A photograph of a forest floor covered in moss and fallen leaves. In the foreground, there are several small white and blue flowers with green leaves. The background shows a dense forest of trees with bare branches.

NORTH AMERICAN ROCK GARDEN SOCIETY

The Rock Garden
QUARTERLY

WINTER 2014/2015

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Front cover: *Hepatica americana*, Michigan - Tony Reznicek

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The Rock Garden
QUARTERLY

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From the Editor

IN THE LAST issue there were contributions from a number of writers of their memories of Boyd Kline. Before that issue appeared, and quite independently, Barry Starling from Devon, in England, had written to me with an article, written before the news of Boyd's death had reached him, about his experience of a trip to Kashmir and Ladakh with Boyd. It was still easy and safe to visit Kashmir then, but became much less so subsequently.

Kashmir is not alone in having become difficult to visit. While air travel has become increasingly cheap, many of the high or remote places of the world are in lands less safe for the traveller than they were once. Remote places make safe havens for disparate groups: political, religious, narcotic; mountain chains make great natural borders and hence are often the scene of conflict. At various times in the last 50 years it has been dangerous to visit the Peruvian Andes, the Rwenzori of the Uganda-Congo border, Iran, Afghanistan, and many parts of the Caucasus. At one point the Nepalese Himalaya became more difficult. The mountain valleys of northern Pakistan have moved from being a regular trekking destination to a no-go area. But some of the other places have come back to us: Peru, some parts of the Caucasus, and the Rwenzori. Iran may soon offer opportunities once again. Parts of Mexico are far less safe than they once were, but Colombia which was definitely a no-go area is now a regular birding destination. This transience of opportunity to visit the high places of the world means that reports on trips such as that by Barry and Boyd carry extra value. This is one part of the role of the *Quarterly*, and NARGS itself, but another is exemplified by this year's annual meeting in Ann Arbor, Michigan, during which the focus will be on the activity of rock gardening itself.

Although not itself mountainous, it will soon become obvious, reading the articles in this special issue, that the Great Lakes region presents challenges for the rock gardener. Tony Reznicek provides a wonderfully lucid outline of the region as an "alpine" habitat and the plants associated with it and, separately, a geological and mineralogical perspective on tufa; Brian Winchell discusses double forms of *Trillium grandiflorum*; Bob Grese introduces the Great Lakes Garden; and Jacques Thompson and Don LaFond reflect on the various ways they meet the needs of the plants they love. Together the writers provide an overview which sets the scene for what should be a great meeting.

Finally this time, a correction. The back cover of the last issue featured a wonderful close-up photograph by Dave Toole of the inflorescence of *Aciphylla spedenii* but I managed to caption it incorrectly.

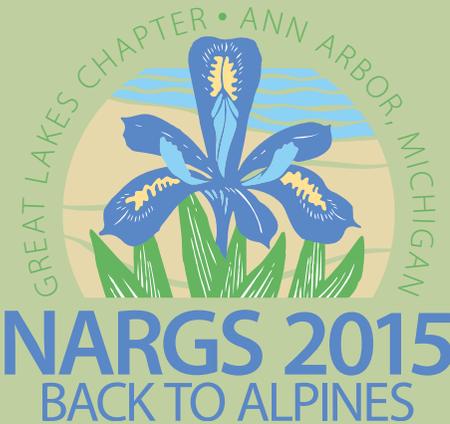
Many apologies, Dave.

GREAT LAKES CHAPTER

invites you to the
2015 Annual General Meeting, May 7-10,
at Weber's Inn, Ann Arbor, Michigan.

The 2015 NARGS Annual meeting will be held in Ann Arbor, Michigan. We will focus on gardens in the area, growing plants in our climate, and little known native plants of the region that are suitable for rock gardens.

The conference begins on Thursday, May 7, and ends on Sunday morning, May 10. On May 8 and 9, we will have bus tours of local gardens and a couple of selected natural areas; the tours will be organized so that everyone will be able to see each of the gardens and natural areas. Additional gardens will be open Sunday, May 10, as well as local nurseries.



Complete descriptions of all activities, as well as online registration, are available through the NARGS website.

Alternatively, you can use the registration form on page 7, though online registration is preferred and online payment can be made on the website <www.nargs.org>.

Registration includes an evening reception (cash bar) and presentation on Thursday, May 7; breakfasts, box lunches and dinners, plus an evening reception (cash bar) and presentations on Friday, May 8 and Saturday, May 9.

In addition, we will have a post-conference field trip to the Straits Region of Northern Michigan from May 10-12, for which you will need to register separately.

Programs

Thursday, May 7 - Tony Reznicek

The Michigan Landscape and Gardening in It.

Tony is Curator at the University of Michigan Herbarium, expert on the Great Lakes region flora and sedges, and an avid gardener, used to battling the climate and local fauna.

Friday, May 8 – Ger van den Beuken

Growing High Alpines at Sea Level or Below.

Ger is an internationally known Dutch rock gardener, experienced with growing and propagating choice alpines, especially Daphne, and the use of tufa.

Saturday, May 9 – Malcolm McGregor

Rock Gardening or What's a Heaven For?

Malcolm is a popular lecturer known to us all as Editor of the *Quarterly*, and as an expert on and author of a comprehensive book about Saxifrages.

Garden Tours

The Ann Arbor area is home to some extraordinary rock gardeners and we will have two days of bus tours to selected gardens on Friday and Saturday, May 8-9. We should see rock gardens and shade gardens in peak flower, plus our late spring bulb display.

The bus tours will also include visits to a sand barren and rich hardwoods to showcase local native plants of interest to rock gardeners. This will include our rich spring ephemeral woodland flora, which should be at peak with *Trillium grandiflorum*, *Viola*, *Phlox divaricata*, *Anemone*, and many others. Sand barrens have a later flora, but there should be *Viola pedata* in bloom among the dwarf oaks (*Quercus prinoides*), and, if the season cooperates, the first of the lupines (*Lupinus perennis*) and hairy puccoon (*Lithospermum caroliniense*).

There will also be open gardens on Sunday, May 10.

Vendors

There will be a large sales area with classic and choice rock garden plants, Great Lakes region native plants suitable for rock gardens, companion plants, orchids, books, and quantities of tufa. If you would like to pre-order a quantity of tufa, please contact Michael Greanya <mfg10@comcast.net> and remember, you will need a truck or trailer.

Meeting Location and Accommodations

Our host hotel is Ann Arbor's own Weber's Inn (Weber's Restaurant and Boutique Hotel). Weber's is an Ann Arbor institution, a family-owned hotel, restaurant, and conference center renowned for its food and local atmosphere. Rooms are available at a special NARGS rate of \$99.00 per night. Please contact the hotel directly, before March 20, 2015, and use the Code: **MAR050715** when registering.

Toll Free Number: (800) 443-3050; Local Number: (734) 769-2500.

The address is:

Weber's Restaurant and Boutique Hotel, 3050 Jackson Rd., Ann Arbor, MI 48103. <www.webersinn.com>

POST-CONFERENCE TOUR, May 10-12

The post-conference field trip will be to the "Straits Region" of Michigan, about 280 miles north of Ann Arbor, with stops on the way there and back.

The focus will be on natural rock gardens and rock garden plants in the wild. We will look at shaded and sunny rock outcrops; rocky, gravelly, and sandy beaches; plus a stop to see large stands of trilliums, and brief stops for other selected items including sand dunes; and, if time allows, jack pine barrens. It will be early for large scale bloom, but we should certainly see bloom in many species with some nice displays.

Keep in mind that it will still be early in the season, so while there will be no mosquitos, it could be cool.

We will not be in wetlands, but make sure you have sturdy footwear for rough terrain, and bring rain gear just in case.

The cost for the tour covers transportation during the tour, lodging, lunches, and refreshments; breakfast and dinner are at local restaurants. If you are staying for the post conference trip, Weber's can hold any luggage you don't need, but you should arrange to have a place to stay the evening of Tuesday, May 12, as we will be getting back in the evening (ca. 9:00 pm). Book early, as we have only 24 spaces available.

