In that same year I met the grower who now has almost all of my hybrids – Jan Ligthart, a tulip hybridizer. He understands handling small stocks. He has had all my smallest stocks since 2013, along with 'Eye Catcher' and 'Holland Glory' (98-YS-1) [a future introduction from one of my front gardens] since fall 2014. Having bought out the original grower I was concerned about ensuring there were sufficient sales to pay growing costs. So I put in efforts to contact wholesalers and retailers to try to get sales. I'm glad I did. In January 2016 the middleman's grower announced he was closing his business and I would need to find another grower for the 2016/17 growing season. Fortunately Jan was willing to help me – growing an additional acre is a bit of an ask, given all the things he already grows.

Let's take a step back. What does it take to get a plant to market?

First, you need to find or develop something special

Second, you need to find a grower and build up stock

Third, you need to market the variety and build sales

For marketing I need to get you, the alpine enthusiast/home gardener interested; but what I really need first is retailers carrying the bulbs so you have a convenient place to buy them. Unfortunately the bulb market seems somewhat limited in the United States. It can appear that people are largely just looking for cheap bulbs; at least that's the way a lot of companies seem to lean. I like a bargain as much as the next person, but there's no way after building up stock for 12 years, paying to get Plant Breeder Rights, etc., that the bulbs can be sold cheaply until a lot later when hundreds of thousands are being sold each year. I do know in one case the variety was being sent over by air, rather than in the retailer's normal, less expensive container shipment. Overall the grower handles tens of millions of bulbs in a short period during the summer, having to dig, clean, dry, sort and count the bulbs and ship them off to customers. With all those bulbs to send out they don't want to be handling a lot of small packages; but it should be able to do some.

Roughly 30 hectares of *Reticulata Iris* have been grown in Holland the past few years, down from 45 hectares in 2005. I keep hearing prices are not good, which perhaps means a further decrease is imminent, though 2016's wet weather may have "dampened" the bountiful crops

of recent years. Preliminary numbers seem to suggest 25 hectares were grown for 2015/16. My understanding is 70% of the bulbs are used for forcing and potting (green sales) [I believe mainly in Europe], and 30% are sold to the nursery trade (dry sales). I'm hoping my hybrids will revitalize the market. It's just a matter of building stocks, and at the same time building demand.

One thing I hear is that 'Spot On' and 'Scent-sational' are just purples. "If people want a purple they'll buy something cheap like 'J.S. Dijt' – they don't care that yours has special markings." Indeed 'Spot On' and 'Scent-sational' can be looked upon as purple; I understand that. They were two of my first hybrids – from 1987 seed ('Spot On' involves my collected *I. bakeriana* ANMc2275). 'Spot On' did get an Award of Merit in 2016, and 'Scent-sational' did get a Preliminary Commendation.

From a marketing perspective let's look at a variety that hasn't yet been introduced, but that should do very well: 'Pristine' (03-FQ-1). It has been in Holland for 6 years. We roughly have 10 meters of it (planting width of each row is about 1.25 meters). A guess is it will be introduced in 2020, with a small quantity being sold in 2019 (i.e. at one outlet). As you can see in the photo it was awarded a Preliminary Commendation in 2016. So I am starting to put effort into showing it and trying to make people aware that it is coming. What will help 'Pristine' is that we are establishing demand for 'Eye Catcher'. In spite of the lower volume of bulbs available it appears we will have more customers for 2017; in the short term they'll be getting fewer bulbs than they'd ideally like, but if they can get their customers interested, it will be good for everyone involved.

My hybrids aren't perfect; remember they're not far from the species level. I

Iris 'Pristine' (03-FQ-1)
2016 Preliminary Commendation





Slowly but surely stocks are being built up (here in 2014) in Holland

say this in part because the commercial triploid form of *Iris danfordiae* is notorious for “shattering” (the large flowering bulb of one year succeeded by a mass of tiny bulblets the following year), and I do find *I. sopherensis* benefits greatly from being moved every few years. Many of my hybrids are good doers and I think benefit from being bred in the harsh Toronto environment here in Canada, compared to in Holland. They will form clumps if given a bit of space. I do recommend planting some bulbs in a second location in case something happens to the original planting. Key is ensuring they have a long growing season in order to regenerate bulbs that are large enough to bloom. An extra week of growth can potentially make them one size larger (or at least that’s the amount of increase for tulips). If you replant my hybrids with *I. danfordiae* parentage and move their bulblets closer to the soil surface the bulblets will grow into bloom-size bulbs in about 3 years (2 years in Holland). Retics don’t mind water in spring, but it’s not good if they are sitting in it. Good drainage is important, which can easily be accomplished by planting in a raised bed. It can also be as simple as dumping a wheelbarrow of soil on top of an existing garden. If you do have problems, try digging the bulbs right when the leaves are starting to die down, and storing them in netted bags hanging from the rafters of a garage. Then simply replant them in the fall. I now believe this method would have been the savior of BM11026, as it has been for *Iris sopherensis*. I am attempting to rescue my *I. danfordiae* ANMc2325 this way. A bulblet has been moved to the main garden. Assuming it’s big enough, I will start storing it in the garage in 2017.

Conclusion

I’m passionate about Reticulata *Iris* because of what I’ve been able to accomplish. Each breakthrough encourages me to do more. This is a

hobby; something to be enjoyed. It's fun to go to London, England, and see my hybrids on display, and to see them in the field in Holland. What's not fun is the problems I've had needing to ensure there are enough sales to pay growing costs. It's discouraging to see some varieties losing money (a marketing issue). I'm simply trying to take my success to the next level, so you too can enjoy them. There have been times I've almost wished I had never bothered. It seemed just one more hurdle then everything will be fine. But then there's another hurdle, and another...

Rock garden enthusiasts love pure species, but sometimes those species are very difficult to grow in our gardens. This is where a little hybridizing between species can help to make plants that are more robust. If I can create something amazing, that's easy to grow, then why not? We should be encouraging other people to enjoy alpinines. If people give it a go and many of their plants die, they're simply going to give up. In a sense all I'm doing is giving Mother Nature a helping hand. If *Iris danfordiae* and *I. sopenensis* were to come together in the same valley in Turkey, then many of my hybrids would be the result. It is also fascinating to wonder how the various species came into existence in the first place.

It's good to be able to tell you my hybrids are, at long last, starting to become available. And, I've got a lot of really nice things in the pipeline. As a starting point check out: McClure & Zimmerman, Odyssey Bulbs, Van Engelen, White Flower Farm, and Jacques Amand International (biggest selection; parcels are distributed within the U.S. so you don't have to deal with any paper work). I don't know what each of these

This was my third year at the Royal Horticultural Society early spring show in London. My hybrids were on display at the Jacques Amand stand, including ones to be released in coming years



companies will be offering so do also check back in 2018. As I like to say, "It's a matter of luck, understanding science, a bit of intuition...plus lots of patience!"

I could never have imagined what I've accomplished was even possible. I wonder what the future holds? The good news is I've got 5 years worth of seed in the ground, so a lot of exciting things are already on their way.