For further information about the meeting, and questions, contact: Susan Reznicek <reznicek@umich.edu> or phone (734) 996-0692

Registration Form

We would prefer that you register through the NARGS website <www.nargs.org> but if you do not have computer access, please fill out this form, and send with a check payable to "NARGS – Great Lakes Chapter." Mail to:

Libby Greanya, Conference Registrar
2204 Vandemere Dr.
Jackson, MI 49201 USA

Keep in mind that you need to be a NARGS member to register (though you can join on this form or online if you are registering online).

If more than one member of a household is registering for the meeting please use the form on the reverse of this page (if more than one, please complete a registration form for each person) for the extra person, or if you will be accompanied by a guest who will not be attending the trips and programs, but wishes meals, again use the form on the reverse.

Name: _____

Mailing address _____

City: _____ State /Prov.: _____ Postal/Zip code: _____

Country: _____ Email: _____

Phone: (_____) _____

Vegetarian _____ Yes / No

Any other special dietary requirements: _____

Registration (enter amount on the right)

Registration US\$290 (US\$325 after March 20, 2015)
includes all meals US\$ _____

1-year NARGS membership (if not a member)
US\$30 if resident in N. America; US\$35 if overseas US\$ _____

Guest (meals only - Thursday reception, Friday and Saturday breakfast and dinner) US\$120 US\$ _____

Post-conference tour, May 10–12: US\$235 per person, double occupancy; US\$295 per person single occupancy (cost covers transportation during tour, lodging in St. Ignace, box lunches, and refreshments. Breakfasts and dinners (not included) will be as a group, but at local restaurants.)
US\$ _____

Do you need information about transportation from Detroit Metro Airport (DTW)? (Yes/No) _____

NOTE: Sorry, refunds after April 20 only in extraordinary circumstances.

Registration Form for ADDITIONAL individuals

Please fill in this page ONLY if you are registering an extra person.

We would prefer that you register through the NARGS website <www.nargs.org> but if you do not have computer access, please fill out this form and send with check payable to “**NARGS – Great Lakes Chapter.**” Mail to:

Libby Greanya, Conference Registrar
2204 Vandemere Dr.
Jackson, MI 49201 USA

Name _____

Mailing address _____

City: _____ State /Prov.: _____ Postal/Zip code: _____

Country: _____ Email: _____

Phone: (____) _____

Vegetarian (Yes / No) _____

Any other special dietary requirements: _____

Registration (enter amount on space to the right)

Registration US\$290 (US\$325 after March 20, 2015)
includes all meals US\$ _____

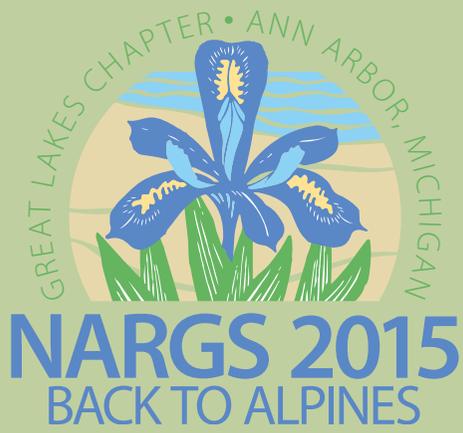
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Do you need information about transportation
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NOTE: Sorry, refunds after April 20 only in extraordinary circumstances.





Large boulder of Mackinac breccia on the Lake Michigan shore with Mackinac Bridge in the background

Natural Rock Gardens in the Great Lakes Region

TONY REZNICEK



ROCK GARDENING IS all about – well, rocks and plants – and the largest concentrations of exposed rock are mountains. So as rock gardeners, we naturally love our mountain ranges and the plants that occur there. But in Michigan and the Great Lakes region, our mountains are humble. Though they were spectacular a billion years ago in the Precambrian, they are long retired, ancient ground-down nubbins, at most a little more than 2000 feet high. While these do have some fine scenery and plants, they are mostly all forested and other areas of exposed rock, lower, and more recent in origin, offer much more in the way of plants interesting to rock gardeners. The exposures are rock outcrops, mostly limestone, open or shaded, plus the present-day and fossil shores of the Great Lakes. These natural rock gardens, along with other open habitats like our dunes and beaches, do not have communities of alpine plants but they do have a selection of exciting and often-overlooked plants suitable for rock gardens, as well as beautiful plant assemblages for design inspiration. Note that, these plants are generally much more tractable in a lowland garden setting than most true alpiners, and some perform admirably as “backbone” plants for our rock gardens.

The most diverse area for such plants centers on the Straits of Mackinac (pronounced Mackinaw!), marked by the 5-mile-long Mackinac Bridge, but extends in an arc traced by the Niagara Escarpment from the Bruce Peninsula of Ontario to the Door Peninsula of Wisconsin. These areas are underlain by sedimentary rocks: limestone, dolomitic limestone, and sometimes shale of Silurian and Devonian age (ca. 380–440 million years ago). These are mostly flat-bedded rocks, but in areas near the city of St. Ignace, a peculiar rock form occurs, called Mackinac breccia, which is a jumbled, complex rock type formed when great salt deposits in the original layered rocks were dissolved, and the

rocks capping these cavities then collapsed into them as rubble. These masses of rubble were later re-cemented into irregular stone, which is quite interesting in the garden.

Where not buried by glacial deposits, the bedrock forms outcrops ranging from tall cliffs, to irregular ledges, to flat “pavements” known as alvars. In areas where the glacial deposits were washed away by past higher Great Lakes water levels, many boulders may also be found at the surface, sometimes in great abundance. In addition, the Great Lakes, with their changing water levels after the glaciers, formed great deposits of gravel and sand, some now quite far from the present shore,

but some still forming on the shores today. This is the area where, despite being a glaciated lowland habitat, there are a number of endemic species, some of which are highly desirable rock garden plants. One interesting side note about virtually all these habitats is their relative youth, despite containing many interesting and rare species, including several endemics. Not only was the entire region completely covered by the most recent glaciation, but all but a few of the highest hills were also underwater during past higher-water phases of the Great Lakes.



Sarracenia purpurea in early spring on shore of Lake Huron

In terms of sunny, open habitats, as in rock gardens, the rocky, gravelly, and sandy Great Lakes shorelines and open rocky areas back of the shores offer the most treasures. These areas have sweeping vistas, some exquisite floral shows and, in wetter areas, are known for their carnivorous plant diversity: compact pitcher plants (*Sarracenia purpurea*), here growing in very calcareous settings; three species of sundews (*Drosera* spp.); several bladderworts (*Utricularia* spp.); and even, very locally, butterwort (*Pinguicula vulgaris*). On the upper shores, among the dominant small grasses, sedges, and rushes, which are not to everyone's tastes, are other tiny unsung treasures, often as important components.

The star is *Iris lacustris*, the dwarf lake iris, endemic to this small area. Unlike our tall marsh "blue flags," this iris is a tiny plant of drier habitats: gravelly and sandy upper parts of shores especially, and also nearby alvars and gravel ridges. It is arguably the shortest iris in the world, often only 5 cm (2 inches) tall in flower, but may form extensive mats.





Iris lacustris on limestone gravel (above) near Lake Huron shore

A large stand of *Iris lacustris* back of Lake Huron shore





Clinopodium arkansanum in the rock garden

Houstonia canadensis in limestone pocket,
Bruce Peninsula, Ontario



A more wide-spread plant is the tiny mint *Clinopodium arkansanum*. This has abundant violet-blue flowers on short upright branches above evergreen creeping mats. Not only that, it also blooms for a long period in summer (late June through July in Ann Arbor). The fresh, minty odor is so strong that one smells this plant as soon as you step on it, often before seeing it. It is a superb addition to rock gardens. Of similar habitat and distribution, but rarer and forming tiny cushions is *Houstonia canadensis*.

Scattered about will be the white camas, *Anticlea (Zigadenus) elegans* subsp. *glaucus*, blooming in summer, and of course, *Castilleja coccinea*, biennial, but with flaming red bracts (rarely luminescent yellow). Our only native primula, *Primula mistassinica* occurs here, though often in moister sites, as does the abundant and showy, late blooming *Parnassia glauca*.

At the forest edge on the upper shores, usually there are yellow lady slippers, *Cypripedium parviflorum* var. *pubescens*, which nobody wants to exclude from a rock garden. The driest portions of the rocky upper shores, and also sand dunes, may be dominated by the dwarf evergreen creeping shrub, bearberry,

Arctostaphylos uva-ursi, now popular in cultivation, and with it may also occur the wild form of creeping juniper, *Juniperus horizontalis*, even more popular in cultivation. Another dwarf shrub here, erect, but small enough for a larger rock garden is the shrubby St. John's wort, *Hypericum kalmianum*. This is endemic to the Great Lakes region and a more delicate plant than the commonly grown shrubby species. Not often grown, but it is worth acquiring.

On rock shores, much rarer in Michigan though widely present on Lake Superior and locally in the northern reaches of Lake Michigan and Lake Huron, we can see some of the finest natural rock gardens.



An example of *Castilleja coccinea* with yellow bracts, Lake Michigan

Here, additional dwarf species suitable for rock gardens can be found. If the rocks are moist, butterworts and bird's eye primrose again are possible, and even *Saxifraga paniculata*. On the drier rocks, crevices can be filled with dwarf goldenrods, dwarfed shrubby cinquefoil, *Dasiphora* (*Potentilla*) *fruticosa*, and if the rocks are metamorphic or igneous,



Lithospermum caroliniense in a sand bed

three-toothed cinquefoil, *Sibbaldiopsis tridentata*.

Sand dunes, like sandy, gravelly, and rocky shores, may also be dominated by bearberry and creeping juniper. But on dunes one can also see another evergreen shrub, the beach heather, *Hudsonia tomentosa*, showy but hard to grow. Another plant of dunes that is very fine in the garden, if you can establish it in a sand bed, is the hairy puccoon, *Lithospermum caroliniense*. This has masses of rich yellow flowers in late spring, on a mounding, bushy plant. *Anticlea elegans* is also prominent on dunes, with its green and white summer flowers. Dunes are formed along the lakeshore, and, when first formed, the sand has a high calcium carbonate content. But in time, the

carbonate is leached from the upper layers and the surface becomes acidic. Older portions of dunes, and the many inland sand deposits of older origins such as "fossil" dunes from earlier, higher stages of the Great Lakes and the many sandy areas deposited soon after the glaciers left, now can support plants that tolerate or prefer acid soils. The most extensive areas of acid sandy soils in the northern Great Lakes region are probably the great jack-pine plains that cover much of the northern Lower Peninsula of Michigan. In addition to closed canopy forests,



Alvar with *Castilleja coccinea* and *Tetaneuris herbacea*,
Bruce Peninsula, Ontario



there are areas of barrens on these jack-pine plains, with open sandy habitat with short vegetation and a number of small showy plants suitable, if the soil is acid, for rock gardens or sand beds. Most notable among these is the finest eastern North American violet, the bird's foot violet, *Viola pedata*, and again the three-toothed cinquefoil. Hairy puccoon is also here, as on dunes, along with other dwarf plants like carpeting *Antennaria* species and the dwarf pink milkwort, *Polygala polygama*.

Many of the same species as on the shores and sandy inland habitats also occur on one of the most distinctive habitats in the region, the unique glaciated limestone pavements, called alvars. These mostly occur inland from the actual shores, and are flat areas of rock, fully exposed and with moss and lichen cover, or with a thin soil layer with a turf of short grasses and sedges. They are then sparsely to liberally sprinkled with showy species, sometimes *Iris lacustris*, often *Castilleja coccinea* and *Juniperus horizontalis*, plus a few plants that are rare or absent on the present-day shorelines. Most striking among them is the lakeside daisy, *Tetaneuris herbacea*. This plant, very rare in Michigan, but more frequent on alvars eastward in Ontario, is a stunning yellow daisy, compact but very amenable to cultivation, and endemic to the Great Lakes region. Also on these alvars occurs the only endemic sedge

Clump of *Tetaneuris (Hymenoxys) herbacea*, Bruce Peninsula, Ontario



of the northern Great Lakes region, *Carex scirpoidea* subsp. *convoluta*, a very compact dioecious species where the males have showy spikes of yellow anthers. Some alvars, especially eastward, also have the prairie smoke, *Geum triflorum*; and some other prairie elements occur, such as the showy, short prairie buttercup, *Ranunculus fascicularis*. But the remarkable feature of these alvars, or most of them anyway, are the deep crevices, called grykes. These grykes are formed over millennia by water dissolving the rock along cracks and joints in the limestone. I can't help looking into them or even climbing down into big ones, although near roads they are often used for dumping garbage. Though not inhabited by many plant species, I am rewarded occasionally by a sight of some rare rock fern, most often fragile ferns *Cystopteris fragilis*, *C. tenuis*, and even *C. laurentiana*, but sometimes maidenhair spleenwort, *Asplenium trichomanes*, purple cliff brake, *Pellaea atropurpurea*, or even the rare northern holly fern, *Polystichum lonchitis*,