Picture for a moment a bed of seedlings with buds coming up, ready to bloom for the very first time. To paraphrase Dave Bowman from the movie *2010: The Year We Make Contact*, "Something wonderful is going to happen." Indeed, several times each bloom season when a special hybrid opens for the first time, it brings a very big smile to my face and I think, "Yes, this is what makes all of the effort worthwhile" – the beauty of nature. The Dutch would say, "Alan, you have too many." To me, "Variety is the spice of life."

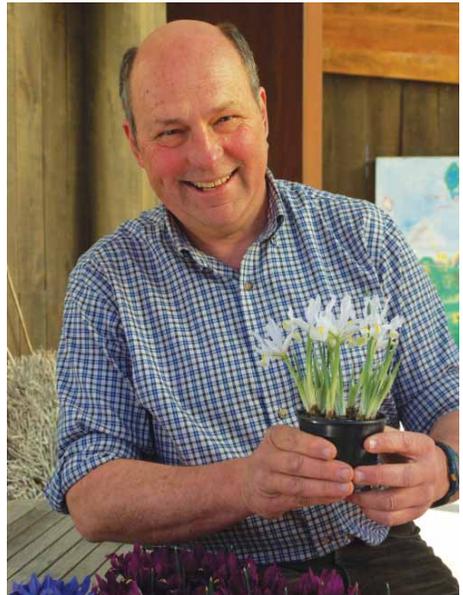
Check out <www.Reticulatas.com> to see my hybrids, their parentage, and their siblings. I don't have bulbs for sale: it is an informational site, where you can also read all of my writings. And you can skip over to see some of my Juno *Iris* hybrids, a few of which have been available through Janis Ruksans.

I do hope I am successful and a few of my hybrids make their way into your garden.



Jan Ligthart had a display of his tulip hybrids along with some of my Reticulatas at the 2016 Lentetuin (Dutch for "spring garden") Show in Breezand, Holland. Note 'Lilac Beauty' at the center.

Alan McMurtrie holding a pot of 'White Caucasus'





Bookshelf

ROCK GARDENING:
REIMAGINING A CLASSIC STYLE

Rock Gardening Reimagining a Classic Style

Joseph Tychonievich

2016, Timber Press.

ISBN-13: 978-1-960469-587-8

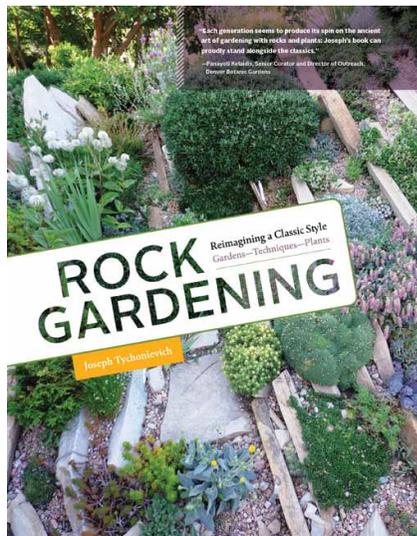
Hardcover: 296 pages, 243 color photos
9 x 7½ inches.

THIS IS A book with ambition. Its stated intention is to reimagine a classic style and through its three parts it considers just that. Its target audience is most obviously the gardener who might be thinking about a rock garden, who has seen or imagined a rock garden, but is still at the stage when they need example and inspiration. But it has things to say to all of us. In each of the three sections of this book - gardens, techniques, and plants - the author attempts a broad survey of the field. Nowhere is this seen more effectively than in the survey of gardens.

The first of the three sections of the book, Gardens, surveys ten rock gardens from across Britain and the US. These gardens, the author contends, epitomise various

approaches to rock gardening and each offer insights and opportunities. And the gardens are certainly varied.

Although at heart these are small gardens, personal gardens, the tour opens with Branklyn Gardens in Perth, Scotland. This was a personal garden created in the 1920s and is now managed by the National Trust of Scotland but it is 2 acres, hardly small for many city dwellers. But it's hard to disagree that it has an intimacy which grand public rock gardens inevitably lack. However, the second garden is the much smaller idiosyncratic



Edwardian rock garden at Aysgarth, North Yorkshire, England, created over a hundred years ago where the visitor is brought face to face with a startling extravaganza of rocks assembled into what could be thought of as a fairy tale rock garden and all on a site just 0.14 acres.

Subsequent visits are to Ev Whittemore's North Carolina garden, short on rocks but clearly a rock garden; Glenn Shapiro's UK rock face location; Helen Nelson's garden in Denver, Colorado, where we are shown some beautiful European treasures in her "jewel box of a garden" rather than the lewisias which we are told "seed around Denver gardens like weeds." In Meford, Oregon we are shown two gardens: Phyllis Gustafson's with her strongly rock-orientated garden with outcrops built by Josef Halda, and Kathy Allen's with her glorious extensive gravel-covered berms. Near Edinburgh, Scotland, we see Stella Rankin's spectacular garden, in Manhattan, New York, Michael Riley's rooftop garden; and finally, in Cliff Booker's garden in Lancashire, England. From each of these, key headline recognitions are picked out to bring away and discuss. It's a wide range of gardens but it also makes you aware of just how every rock garden can provide insights. And it's the commentary as much as the gardens themselves that makes the section so effective.

Part two, Techniques, deals with the options available for the construction of the rock garden. From style to practicality this section deals with the creation of the rock garden. Rockeries, screes and moraines, rock

walls, and crevices are allied to a valuable consideration of soil types and the constituents of the rock garden soil: sand, gravel and the like. This then provides the rock gardener with the recipes for the superstructure of their garden. There is consideration of containers, from making hypertufa troughs to upcycling old containers, and there are two further sections on climate and on propagation. The section on climate is well-argued and wide-ranging with hardiness, heat and cold, rainfall, light levels, humidity all getting discussed with even the issue of alpine houses getting a look in.

The final part of the book is about plants - what the whole book has led to. And here we see the breadth of the new rock garden with the selection of plants that the author concentrates upon. Cacti and conifers are there alongside cyclamen, irises, and tulips, daphnes and hostas, penstemons and lewisias.

If anything the book is weighted towards British classicism over North American radicalism. Just as half the gardens are American and half are British, the selection of plants also reveals that this is a book that is as appropriate to the European gardener as the North American one.

This is a book built around the author's personal experience; the admissions of failure or embarrassment contend with sharp observation and an over-arching intelligence. This is a book where enthusiasm shines through. Whether experienced wrinkly or hopeful newbie this is a book that offers insights into the delights and challenges of rock gardening.
Malcolm McGregor.

Verna Pratt

1930-2017

*Alaska has its fields and streams,
Its mountains, snow and showers
But the fondest of my memories
Were formed amongst the flowers.*

Verna Pratt, 1979



And that is how Verna E. Pratt lived her long life – amongst the flowers. Internationally acclaimed for her incredible expertise in Alaska native plants Verna's depth of knowledge was all the more amazing because she was self-taught. What is equally remarkable is how completely generous she was in sharing that knowledge with others through teaching, mentoring, speaking, leading field trips, and in writing and publishing six books, from the *Field Guide to Alaskan Wildflowers Commonly Seen Along the Highways and Byways* in 1989 to a book for children called *Linnaea's World* in 1996. One book, *Field Guide to Alaska Wildflowers* has sold 100,000 copies and is now in its 16th printing.