Natural crevice garden on alvar in northern Michigan



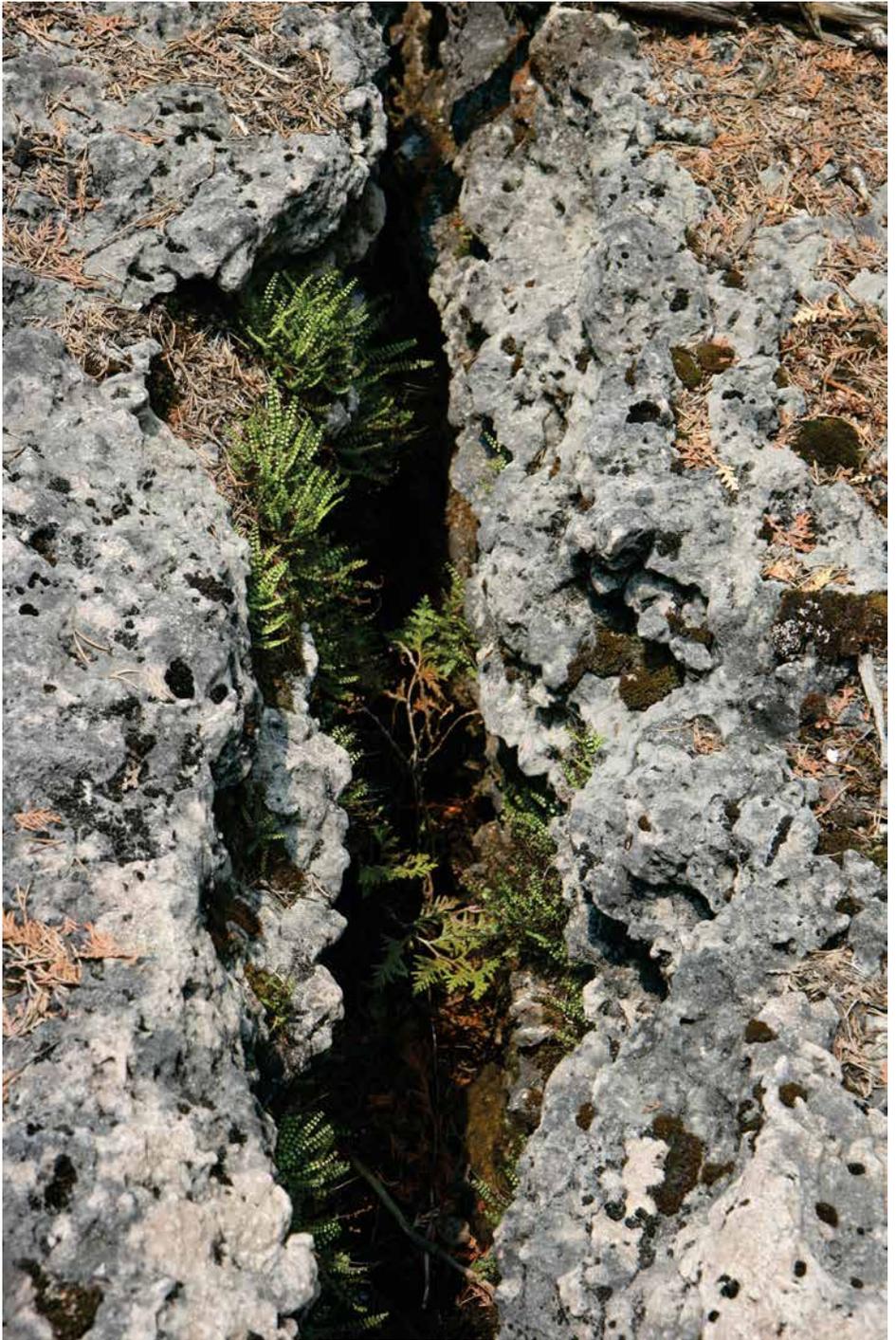


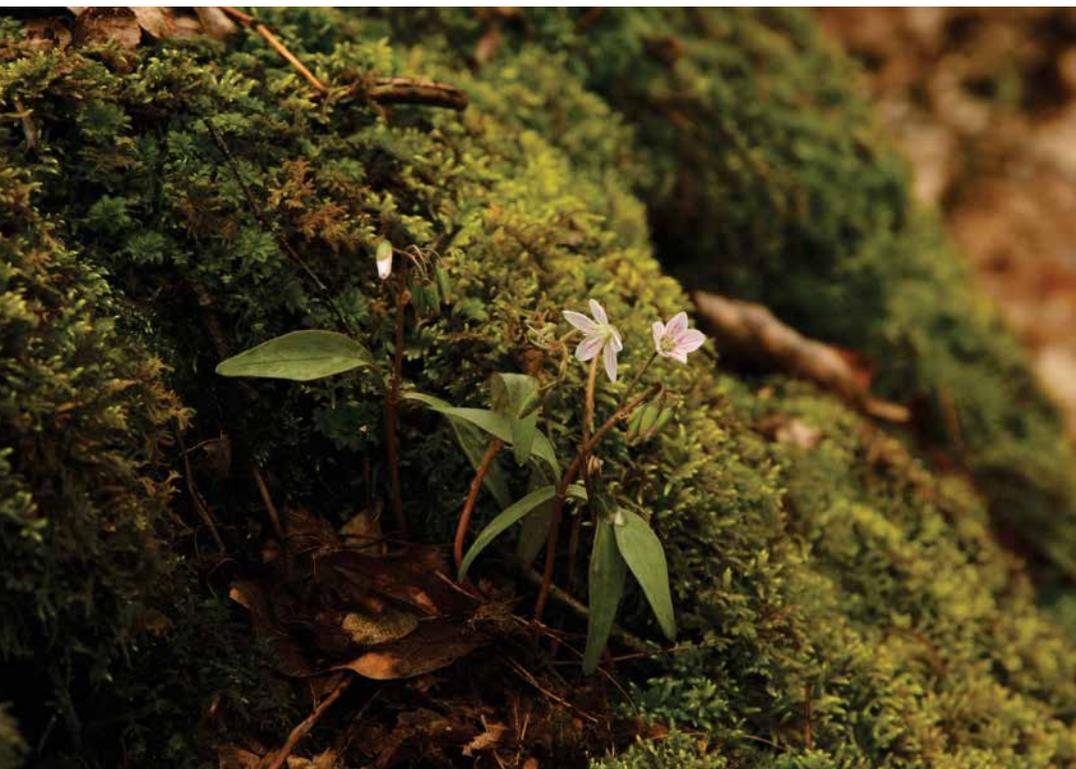
Dwarfed *Thuja occidentalis* on rocks by Lake Superior

all excellent rock garden ferns. Grykes offer a very different microclimate to the surface and though I've never heard of anyone building artificial grykes in their rock garden, it might be a way to grow some of the more delicate rock ferns. Finally, especially on alvars, but also on rocky shores, there are often gnarled arborvitae, *Thuja occidentalis*, dwarfed by the severe environment not genetics, but providing inspiration for using dwarf conifers in the garden.

The very rim of the Niagara Escarpment in this area does have some tall cliffs, which have some interesting plants, especially rock ferns, and even *Draba arabisans*, unfortunately not the showiest of its genus. But the areas of greatest interest on the Niagara Escarpment, in Michigan especially, are the lower forested outcrops. This is the realm of mosses and rock ferns, though many small forest understory plants are also at home in the rock crevices and ledges. Early in the spring, it is amazing how many hepaticas are nestled into and on top of the outcrops, and sometimes other woodland species, such as spring beauty, *Claytonia caroliniana*, Dutchman's breeches, *Dicentra cucullaria*, violets, and even

Asplenium trichomanes in gryke, Bruce Peninsula, Ontario





Claytonia caroliniana in crevice of mossy and shady limestone outcrop

trilliums, making for beautiful compositions. Presumably, their fruits are carried up into these areas by ants. This is where the rare northern holly fern may occasionally occur in some numbers. It is evergreen and attractive whenever there is no snow, and much more rarely, the walking fern, green spleenwort, and even the legendary American hart's tongue fern can be seen. Anybody contemplating a rock garden in a shaded setting would be rewarded by studying these expansive and remarkable natural rock gardens. In fact, all these habitats with small plants on rock, sand and gravel offer not only plants and design inspiration, but also lessons in how to grow the plants in our climate and garden settings.

Hepatica americana growing on a shaded rocky ridge





Trillium grandiflorum 'Pamela Copeland' (Tony Reznicek)

Seeing Double

BRIAN WINCHELL



IN THE GREAT LAKES region, “trillium” mostly means *Trillium grandiflorum*, by far the most abundant species in the region, arguably the showiest of all trilliums, and the state wildflower for Ohio and provincial flower of Ontario. My first experiences with trillium came early; my grandfather was an avid gardener, even in later years when he became a snowbird. On his return trips from Florida, he would search for trilliums, especially variants and hybrids. When our family would visit his garden in the springtime, I noticed in the midst of very thick stands of trilliums two double forms of *T. grandiflorum*, one with green flowers and one with white. I would later learn my grandfather had not purchased these, but in fact found the green double himself, probably in the 1960s, so I assumed I could find them as well.

With that information, I decided to go hunting for *Trillium* mutations myself. Against the odds, I discovered four fully-double white-flowered *Trillium grandiflorum* in a small but very thick stand of plants in a small woodlot in Bay County, Michigan. I also found plants with multiple sets of leaves in Saginaw County. These plants had on average at least 24 leaves, some with petioles of different lengths, some with space between whorls of leaves, and some with no space, the leaves all in one group making them look like a large double flower. Unlike the common

variants with all parts in sets of four (or rarely more), these had normal flowers with three sepals and three petals.

But between a lack of good public woodlots and an increasing deer population reducing plant numbers, I needed to find new locations to hunt for plants. I tried looking for plants in places Fred Case had suggested, but with little success. But in 1989, I went on a brook trout fishing trip with a friend in the northern Lower Peninsula, and ended

up getting lost in pursuit of a state camping area. We finally just pitched our tent at the end of a short, two-track road. The next morning, I was impressed by the large number of *Trillium* plants in the woods, despite it being August.

So next spring, I returned to the area. This area of Michigan turned out to be notable for having a lot of forests with vast numbers of *Trillium grandiflorum*, so there were many areas to explore and many plants to examine over the years. And *T. grandiflorum* is especially variable in features like the size of the plant and the size and shape of petals. In terms of the color of normal petals, these northern plants are all white, but more variation occurs in southern Michigan with good pinks, though nothing as deep as the lovely plant illustrated on the dust jacket of Fred and Roberta Case's book *Trilliums*.

But I was looking for bolder variation. And I almost immediately found a plant with six petals. On closer examination, I realized that

Trillium grandiflorum with petal-like sepals (Brian Winchell)



the sepals had become petal-like. This mutation, would, in later years, be found in mass at a different locality, with a lot of variation in the plants. Some of the plants were striking – appearing to have six full-sized white petals. Others had six white parts, but with the outer ones still being the size and shape of sepals. Many, however, had the outer whorl partly white and partly green. Unlike trilliums with 4 or 5 sets of parts,



Trillium grandiflorum f. *roseum*, southern Michigan
(Tony Reznicek)

Trillium grandiflorum with multiple leaves
(Brian Winchell)



which appear to be developmental not genetic variation and “revert,” these variants are largely stable from year to year. These plants all have normal reproductive organs, and if you grow seeds derived from self-pollinating them, at least one fourth of the plants are like the mother plant. So the large numbers of these plants in some woods is easily explained – and it may mean that these striking plants could be reproduced more efficiently than doubles, which are sterile and must be reproduced vegetatively.

Rarely, the reverse condition occurs: plants with green, sepal-like petals in addition to more or less normal sepals. These are not especially attractive, and the petals are shorter and wider than normal, with the stamens and ovary present, but appearing somewhat deformed. Though these deformities are not like those seen in plants infected with the *Trillium* phytoplasma disease, they may nevertheless be pathological.

On this first trip spring trip, I also found two double green-flowered plants, very much like my grandfather’s. Over the years, I would find these green doubles in a number of locations and in different circumstances, some being a single plant and nothing more, some in areas where I had also found fully-double white-flowered forms, and others where there would be a number of green doubles with more being found in the same area in later years. The petals of these plants vary greatly in shape, color, and texture, but rarely in size. They tend to be about the length of sepals, but usually are slightly wider. An oddity I’ve always seen in the plants is that they have a double set of apparently normal sepals.

The color and texture of the petals made me suspect that these plants had somehow descended from plants that were infected with phytoplasma. Such infected plants may have the petals green

Trillium grandiflorum with green petals (Tony Reznicek)





Trillium grandiflorum "stacked" double (Brian Winchell)

Trillium grandiflorum double with full flower with very rounded, broad petals
(Brian Winchell)



and more leaf-like in size and texture, and the reproductive organs would also be converted to leaf-like parts – appearing like a double flower from a distance, though with “petals” more like the texture and thickness of the ovary of the plant. At some point, I discussed these plants with Fred Case and was surprised to find out that he suspected the same might be true of double white-flowered forms of *Trillium grandiflorum*. However, these plants are vigorous, stable, and do not decline or show any progression of the phytoplasma disease, nor do they show the petioled leaves typical of diseased plants. Possibly, as with those singles where the petals are green and sepal-like, some other disease agent is present, perhaps a virus, as with the modifications found in some horticultural forms of tulips.

Woodlots where doubles are found are typically ones where *Trillium grandiflorum* occurs in vast numbers. However, sites where doubles have been found do tend to have more doubles show up sporadically over many years. So there evidently is some tendency to produce doubles in some populations. Some of these doubles, in cultivation, would go back and forth from year to year from fully double to having somewhat fewer petals, but with reproductive organs – perhaps dependent on vigor.

Where the double whites occurred in Bay County, I eventually removed all the plants in an area 10 foot by 12 foot where the 4 doubles were found. The landowners were putting up no hunting signs and

Trillium grandiflorum old commercial double (Smith double) (Brian Winchell)





Trillium grandiflorum with twisted narrow-petaled double (Brian Winchell)

the deer population in the area was exploding, decimating the plants except where I had protected some by arranging dead branches over them. Then in 1997, six plants from this group each had a small piece of petal growing on one stamen on each plant. Though these plants never did this again, seeds grown from these plants tend to produce about 5% of double offspring. There would seem to be recessive tendencies for doubling in plants that appear normal.

White doubles are the showiest and most sought after of all *Trillium grandiflorum* forms. Over the years, I have found quite a number in a number of different woodlots. Many of the plants either had twisted or crumpled petals – interesting, but not necessarily attractive in the traditional sense. As a rule, fully double flowers have 30–36 petals, though some plants have fewer, as few as 15. My best-looking find tends to have only 24 petals, but this allows the petals to be “stacked” and the flower to have a geometrically pleasing form. Most of the doubles raised from seed are of the camellia-flowered form with medium-width petals with no ripples on the sides, and curving backwards as the flower ages. One find has very round petals almost as wide as they are long. Of real interest are extremely thin-petaled plants found by Fred Case, many of which have a twist to the petals which can cause the flower to spiral in one direction or another. Of the variations

found in flowers, the most beautiful aspect is the very geometric folds found on the edges of some petals. The plant that has been widely sold commercially, the “Smith” or “New York” double, has this trait, as have many of the largest-flowered plants found by Fred Case, and also my best looking double with 24 petals. For reasons I don’t understand, these flowers remain forward facing, with no tendency for the petals to bend backwards with age. Over the years, it is also clear that some doubles stay as single stems for long periods, but others are good clumpers. The first good white double I found in 1991 is a vigorous clump former and I now have over 70 divisions.

One question that does come up is what is it about these localized northern Michigan woodlots that allows such large numbers of *Trillium grandiflorum* to exist, when woodlots in southern Michigan have been decimated by deer. I’ve concluded that the lack of standing water in the area and deep winter snows probably keep the deer population lower. Also, limestone gravel in the soil helps it stay close to neutral, which *T. grandiflorum* prefers. Selective cutting of larger hardwood trees helps more light to reach the forest floor, which also, in the long run, may favor trilliums.

Finally, because gardeners are always interested in the unusual, it is worth briefly commenting on the *Trillium* phytoplasma disease that so severely affects some populations of *T. grandiflorum* – though fortunately not yet the large populations that have produced doubles. Initial symptoms of the disease are petals that are more or less normal – sometimes somewhat enlarged – but with a prominent green stripe down the middle. Each of the three leaves is also distinctly petiolate. As the disease progresses, the female reproductive organs tend to quickly become sterile, but even though the stamens can change greatly in size and shape, they tend to continue to produce pollen. Badly infected plants are severely distorted, with long-petioled, more or less basal leaves and





Trillium grandiflorum green double with six sepals (Tony Reznicek)

distorted green flowers, lacking any reproductive parts. An illustration of this can be found in Fred and Roberta Case's book (plate 2).

Phytoplasma (a group of bacteria) are probably spread by leafhoppers, planthoppers, and aphids, which feed on the phloem tissues of infected plants. While some trilliums in the early stages of disease may look striking, with the green striped petals, it is probably not a good idea to grow them. Research is currently being undertaken to establish the nature of the threats to wild populations of *T. grandiflorum* from phytoplasm infection.

IT GETS HOT in Michigan. Sometimes melt-your-face-off hot. It's almost never a dry heat, either. Heat and humidity breed a special sort of misery for us here. Working outside in the sun you feel your skin burning at 90–95 degrees at the same time you're swimming through air with 95–100% humidity (yes 100% humidity and it's not raining!). So you can imagine an alpine plant growing here, whining and complaining, attracting every airborne fungus and disease known to exist. Enter artificial shade.

I understand the premise that artificiality and rock gardens don't go together, but Farrer is dead. Rock gardens in the countless ways they are being constructed are all artificial constructions, from Harland Hand's hillside garden overlooking San Francisco, built with every kind of rock, brick and cement, to Lola Lloyd Horwitz's small Brooklyn, New York, garden that partially uses chimney flues. On this basis, I think what I've done here isn't too bad looking and could fit into a liberal idea of a rock garden. And most of all it allows me to grow some plants that I heretofore haven't been able to grow.

I love shortias (I know, I know; that's like saying I love chocolate) and I was prepared to do anything short of burying a refrigerator in the ground to grow them. My friend found that growing shortias in a sandstone trough buried in the ground in the shade of a pine tree was enough protection from the sun and tree roots to grow them. Not in my gravel pit, though. So, I hooked up a shade cloth to my house on the northwest side and it worked – almost. It wasn't quite big enough, and at certain times of the day it still allowed direct sun to touch the princess-like leaves – they recoiled and sulked but they lived. I used the shade cloth for several years but it was a nuisance. I had to take it down before the snow and put it up before the scorching sun arrived sometime in March or April or May. I needed permanence.

I built a ... well, what to call it? A lath house? It is simply a roof built of 2 × 8-inch rafters with 1 × 1½-inch strips of wood (laths) nailed to the tops of the rafters

At work on the lath-house roof





What Would Farrer Say?

DON LAFOND

with 1-inch or so spaces between them. This allows rain and snow and some light to get through. It's supported by posts in the ground, and there are no sides. Underneath the lath-house roof is a 4 foot × 15 foot × 3 foot-tall raised bed made of 4 × 6-inch landscape timbers. I filled it with a mixture of ⅔ sand from my land and ⅓ sphagnum peat moss.