When Verna and her husband, Frank, moved to Alaska in 1966, the interest she'd had in plants since early childhood became her passion. Among her many accomplishments, she founded the Alaska Native Plant Society in 1982 and served as its first president. Verna then became a founding member of the Alaska Rock Garden Society (ARGS) in 1997 and was the first president of this group as well. After attending the North American Rock Garden Society's (NARGS) national convention in Minneapolis the following year, Verna returned to Alaska enthusiastic about the idea of hosting a future NARGS convention in Anchorage. To that end, she became the driving force behind the creation of a large rock garden at one of her favorite places, the Alaska Botanical Garden, which would serve as a focal point for the big event. With the help of a dedicated team of volunteers, this garden now serves as a wonderful teaching tool for Alaska rock garden enthusiasts.

In 2002 Verna's dream of hosting the NARGS national convention was realized. Once again she was at the forefront of activity insuring that local chapter members were familiar with the hikes and knowledgeable about the plants that their guests would see along the way. In describing this preparation, Verna's close friend of many years

and current ARGS president, Carmel Tysver, explained, “She kept all of us in line in the naming of the plants botanically, not always an easy task for some of us.”

Verna’s recognition extended well beyond Alaska’s borders. A special highlight for her was being invited to speak at the International Rock Garden Plant Conference in 2001 in Edinburgh, Scotland, where she is remembered fondly for her friendly and generous nature as well as her depth of knowledge. As fellow NARGS and ARGS member, Jaime Rodriguez, wrote on hearing of Verna’s death, “A great botanical light of Alaska has gone out.” She was indeed a great botanical light.

In 2000, Verna was honored with the NARGS Carleton R. Worth Award for distinguished writings about rock gardening and rock garden plants. She was elected to the Board of Directors of NARGS in 2015 and at her death she was vice-chair of the Alaska Chapter.

A warm, humorous, gregarious woman who was a good friend to many, Verna was genuinely delighted to share her expertise with any willing and interested audience. Born and raised on a farm in Massachusetts, she found her home and calling many miles away in Alaska. Nonetheless, this recipient of more awards than we can count carried the distinctive accent of her birthplace and projected the quiet humility of her rural roots throughout her life. We will all miss Verna dearly, but the light she brought to her fellow gardeners as well as the joy of having known and learned from her will live on in our hearts.

Brenda C. Adams.



Photos by Amelia Walsh (opposite) and Brenda Adams (left)

NARGS 2017 Nominations for Online Election to Board of Directors: June 1 - 15, 2017

All active members will be emailed a link shortly before the election opens.



Nominated for President: Betty Anne Spar (Arizona): "I've worked as a propagator for a commercial nursery, and assistant to the curator at The New York Botanical Garden T. H. Everett Rock Garden. After relocating to Washington, DC, I worked at the United States Botanic Garden and retired as the Chief Administrative Officer. I joined NARGS in 1991 and the Potomac Valley Chapter in 1993 and I have held the positions of Chair, Secretary, Hospitality and Program Specialist, the latter for six years. I've assisted with two Potomac Valley Chapter NARGS Eastern Study Weekends, and a Seedex distribution.

In terms of NARGS, I've attended at least 15 Annual General Meetings; chaired the NARGS Awards Committee; and developed and chaired the Book-of-the-Month review." [Betty Anne has served on the Board of Directors as Director at Large and is the current NARGS Vice President.]

Nominated for Vice President: Don LaFond (Michigan): "I'm a stay-at-home dad and in my free time I love gardening. What got me interested in gardening is I found out that an English/cottage style garden wouldn't grow in a gravel pit; so I



started rock gardening instead. I joined NARGS sometime in 1990. I've enjoyed being president and vice president of the Great Lakes Chapter of NARGS. I like to collect daphnes and dwarf conifers. My garden also consists of rhododendrons, trees, shrubs, and other perennials. My favorite way of gardening is creating troughs." [Don has served on the NARGS Board of Directors and his garden received the NARGS Millstream Award for an alpine

garden in 2015. He has also received the NARGS Geoffrey Charlesworth Writing Award for an article in the *Rock Garden Quarterly*.]

Nominated for Treasurer: Richard H. Lane (North Carolina): Richard is currently with RSM US LLP and is owner of Lane Financial Services in Raleigh, North Carolina. Richard specializes in internal audit and individual income tax consulting. He has over 30 years of internal auditing experience in the financial services industry. Richard is a Distinguished Faculty Member of The Institute of Internal Auditors. He is a Certified Internal Auditor, a Certified Financial Services Auditor, a Certified Public Accountant, a Chartered Bank Auditor, and a Certified Information Systems Auditor. He and his wife,



Amelia, are members of the Piedmont Chapter of NARGS and the Friends of the JC Raulston Arboretum in Raleigh, North Carolina. [He is currently completing two years as NARGS treasurer.]

Nominated for Recording Secretary: Joyce Hemingson (Connecticut): “Growing up among tobacco farms, woods, and pastures started my lifelong love of plants and the outdoors. After college I worked as a computer programmer/ systems analyst, but left for botany at the University of Connecticut, studying pollination biology of sweet pepperbush (*Clethra alnifolia*) for my thesis. Now retired as director of publications for a mail-order nursery, I’ve had time for walking trips in England, Switzerland, and Bhutan. The Berkshire Chapter of NARGS introduced me to rock gardening, back when Norman Singer and



Geoffrey Charlesworth hosted legendary plant sales at their home as fundraisers. In 1989, I joined the American Rock Garden Society, now NARGS, and have enjoyed many Winter Study Weekends and annual meetings since then. I’m currently the Berkshire Chapter president, having served in other roles in the chapter over the years.”

Nominated for Director: Thornton Burnet, Jr. (Virginia): Thornton has been gardening since he was 7 years old. In 1989 he started Contours & Concepts,



a landscape design-build firm located in Arlington, Virginia, creating diverse residential gardens of various sizes and styles. He has served on the board of Green Springs Garden, a public garden operated by the Fairfax County Virginia Park Authority, for almost 15 years, six as board president. Thornton's gardens in Arlington, Virginia, and Tampa, Florida, are destinations sought after by garden clubs and he shares his plants and horticultural expertise with the Potomac

Valley Chapter of NARGS and other garden groups. A NARGS member since 1997, Thornton welcomes the chance to work on the NARGS board to help keep the organization moving forward.

Nominated for Director: Panayoti Kelaidis (Colorado): He is Senior Curator and Director of Outreach at the Denver Botanic Gardens, having been employed



there since 1980. He has designed plantings for gardens at DBG, including its Rock Alpine Garden. He has taken plant-collecting trips to Southern Africa, the Andes, Central Asia, the Himalaya, as well as travels throughout much of Europe and New Zealand. His plant introductions are available through Plant Select®. He has lectured in over 140 cities in twelve countries, and has been featured in television, newspaper, magazine pieces, and books. Panayoti has received numerous honors, including the Garden Club of America as Member-at-Large, the National Garden Clubs Medal of Honor,

the Arthur Hoyt Scott Medal from the Scott Arboretum, and the Liberty Hyde Bailey Award from the American Horticultural Society. Also, he's received numerous awards from NARGS, is a frequent contributor to the Rock Garden Quarterly, and has coordinated traveling speakers to NARGS chapters. [He is currently completing a three-year term on the NARGS Board and is eligible for a second three-year term.]