The sand here is acidic which allows ericaceous plants to grow pretty well. If you don't have acid sand it would be worth trying to locate some. It seems many shade plants, although not all, like or require acidity. Oftentimes your local pit operator will know what the pH of his sand is. What I have been taught is, at least here in Michigan, the deeper the sand is in the ground the less acid it will be, the top 8–12 inches of undisturbed sand being the most acid. Another option is pure silica sand, it is also acid. Silica sand is the sand used for sandblasting, and unfortunately real silica sand is getting hard to locate.

In Michigan, people mine peat from our swamps and fens, they call it sedge peat. The pH of sedge peat is quite variable, often alkaline and not generally recommended for ericaceous plants.

I also fashioned a watering system using rain from the roof of the house. I ran the downspout into a 4-inch plastic pipe with ¼-inch holes drilled into it and suspended it slightly above the top edge of the bed. The bed stays moist unless it doesn't rain for a few weeks – a regular occurrence. Then the hose fills in nicely. I have wellwater with a pH of around 7 and this hasn't had any ill effects on the ericaceous plants. My first well had water with a pH of 8.2. I killed many ericaceous plants until I got a pH tester and a hose-on adapter. The pH tester is electronic, you simply dip it in your water and it spits out a digital reading. The hose-on is a brass fitting that threads onto the outside sillcock. It has a rubber hose that dips into a bucket of water with fertilizer diluted in the bucket and siphons out the dilute fertilizer or, in my case, battery acid. I found that an

Lath-house roof over shade bed and raised bed







The shady beds underneath the roof, sunnier portion in the foreground

old-fashioned film canister full of battery acid in a 5-gallon bucket of water would take my 8.2 pH water down to around 6.

Opposite the raised bed, against the house, under the lath roof there is a section of garden about 7 x 16 feet that's not raised. The sand here was heavily fortified with leaf mold, creating a very nice woody soil.

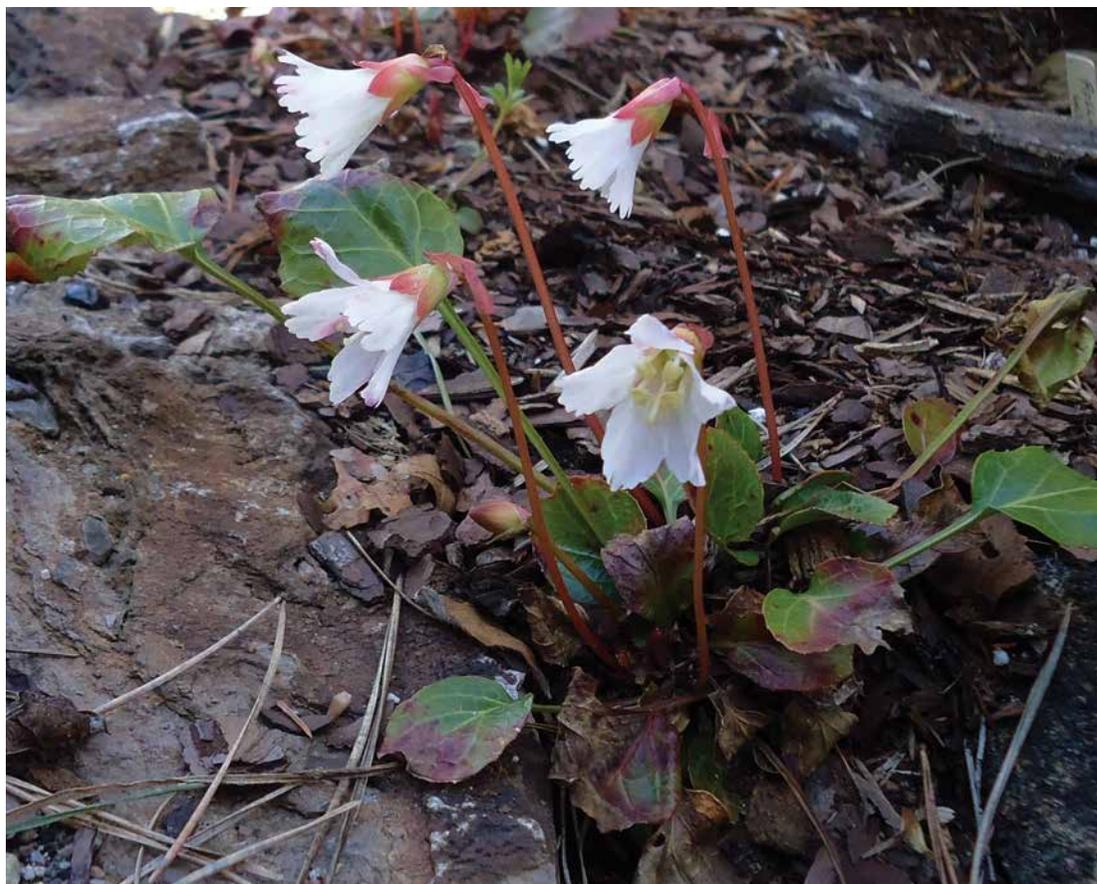
I grow an assortment of shade plants including *Carex fraseriana* (*Cymophyllum fraserianus*), *Podophyllum hexandrum*, hepaticas, trilliums, *Anemonopsis macrophylla*, anemonellas, *Stewartia ovata* and, yes, in a couple of buried sandstone troughs I grow *Shortia uniflora* 'Grandiflora Rosea,' *S. soldanelloides* var. *magna*, *S. galacifolia*, and *S. galacifolia* x *S. uniflora* 'Leona.' In the raised bed I planted gentians, primulas, dodecatheons and *Linnaea borealis*. The *Linnaea* was interesting; I couldn't grow it before, now I have to clip it to keep it from smothering the other plants in the bed. I also have been successful with *Epigaea*

repens and *Polygala paucifolia*, Michigan native plants that were giving me fits to grow before. I also did a minor experiment on one end of the raised bed. It gets more sun on the west end so I buried sandstone like a Czech-style rock garden and planted that space with many plants that usually insist on full sun or at least more than they get there. In those spaces between the stones (1–2 inches wide) I put *Asperula*, *Daphne*, *Erigeron*, *Gentiana*, *Veronica*, *Fritillaria* and others. It's remarkable to me how well these plants are doing in this shady spot.

In the shade of trees, which I have plenty of, I grow the usual subjects of epimediums, trilliums, rhododendrons, and the like, and they do fine. The touchier plants can struggle in this competitive environment. I find the problem to be tree roots. They rob the soil of too much of the moisture and nutrients.

If you don't have the wherewithal to build a lath house but still want to grow some of the touchier plants, a less expensive way is to bury a