Nominated for Director: Marianne Kuchel (Vermont): Marianne grows most of her plant material from seed, particularly primulas and alpines. Accompanying her husband to various parts of the world, she developed gardens from tropical and sub-tropical plants in Africa, terrace gardening in Rome, and herbaceous borders in Europe. Now in Vermont, she developed her own garden, which features rock and scree gardens for alpines. Marianne is a long-time member of NARGS, an active participant in its seed exchanges and programs, and a member of the Fells Chapter. She is a past vice president and board member of the American Primula Society and holds a degree in Landscape Design from George Washington University. She has an interest in encouraging a new generation of gardeners in the therapeutic joy of working with plants and soil.



Nominated for Director: Steve Whitesell (New York): He has been a member of NARGS since 1989. He served seven years as the chairperson of the Manhattan chapter, served on its board, acted as the chairperson of the NARGS Speaker's Tour, and currently organizes the Book-of-the-Month feature for the NARGS website. He has been co-organizer of the Tri-State meeting of five metropolitan New York NARGS chapters with Don Dembowski for fifteen years. Steve recently retired from 27 years as a landscape architect for the New York City Parks Department designing parks, playgrounds and open spaces, primarily in the Borough of Queens. He has moved to rural Schoharie County in upstate New York, where he is developing a garden around two Greek Revival cottages that currently includes several hundred woody and herbaceous taxa and will expand greatly in coming years. He recently joined the Adirondack Chapter.



Those without email addresses may request a paper ballot from:
NARGS, POB 18604, Raleigh, NC 27619-8604



Bulletin Board

spring
2017

volume 75 | 2

President's Letter

This will be my last letter as your President, which leaves me with mixed emotions. There is no denying that leading a large plant society towards growth given today's cultural climate is challenging, yet NARGS has such a great heritage and a deep and active membership that compared to most plant societies, its future feels more hopeful, even if our numbers don't always move upward. It's about more than that.

In the future, new officers will be challenged with change, and how to move an organization towards a new definition of what a 'club' or 'society' is. You, the members can help by being flexible and able to adapt to changes as they come, for change will be inevitable, and the greatest risk facing most plant societies is the inability to adapt.

For now, we are on a steadier course than three years ago. The benefits and changes to the organization are obvious. Most obvious is our journal, *The Rock Garden Quarterly*, under the leadership and editorship of Malcolm McGregor, the journal moved from what was already a notable and respectable publication, to one which now has full color throughout, a new exciting design and a wide range of content. Sadly, Malcolm has decided to move on to other projects and with this issue, is stepping down as editor. Please join me in thanking him for creating such an outstanding contribution to our library shelves over the past seven years, and in wishing him the best of luck with his new ventures.

Also, I am pleased to announce that we have a new Editor – Joseph Tychonievich author of *Rock Gardening: Reimagining a Classic Style* who will be stepping up to be editor of our 75 year-old quarterly journal. Joseph brings with him a new perspective, a unique generational vigor in his deep respect and knowledge of native plants and alpinists. I am excited to see his vision applied to one of our most beloved benefits, the *Quarterly*. Congratulations Joseph.

This June a new board is being voted in and as of this date, we have an exciting list of candidates – each with a clear vision of where NARGS needs to go, and on how to move it there. As other plant societies falter and fail, we should be proud that our organization remains strong and steady, moving forward even through difficult times.

Lastly, I want to thank our members who so generously contributed to our call for donations and giving during the fourth quarter of last year. The response was more than even I could have dreamed, and is a promising sign that many still care deeply for our organization. Every contribution, large or small helps NARGS in continuing to deliver the joy of rock gardening, alpine plants, bulbs, or however

you define rock garden plants – to all who might be interested. NARGS is one of the few organizations which appeals to both young and old, to beginners as well as to experts, it crosses all boundaries of interests, as we discovered this past June in Steamboat Springs with many new members under the age of 30 joining retired folks in their prime on high elevation hikes. How many plant societies can claim that?

As I step down as President, I want to thank my officer team – the AdCom – for all of their support (I can admit now that I am a master-delegator, as they well know! As I had very little time to do much all by myself!). I am thrilled with the prospects of a new team stepping up to lead this fabulous organization, and I want to thank each of you for giving me the opportunity.

Best wishes
Matt Mattus

NARGS Donations

Donations between November 1 and January 31, 2017: \$33,350

Designated for the general fund, Rock Garden Quarterly, Seed Exchange, printing expenses, and Web site development; speakers' tour; in honor of Malcolm McGregor's tenure as editor of the *Rock Garden Quarterly*; in memory of Woody Accardo, Utah Carl Calvin, Edward "Ted" Childs, Richard Darling, Lincoln Foster, Boyd Kline, Chiyo Kubota, Elizabeth Lawrence, J. C. Raulston, Harvey Wrightman; and "in memory of past members who inspired me."

Anonymous 1, 2, 3, & 4	Carson, Brian (Ontario)
Alaska Rock Garden Society--NARGS	Church, Clara A. (California)
Delaware Valley Chapter--NARGS	Clark, Mary (Minnesota)
Abrams, Trish (Pennsylvania)	Clark, Susan (Massachusetts)
Accardo, Marlene (Colorado)	Clayton, Hilary (New Jersey)
Adelman, Elizabeth L. (Wisconsin)	Collins, Jane D. (Virginia)
Allen, Kathy (Oregon)	Cromwell, Cynthia (North Carolina)
Atwater, Berta J. (Rhode Island)	Dambrosi, Paul (New York)
Aurichio, Linda (California)	Darling, Eric (Massachusetts)
Bell, Lynne (Oregon)	Dearing, Michael (Wisconsin)
Bitterroot Gardening & Design (Colorado)	Deeks, Constance "Susan" (New Jersey)
Black, Lida A. (New York)	Deurbrouck, Al (Pennsylvania)
Bolt, Joan F. (Michigan)	Dodge, Marianne (Maine)
Bouffard, Vivien (Massachusetts)	Donahue, Maura (Massachusetts)
Bowman, Ruby (Colorado)	Dorow, Janet (Oregon)
Bush, Allen (Kentucky)	Duffus, Roslyn (Nova Scotia)
Campbell, Joan (Montana)	Dumont, Judith O. (New York)
Caroff, Julie (Michigan)	Dussler, Barbara (Germany)

Earle, Carol E. (Colorado)
 Egan, Betty (New Jersey)
 Farrier, Maurice (North Carolina)
 Feinberg, Ira (Connecticut)
 Ferris, Terry (Minnesota)
 Fish, Diana (California)
 Fluet, Amy (Wyoming)
 Franklin, Catherine & Rebecca Washburn (Alaska)
 Gaertner, Catherine (North Carolina)
 Gentling, Peter (North Carolina)
 Georgi, Pierrette (Switzerland)
 Gilrein, John E. (New York)
 Gluek, Nancy K. (Massachusetts)
 Goldman, Doris (Pennsylvania)
 Gonzy, Michele (France)
 Goudge, Pam (Ontario)
 Grissell, Edward (Arizona)
 Gryboski, Maryanne (Connecticut)
 Haas, Joan T. (Pennsylvania)
 Hampton, Sandra Kay (Illinois)
 Hayes, Peter Paul (United Kingdom)
 Hegedus, Mary (Colorado)
 Hewitt, Sigrid N. (Rhode Island)
 Highberg, Patricia (Vermont)
 Hirsch, Eric (New York)
 Hoeffel, Joan Z. (New York)
 Hoog, Antoine (France)
 Horne, Alan (New York)
 Hornig, Ellen (Massachusetts)
 Horwitz, Lola Lloyd (New York)
 Howard, Margaret (Australia)
 Hultman-Hallberg, Annika (Sweden)
 Humphries, Terry (New York)
 Hunt, Jim (Arizona)
 Illman, Richard John (Australia)
 Jaward, Susan (Ontario)
 Jeddeloh, Jan (Oregon)
 Jelisavcic, Joseph M. (New York)
 Jensen, Merrill (Alaska)
 Jurries, Elaine (Colorado)
 Kantor, Joseph A. (Iowa)
 Kelley, Sabra (North Carolina)
 King, Judith D. (Connecticut)
 Kintgen, Mike (Colorado)
 Koch, Helen G. (Maine)
 Koltun, Nancy (Illinois)
 Konen, Sally (Idaho)
 Krementz, Margaret "Peggy" (New Jersey)
 Kubota, Shigeo (California)
 Lane, Richard & Amelia (North Carolina)
 LaPlante, Fred (Washington)
 Laughner, Linda (California)
 Lawrence, Starling R. (New York)
 Leece, Cathy (Minnesota)
 Leggatt, Anna (Ontario)
 Lehman, Jr., Leonard C. (Pennsylvania)
 Lewis, Mary (New Hampshire)
 Littlewood, Ann (Oregon)
 Lockhart, Bruce (Massachusetts)
 Lofgren, Aaron (Minnesota)
 Macartney, Kathryn (Ontario)
 Maksymowicz, Alex & Lillian (Oregon)
 Mandeville, Sue B. (Oregon)
 Markovitz, Kirk (Oregon)
 Marsolo, David (Ohio)
 McCarty, Sarah (New Mexico)
 McDonald, Rosaleen (Nova Scotia)
 McIntosh, Kevin (Maryland)
 McKenzie, Laurel (New Hampshire)
 McMaster, Donna (Ontario)
 Mear, Doreen (New Zealand)
 Melanson, Valerie A. (British Columbia)
 Meszaros, Patricia (Saskatchewan)
 Milam, Sandy (Washington)
 Milano, Phyllis (Connecticut)
 Miller, Joyce E. (Oregon)
 Miller, Lee (District of Columbia)
 Mitchell, Colleen (Michigan)
 Mizin, Michael (Pennsylvania)
 Moamar, Amal (Massachusetts)
 Morris, Caroline (Idaho)
 Moscetti, Paula J. (New Jersey)
 Muggli, Michael A. (Minnesota)

Norris, Peter (Massachusetts)
 Novak, Janet (Pennsylvania)
 O'Brien, Bart (California)
 Pasche, Erich (Germany)
 Phelps, Laurence "Larry" (Wisconsin)
 Plankeel, J. W. (Netherlands)
 Plaskota, Roman (Poland)
 Ramik, Robert & Laura Grant
 (Ontario)
 Reh, Patricia Jean (California)
 Rettenmund, Scott (Washington)
 Rifkin, Gerald B. (Pennsylvania)
 Riggs, Rudy (North Carolina)
 Ripley, Nicola (Colorado)
 Ripperda, Jerry (California)
 Robertson, John (Illinois)
 Rousseau, Margaret (Colorado)
 Sale, Charles (British Columbia)
 Salman, David (New Mexico)
 Sanguinetti, Mary Alice (Washington)
 Schellingerhout, Jan (Netherlands)
 Schleifer, Liane (Georgia)
 Schmidt, Loren (Alberta)
 Schramm, Nancy (California)
 Schueler, Lynn (Washington)
 Schulze, Robert (Massachusetts)
 Scott, Caroline (Alberta)
 Selcer, Donald (California)
 Shepard, Cecile (California)
 Sierra, Mary-Stuart (Maryland)
 Skulski, Lori (Alberta)
 Smarsh, Debra J. (New York)
 Smith, Carole P. (Ohio)
 Steinmetz, Julia M. (Michigan)
 Stella, Mary (Alaska)
 Stephenson, Laura L. (Pennsylvania)
 Stevens, Rose (Ohio)
 Stewart, Diane M. (Massachusetts)
 Straub, Peter S. (California)
 Stuart, Thomas (New York)
 Swanberg, Joan (Virginia)
 Toit, Helen du (Massachusetts)
 Trachtenberg, Arnold (New Jersey)
 Turner, Larry (Colorado)
 Turunen, Michael (Finland)
 Van Vleet, Patrice (Colorado)
 Vaxvick, Linda L. (Alberta)
 Waldrep, Lynda (North Carolina)
 Walker, Sally (Arizona)
 Ward, Bobby J. (North Carolina)
 Warner, Gary (New Jersey)
 Watrous, Ellen (Oregon)
 Weiss, Edward (Michigan)
 Wessells, Arcangelo (California)
 White, Mark E. (Alaska)
 Whyman, Steven (North Carolina)
 Wiersdalen, Inger Lise (Norway)
 Willis, Linda V. (California)
 Yates, Richard (United Kingdom)
 Yatko, John (Ohio)

Patrons

The following recently became NARGS patrons: for 2017

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Hold the Date!

NARGS Annual Meeting and Board Meeting
Raleigh-Durham, North Carolina
November 17 – 19, 2017

“Southern Rock Gardening: Past & Present”

Speakers:

- Tim Alderton (JC Raulston Arboretum)
John Grimshaw (Author: *Snowdrops: A Monograph of Cultivated Galanthus*)
Larry Mellichamp (North Carolina Native Plant Society)
Andrea Sprott (Elizabeth Lawrence Garden)
Joseph Tychonievich (Author: *Rock Gardening: Reimagining a Classic Style*)
Bobby Ward (Author: *Chlorophyll in His Veins*)
Tony Avent & Jeremy Schmidt
(Plant Delights Nursery and Juniper Level Botanic Gardens)

Tours:

- Juniper Level Botanic Gardens
Montrose Gardens
JC Raulston Arboretum

Optional: Pre-conference, two-day tour highlighting unique flora of
North Carolina's Coastal Plain

Optional: Open private gardens

SEED EXCHANGE

Isn't it wonderful to begin another gardening season, with all the joys of spring and summer ahead of us? I hope that the seeds you potted up earlier this year all germinate, and that the resulting seedlings all produce flowers... and seeds in their turn. And I also hope that you will share your seeds – from new plants and old – with other NARGS members by donating to the Seed Exchange. Details about donating seed are online and will also appear in the summer issue of the “Rock Garden Quarterly.”