Shortia galacifolia

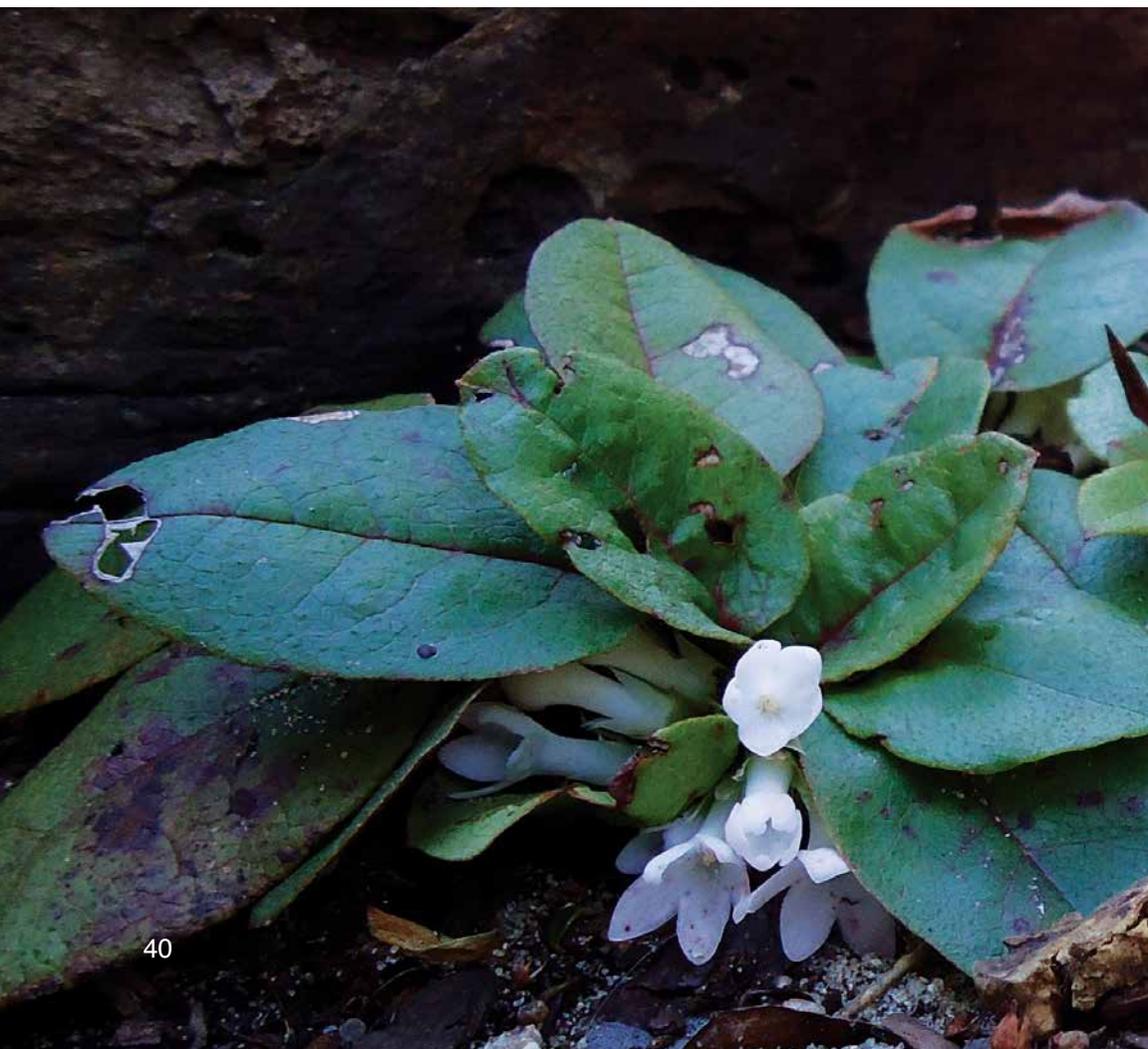


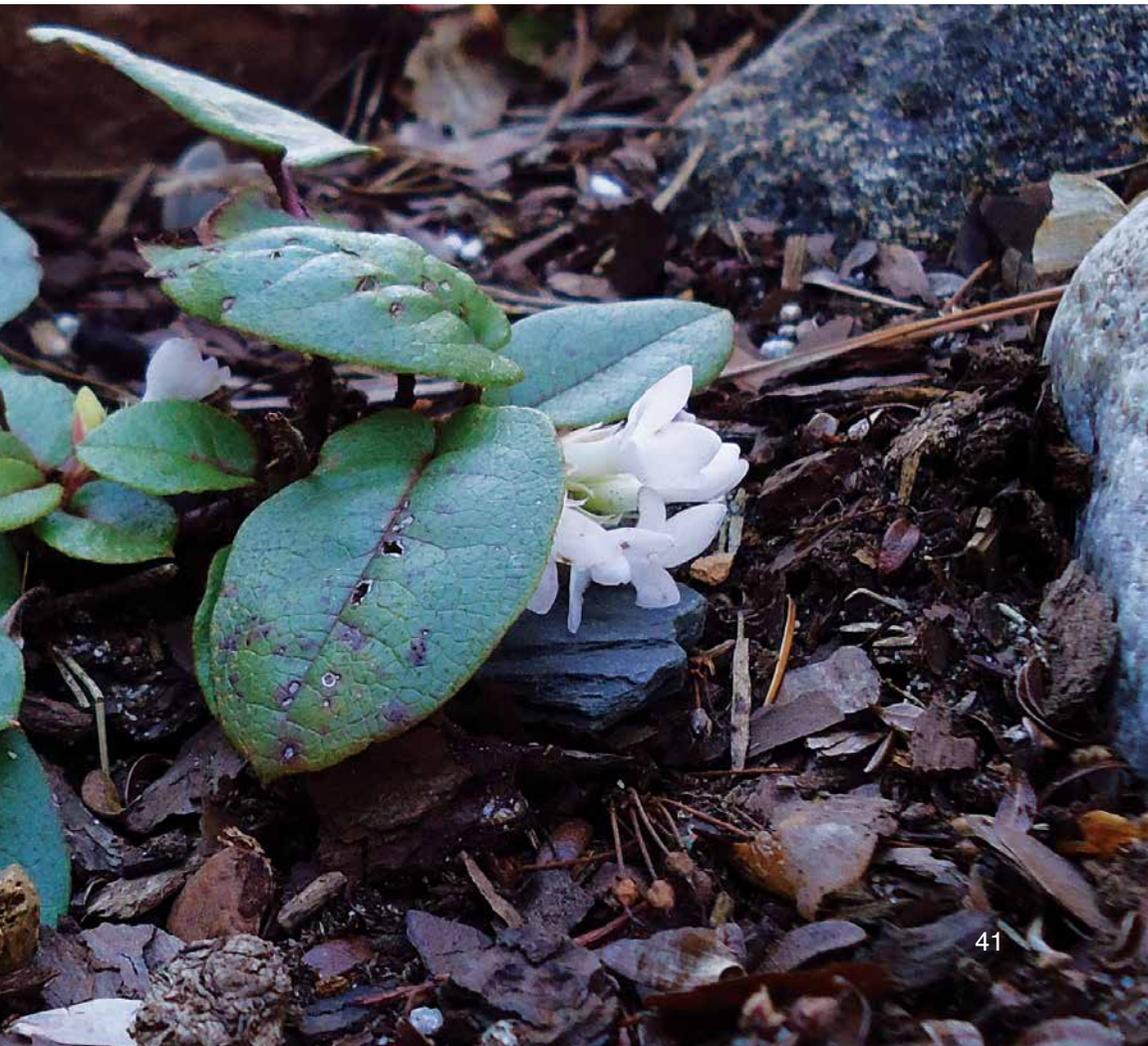
swimming pool. No, not a 20-foot circular above-ground pool, although that would be very useful; just use a 4–5-foot kiddie pool. Bury it where you want it and deep enough so you don't see the blue edges. Fill the pool with your choice of soil mix and mound up soil towards the middle. This ensures that you're not creating a bog, unless of course you want a bog, but that's another story. I don't poke any holes in the pool. We get around 35–40 inches of rain a year and I don't have a problem with it being too wet. You can also use this strategy to grow other types of intransigent plants by changing the soil composition or pH, or to just confuse your children about what a pool is for.

I am sure other people have other strategies to grow the plants they like so don't give up until you have killed a bushel of plants, or your partner says the kids are hungry.

Campanula stevenii shaded by the laths

Epigaea repens in the shade bed by the house







A view of the alvar garden at the Great Lakes Garden

The Great Lakes Gardens

Matthaei Botanical Gardens, Ann Arbor, Michigan

BOB GRESE

MATTHAEI BOTANICAL GARDENS recently opened a series of conservation-themed gardens – the Great Lakes Gardens: a collection of gardens celebrating the floral diversity of the Great Lakes region.



While our region does not have towering mountains, we do have majestic sand dunes, dramatic limestone bluffs and pavement areas found around the Great Lakes, native prairies and oak openings (or oak savannas), and coniferous and deciduous forests. The intent of these new gardens is to introduce the general public to the beauty and value of these diverse ecosystems and to acquaint visitors with many of the unique plants found within the Great Lakes region.

Perhaps the garden of most interest to NARGS members is our alvar garden, simulating the distinctive limestone habitats found around several of the Great Lakes and in only a handful of other areas around the world. The name “alvar” was given to the exposed limestone habitat found in various places in Sweden. Other alvar locations are found in Estonia, England in the Pennines, and in western Ireland notably in the Burren. In North America, alvars are limited to the Great Lakes region where they harbor a number of rare and unusual plant species.

Our garden was designed to represent the alvars found in the Great Lakes Region and showcase both the typical and rare plants found in these unique places. The landscape design was created by Shannon Gibb-Randall of InSite Design Studio of Ann Arbor, and the stonework laid by Ray Rogers and his staff from Rockworks, LLC in Lake Orion.