By the time you read this, we will have concluded a very successful Seed Exchange season. As I write this, at the closing of the Main Distribution, 565 members have requested seeds, and there will be hundreds of ardent seedistas purchasing even more seeds in the Surplus Round.

Each year, at the conclusion of the Surplus Round, many chapters request and receive portions of the leftover packets at the conclusion of the Surplus Round, which will be shared among all their chapter members. In addition, chapters often donate these free packets to local schools, scouts, or non-profit organizations that allow them the use of their meeting facilities. If your chapter would like to share in these riches next March, be sure to have your Chair let me know.

We owe ample thanks to everyone who made this seedex so successful.

To begin, we thank our generous Donors, without whose continuing efforts each spring, summer, and early fall we would simply have no seeds to share.

We are aided every December by our loyal troops of seed packagers, working within chapters or individually, who take time from their busy holiday schedules to divide and re-package all the seed donations so that more NARGS members can receive their full allotments of 25 or 35 packets of seed.

This year, a special “Thank You” goes to the new and tiny Sierra Chapter, which took on the demands of the Main Distribution. Their chapter chair and chief-of-just-about-everything, Val Myrick, coordinated the tasks of order fulfillment with the able help of Diane Williams.

In March the stalwart members of the Columbia-Willamette Chapter, which has probably handled more recent distributions than any other chapter, once again gave a major hand to fill the orders during the Surplus Round. Jane McGary coordinated their very capable efforts.

This year, the electronic online seed ordering began on time and functioned beautifully... finally! Laura Serowicz – who not only receives, researches, and records all donated seed – also had a major hand in seeing that the program worked smoothly.

We hope that all who participated – by donating (seed and operating funds), volunteering, or ordering – will continue to actively support the Seed Exchange into the future.

Special Note: To our wonderful Donors living in Canada and overseas: a gentle reminder. Please check our website to be sure that the seeds you are exporting to us are allowed to be imported by us. The page with “Restricted Seeds” is a list of all those taxa that are prohibited entry into the U.S.: <https://nargs.org/restricted-seed> . The listed species are either on national or international lists of endangered species, or they have been found to carry pests (yes, those tiny dust-like seeds can carry diseases), or the plants themselves are invasive pests. Fortunately for us, the great majority of those banned taxa are not rock garden subjects, anyway. We thank you for your contributions and your compliance.

Joyce Fingerut, Director
NARGS Seed Exchange
Email: alpinegarden@comcast.net

NARGS Chapter Challenge Grant

The Rocky Mountain Chapter of NARGS has announced a challenge grant of \$10,000 to other NARGS chapters. Rocky Mountain Chapter will match dollar for dollar donations made to NARGS during the calendar year 2017 by other NARGS chapters (not by individuals) up to \$10,000. We thank the Rocky Mountain Chapter and its board for this challenge grant.

Adirondack Chapter Award for Service

Harold Peachey

Harold Peachey has consistently been a major contributor of plants for both of the annual plants sales, providing many plants that are both interesting and high quality. In addition, Harold works every year at the larger May plant sale that is our largest and most labor-intensive event.

Harold has not only been generous in providing plants for the plant sales. In his relatively short time living outside Syracuse, New York, Harold has done extensive planting, installing perennial beds, a woodland garden, a rock garden, and a greenhouse. Harold has opened his garden to visitors for garden tours numerous times, for both Chapter sponsored events, and tours arranged for small groups. A garden tour at Harold's is an event not to be missed, as the lucky tour participants normally return home laden with divisions from Harold's garden, or seedlings from his prodigious seed raising work. And once we were even allowed to dig plants from perennial beds that were in the process of being decommissioned.

Prior to moving to central New York, he was an active member of the Berkshire Chapter, which helped form the basis of his rock gardening knowledge. He is a contributor to the NARGS seed exchange and an avid propagator, which may even be his favorite gardening activity. Again, he is generous in sharing plants that he has propagated. He obviously loves plants, knows and appreciates plants, and exhibits an all-around enthusiasm for plants. As he prepares to move to Maine (and start a new NARGS Chapter?) he will sorely be missed by our Chapter.

Harold has earned this recognition for a Chapter Service Award for his contributions to the Chapter. *Submitted by John Gilrein*

Upcoming NARGS Meeting for your CALENDAR

NARGS Study Weekend

May 19 – 20, 2017 - Madison, Wisconsin

Contact: Lois Kinlen

(for details see pages 25-29 in the last issue of the *Quarterly*)

NARGS Annual Meeting
and Board Meeting

November 17 – 19, 2017 - Raleigh-Durham, North Carolina

Contact: David White

NARGS Annual Meeting
and Board Meeting

July 6 – 8, 2018 - St. John's, Newfoundland

Contact: Todd Boland

New Members

*Welcome to all those who joined between
November 1st, 2016 and January 31, 2017.*

Adams, Robert, 1453 North Riley Hwy, Shelbyville, IN 46176-9432
Alt, Howard, 645 N Michigan Ave, Ste 422, Chicago, IL 60611-5800
Bremer, Nathaniel, Solaris Farms, 7510 Pinesva Rd, Reedsville,
WI 54230-9118

Brinkley, Caroline, 25850 75th Ave SW, Vashon, WA 98070-8522
Brown, Kathryn S., 10986 Ambush Rock, Littleton, CO 80125-9005
Buckley, Joseph, 4 Pinewood Dr, Blennerville, Tralee, Co Kerry, Ireland
Burke, Anita, 34 Old Colony Rd, Toronto, ON M2L2J8, Canada
Carli, Joseph, All Green Goods, 20227 Canterwood Ct, Oregon City,
OR 97405-7093

Carrington, Mimi, 10 Forest Tr, Basking Ridge, NJ 07920-1505
Chartier, Emeline, 68 Rue de Dampont, Us-en-Vexin 95450, France
Christopherson, Donna, 8536 S. Flower St, Littleton, CO 80128-7113
Clark, Carol, 88 Cottonwood Dr, Toronto, ON M3C2B4, Canada
Clausen, Will, Chase Garden, 819 North 5th St, Apt. 301, Tacoma,
WA 98403-1994

Clos, Rosemary, 9398 W. Creek Rd, Berkshire, NY 13736-1329
Cochrane, William, Primrose Cottage, 32 Fergusson St, Camperdown,
VIC 3260, Australia

Collins, Faye, 4745 Country Ln, Whitby, ON L1P1Y6, Canada
Cornwell, Marla, 456 Sorrel Court, Collegeville, PA 19426-1268
Davis, Claire, 12 Alice St, Beacon, NY 12508-3802

Dodge, Marianne, 17 Kelley Rd, Falmouth, ME 04105-2106
Dwyer, Mark, Rotary Botanical Gardens, 1455 Palmer Dr, Janesville,
WI 53545-5215

Ferrantelli, Lisa, 585 Elizabeth St, Delta, CO 81416-2675
Foster, Sheri, The Scottish Gardener, 209 Sunrise Hill Ln, Norwalk,
CT 06851-2145

Futa, Ben, Allen Centennial Gardens, 620 Babcock Dr, Madison,
WI 53706-1210

Gaskill, Herbert, 111-1290 Crown Isle Dr, Courtney, BC V9N0B8, Canada
Gemmell, Trahern, 118 Upper Cross Rd, Nobleboro, ME 04555-8673
Gontarz, Elizabeth, 546 Chesterfield Rd, Landenberg, PA 19350-1575
Gregg, John, 916 Litchfield Rd, Baltimore, MD 21239-1307

Grossman, Melissa, 28 Keats Rd, Basking Ridge, NJ 07920-2616
Groves, Marsha, 72 Glasgow St N, Guelph, ON N1H4V9, Canada
Harford, Laurie, 143 W Pine St, Louisville, CO 80027-3127

Harris, Marjorie, 199 Albany Ave, Toronto, ON M5R3C7, Canada
Haskell, Colette, Nick's Garden Center, 2635 S Laredo Ct, Aurora,
CO 80013-1418

Hensley, Grace, eTilth, 12753 11th Ave NW, Seattle, WA 98177-4317
Hollister, James, 106 Rothschild Pl, Cary, NC 27511-6674
Hughes, Caroline, Runcton Holme, 46 Common Rd, King's Lynn, Norfolk
PE33 0AA, United Kingdom
Jacobson, Lynn, Olbrich Botanical Society, 3330 Atwood Ave, Madison,
WI 53704-5808
Jarvie, Marion, 37 Thornheights Rd, Thornhill, ON L3T3L9, Canada
Katz, Sara, 24 Bartlett Ave., Toronto, ON M6H3E6, Canada
King, Michelle, 68 Fox Hill Rd, Califon, NJ 07830-3006
Kinlen, Lois, 26 Merlham Dr, Madison, WI 53705-4960
Lapsker, Jeanne, 9 Leathermans Ct, Armonk, NY 10504-1313
Lease, Phoebe, 101 Hermans Ct, Moyock, NC 27958-8502
Lund, Jane, 191 Wilshire Ave, Ottawa, ON K2C0E6, Canada
Mason, Jeff, Mason House Gardens, 1244 Maple Ridge Dr, Pickering,
ON L1X1A5, Canada
McDonald, Valarie, 146 Scott St, Blenheim, New Zealand 7201
McKenzie, Laurel, 103 Fitch St, Jaffrey, NH 03452-5723
Middleton, Sharon, 1290 Old Fort Rd, RR 1, ON L4R4K3, Canada
Miller, Chad, Kansas State U., 1127 Colorado St, Manhattan,
KS 66502-5538
Mustin, Sarah, 53 Wilber St, Keene, NH 03431-3838
Neuman, Chris, 2445 Dahle St, Madison, WI 53704-4514
Norwood, Gail, 102 Sturbridge Ln, Chapel Hill, NC 2751-9315
Parker, Thomas, POB 1445, Vashon, WA 98070-1445
Patrilla, Lory, 5798 29th Ave Dr, Vinton, IA 52349-9338
Quinn, Joy, 28 Ramptons Rd, Eltham, VIC 3095, Australia
Ray, Kenneth, 9968 W 84th Pl, Arvada, CO 80005-1201
Reyes, Rizanino, RHR Horticulture, POB 77086, Seattle, WA 98177-0086
Russell, Alan, Russell Gardens Wholesale, POB 702, Richboro,
PA 18954-0702
Shaw, Stephen, 37 Sullivan Pl, Millbury, MA 01527-3151
Smith, Lois, 4245 County Rd 6, Yarker, ON K0K3N0, Canada
Smyth, Mallory, 146 Six Ave, Apt A6, Phoenixville, PA 19460-3975
Stafford, William, 1270 Baptist Church Rd, Yorktown Heights,
NY 10598-5801
Staples, Aaron Ashcroft, 1-528 Main St, Kentville, NS B4N1L3, Canada
Thomas, Alice, 3102 Reba Dr, Houston, TX 77019-6210
Toews, Jen, 3085 Eaton St, Wheat Ridge, CO 80214-8411
Waltz, Peter, 84 Brentwood Rd, Exeter, NH 03883-4510
Williams, Diane, POB 112, Soulsbyville, CA 95372-0112
Willis, Ken, U. of Alberta, Devonian Botanic Garden, 1A Univ. Campus NW,
Edmonton, AL T6G2E1, Canada
Wire, Cece, 131 Fishback Ave, Fort Collins, CO 80521-2329
Wright, Pamela, 254 Church St, Markham, ON L3P2M7, Canada

Adirondack Chapter Award for Service

Nari Mistry

Our speaker programs are one of the most important offerings of the Adirondack Chapter NARGS. With good programs, we attract new members and in general elicit good attendance at our meetings. Therefore serving as Program Chair – the person in charge of booking our speakers – brings with it a lot of responsibility. It also requires a lot of time, attention to detail, and most of all, resourcefulness. Add to that the fact that for the most part the job falls to one person.

Fortunately, the Adirondack Chapter has had a member willing to take on this role – Nari Mistry. He has held this position admirably for a number of years. Our attendance numbers have never been so consistently high (at least in my recollection) and to that I attribute the excellence of our speakers, the diversity of their topics and to Nari who has pulled it all together.

His involvement with the Chapter doesn't stop there however. He has built beautiful rock gardens and continues to build more. His garden is open to visitors and has been scheduled on one of our day garden tours. He shares photos of his garden, especially of alpine in bloom as well as contributing plants to our plant sales. As editor of the newsletter, I appreciate his write-ups of the program and that he voluntarily writes articles from time to time about his gardening experiences. Nari belongs to NARGS and participates in its annual seed exchange, which is where he has obtained some of the rock garden gems that he has so successfully grown.

Nari has certainly earned this recognition for a Chapter Service Award.

Submitted by Carol Eichler

Report from the Norman Singer Endowment Committee

Annually the Norman Singer Endowment Committee solicits applications for financial assistance for projects that advance the art and science of rock gardening. Applications can be submitted by botanic gardens, book authors, plant explorers, and other groups or individuals, and are evaluated based on the endowment's funding guidelines. The application form and submittal schedule for 2017 are posted on the NARGS website.

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

Verna Pratt, Anchorage, Alaska

Louise "Weesie" Smith, Birmingham, Alabama

Harvey Wrightman, St. Andrews, New Brunswick

CHAPTERS COMMITTEE

NARGS has established a new committee called the Chapters Committee. It was created to bring about a two-way communication between chapters and their membership with NARGS. The ultimate goal is to figure out how to increase membership in our society. We have a spot on the NARGS Web site's Forum called the "Chapters Toolkit." We welcome you to read the Toolkit and provide us comments and suggestions. The Forum is located here, but you will need to log on: <<https://nargs.org/forum/nargs-chapter-chairs-toolkit>>

Thank you,

Don LaFond

Chapters Committee Chair

Email: plantjunkies@gmail.com



ADDITIONAL PLANTSMAN TOUR OF WYOMING

Because of the popularity of the NARGS-sponsored "Plantsman Tour of Wyoming," we now have a second departure (the original tour is sold out) that will run from June 14 through June 19, 2017; i.e., the week before our original tour. There are still places available. Full details can be found on pages 316 - 319 of the fall issue of the Rock Garden Quarterly. Contact: Jody Payne. Email <jodycpayne1@gmail.com> Telephone: 201-314-6685

SECOND TOUR TO THE ITALIAN DOLOMITES

The original tour dates for the NARGS-sponsored tour to the Italian Dolomites is sold out but we have arranged a second departure that will run from June 21 through June 28, 2017. Full details can be found on pages 56-59 of the winter issue of the *Quarterly*. The tour will start and end in Venice - extensions in Venice available. Group size 10-16, walking 4 to 7 miles per day. Bookings should be addressed to David Phillips <davidphillips@naturetrek.co.uk>. Further enquiries can be addressed to Malcolm McGregor <mmcg@mmcg.karoo.co.uk>. There are still places available as we go to press.

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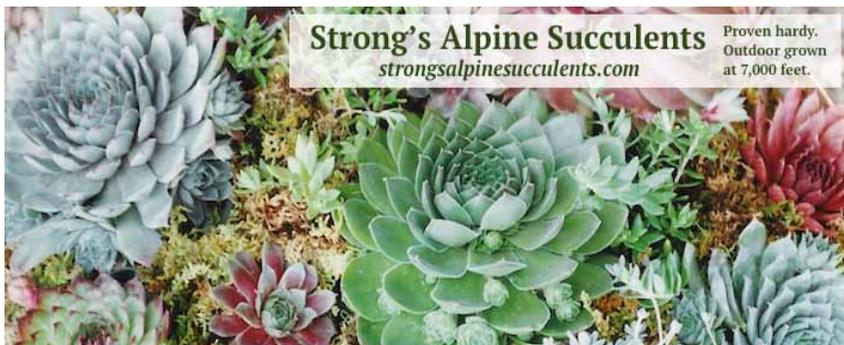
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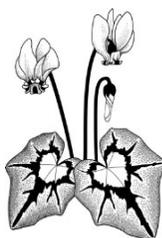
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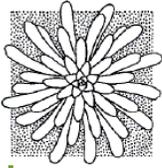
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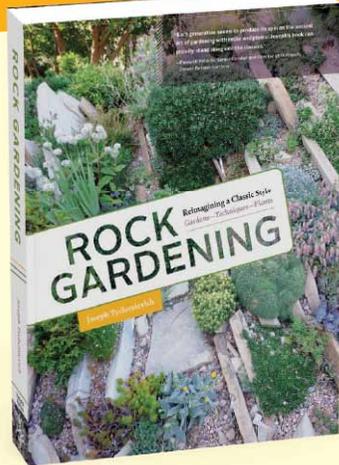
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NARGS CHAPTERS (meeting place/area) and CHAIRPERSONS or CO-CHAIRS

Adirondack (Ithaca, NY)	John Gilrein <basecamp@alum.syracuse.edu>
Alaska (Anchorage & Mat-Su Valley)	Carmel Tysver <garden@gci.net>
Allegheny (Pittsburgh, PA)	Karen Schmidt <karenschmidt@zoominternet.net>
Berkshire (Stockbridge, MA)	Joyce Hemingson <jhem1022@gmail.com>
Calgary Rock & Alpine Garden Society (Calgary, AB)	Margaret Fong <mjfhello@yahoo.ca>
Columbia-Willamette (Portland, OR)	Jane McGary <janemcgary@earthlink.net>
Connecticut (New Haven, CT)	Virginia Gingras <ginnygingras2013@gmail.com>
Delaware Valley (Philadelphia, PA)	Janet Novak <janet@indri.org>
Fells (Newbury, NH)	Thelma Hewitt <thelmakh@gmail.com>
Gateway (St. Louis, MO)	Mariel Tribby <mtribby@gmail.com>
Great Lakes (Southern MI)	Jacques C. Thompson <urdathom@aaps.k12.mi.us>
Hudson Valley (Westchester Co, NY)	Don Dembowski <dondembowski@optonline.net>
Long Island (Oyster Bay, NY)	Donald Ohl <donohl@yahoo.com>
Manhattan (New York, NY)	Brendan Kenney <ny10014@aol.com>
Mason-Dixon (Norrisville, MD)	Marika Sniscak <marika123@verizon.net>
Minnesota (Minneapolis/St. Paul, MN)	Cheryl Philstrom <cphilstrom@frontiernet.net>
New England (Waltham/Boylston, MA)	Vivien Bouffard <vbouffard55@mcn.com>
Newfoundland (St. John's, NL)	Todd Boland <todd.boland@warp.nfld.net>
New Mexico (Santa Fe/Albuquerque)	Robin Magowan <magowanrobin@gmail.com>
Northwestern (Seattle, WA)	Kevin Cretin <kcretin@yahoo.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)	Cheryl Johnson & Lin Chevier <cjohnson24@sympatico.ca>
Ottawa Valley (Ottawa, ON)	Jeff Hurtig and Jane Lund <president@ovrghs.ca>
Painted Hills (John Day, OR)	Gail Klodzinski <gailkathryn3@hotmail.com>
Piedmont (Raleigh, NC)	Amelia Lane <amelia.lane@gmail.com>
Potomac Valley (Alexandria, VA)	Kevin McIntosh <kmac53@verizon.net>
Quebec (Montreal, QC)	Robert LeClerc <leclercr@bell.net>
Rocky Mountain (Denver, CO)	Glenn Guenterberg <glenn.guenterberg@mac.com>
Sierra (Sonora, CA)	Val Myrick <vkmyrick@pacbell.net>
Siskiyou (Medford, OR)	Eric Hagerman <ehagerman27@gmail.com>
Wasatch (Salt Lake City, UT)	Tony Stireman <tonystireman@msn.com>
Watnong (Far Hills, NJ)	Michael Wilson <miwilson@ramapo.edu>
Western (San Francisco Bay area, CA)	Ted Kipping <tkippingsprint@earthlink.net>
Wisconsin-Illinois (Madison-Chicago)	Ed Glover <glover@oncology.wisc.edu>



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	Matt Mattus <mmattus@charter.net> 26 Spofford Rd., Worcester, MA 01607
Vice President	Betty Anne Spar <bettyannespar@gmail.com> 5051 N Grey Mountain Trl, Tucson, AZ 85750-5942
Recording Secretary	Elisabeth Zander, 127 North St., Goshen, CT 06756
Treasurer	Richard Lane <rhlane01@gmail.com> 4904 Hermitage Dr., Raleigh, NC 27612
Director-at-Large	Panayoti Kelaidis, 1244 S Quince St., Denver, CO 80231 <telesonix@outlook.com>

Immediate Past President	Peter George <petergeorge@verizon.net> P.O. Box 833, Petersham, MA 01366-9755
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DIRECTORS OF THE BOARD _____

2014–2017	Panayoti Kelaidis, Denver, CO Brian Carson, Stittsville, ON David White, Durham, NC
2015–2018	Mike Kintgen, Denver, CO Anna Leggatt, East York, ON Jody Payne, Cushing, ME
2016–2019	Dave Brastow, Tumwater, WA Julia Caroff, Birmingham, MI

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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Back cover: Antique glazed sewer pipe trough - Don LaFond