The garden was constructed of limestone from quarries along Lake Superior, with some earlier rock from quarries near Rogers City. Stone was carefully layered to create shelves, simulating the types of limestone bluffs found along Great Lakes shorelines, as well as pavement areas with narrow joints between large limestone slabs. Artificial “grykes” were created in some of the limestone shelves, simulating the narrow fissures found in many alvar habitats and providing niches for a number of rare species. Stone was set on a soil mixture of fine gravel, sand, and with a minimum amount of organic compost. Broken concrete was also recycled as part of the garden to illustrate the similarity of limestone pavement to the often barren environments found in urban wastelands.

Our garden features many of the unique plants of alvars in the Great Lakes region such as lakeside daisy, *Tetraneuris (Hymenoxys) herbacea*; dwarf lake iris, *Iris lacustris*; and Hill’s thistle, *Cirsium hillii*, as well as more common plants like columbine, *Aquilegia canadensis*; poverty grass, *Danthonia spicata*; shrubby cinquefoil, *Dasiphora (Potentilla) fruticosa*; and creeping juniper, *Juniperus horizontalis*. The garden also includes a simulation of a grassland alvar with a thin layer of gravelly soil over a stone base. The soft-textured prairie dropseed (*Sporobolus heterolepis*) dominates the grassland alvar garden, with the delicate prairie smoke (*Geum triflorum*) and other forbs interspersed among the grasses.

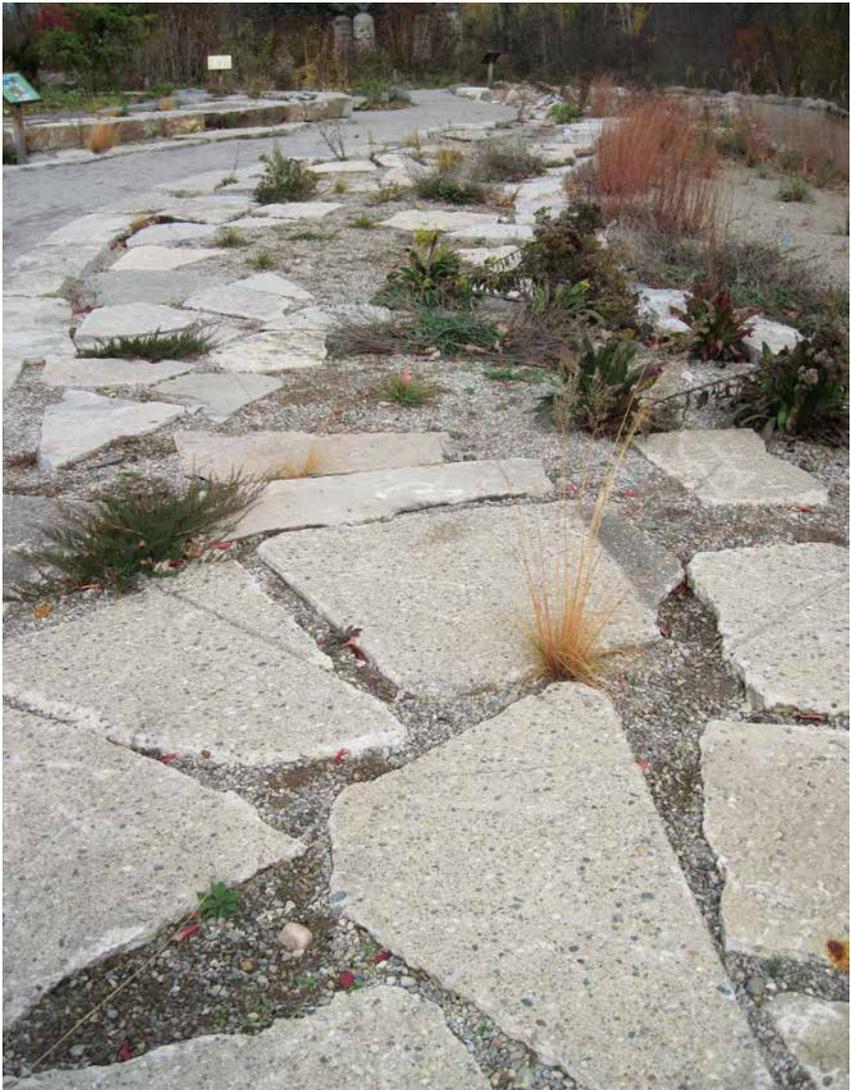
Other garden spaces within this unique collection of conservation-themed gardens include a cobble beach with plants found along the cobble-strewn shorelines of the Great Lakes and a dune garden,



Constructed "gryke" in the alvar garden

featuring the rare Pitcher's thistle, *Cirsium pitcheri*, along with other unique plants of the dunes such as prickly pear cactus, *Opuntia humifusa*.

The gardens also include demonstration prairie plantings, an oak-openings garden, and both drier oak woodland and a floodplain woods. Gardens also include the Jean Avis Wilson Native Orchid Garden, featuring key native orchids and related species. Interspersed among the various gardens is the Herb Wagner Fern Collection recognizing his contributions to our understanding of ferns and the special places



Simulated limestone pavement

where they grow. Wagner was a celebrated faculty member at the University of Michigan, widely recognized botanist, and Director of Matthaei Botanical Gardens.



MATTHAEI BOTANICAL GARDENS
AND NICHOLS ARBORETUM
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Visit during the Annual Meeting



Tufa pile from farm fields, drained former wetlands, in Ohio

Talking Tufa

TONY REZNICEK

TUFA IS MUCH sought after by rock gardeners, but it is surprising how little information is available about what tufa is, how it forms, and what its properties are. In fact, I was able to find only one set of articles in the *Quarterly* (back when it was called the *Bulletin*) about tufa and that was in 1975 (vol.33: 158-161, 167-171). Yet many experienced rock gardeners are convinced that planting on tufa is the key to growing some of the more difficult rock garden plants in our problematic climate – *Porophyllum saxifraga*s, tiny lime-loving rock ferns, and hardy gesneriads, for example. And tufa is intrinsically interesting and attractive, with its complex texture and intricate porous structure but what exactly is tufa?



The first thing to understand is that tufa is not volcanic tuff, a porous rock sometimes erroneously called tufa, perhaps because of the similarity of the names. Tufa is also sometimes mistaken for coral, which is a porous calcium carbonate rock formed by secretions from marine invertebrates. However, tufa is also a calcareous (limy) rock based on calcium carbonate – the mineral calcite. Though the deep calcareous glacial deposits in much of Michigan and the southern Great Lakes region, and our calcareous bedrock, are a source of despair for people who want to grow rhododendrons and other ericaceous plants, these deposits do offer some advantages for rock gardeners. We have a lot of limestone available for our gardens and, most especially, it means we have deposits of tufa.

To get an idea of what our Great Lakes tufa is, it makes sense to start with carbonate rock. In the Great Lakes region, this is limestone (consisting mostly of the mineral calcium carbonate or calcite) or dolomitic limestone, (which contains some amount of magnesium in addition to calcium). In the

The beginnings of tufa – calcite-encrusted plants, stems, and soil surface in a small calcareous seep



southern Great Lakes region, this is usually found as rock pulverized by the glaciers in our moraines and tills, although we also have some areas of solid limestone rock at or near the surface. The other players in this story are water and carbon dioxide. Rainwater picks up some carbon dioxide from the air to form very weak carbonic acid, but much more carbonic acid is then formed in the soil from the carbon dioxide produced by the decay of organic materials. Some limestone is dissolved by this acid, forming calcium bicarbonate as dissolved ions in the groundwater.

The formation of tufa is in effect a reversal of this dissolving process in that groundwater rich in dissolved carbonate and carbon dioxide wells up from the ground and loses carbon dioxide due to warming, consumption by photosynthesizing plants, or agitation and evaporation. When this happens, calcium is reprecipitated as the carbonate in the vicinity of the springs or seeps. So tufa and similar rocks are quite different from typical limestones, in that they are not deposited in layers through sedimentation, but rather formed by a chemical process, even though made of the same mineral.

Natural tufa spring near the bottom of the Ilion Gorge, New York





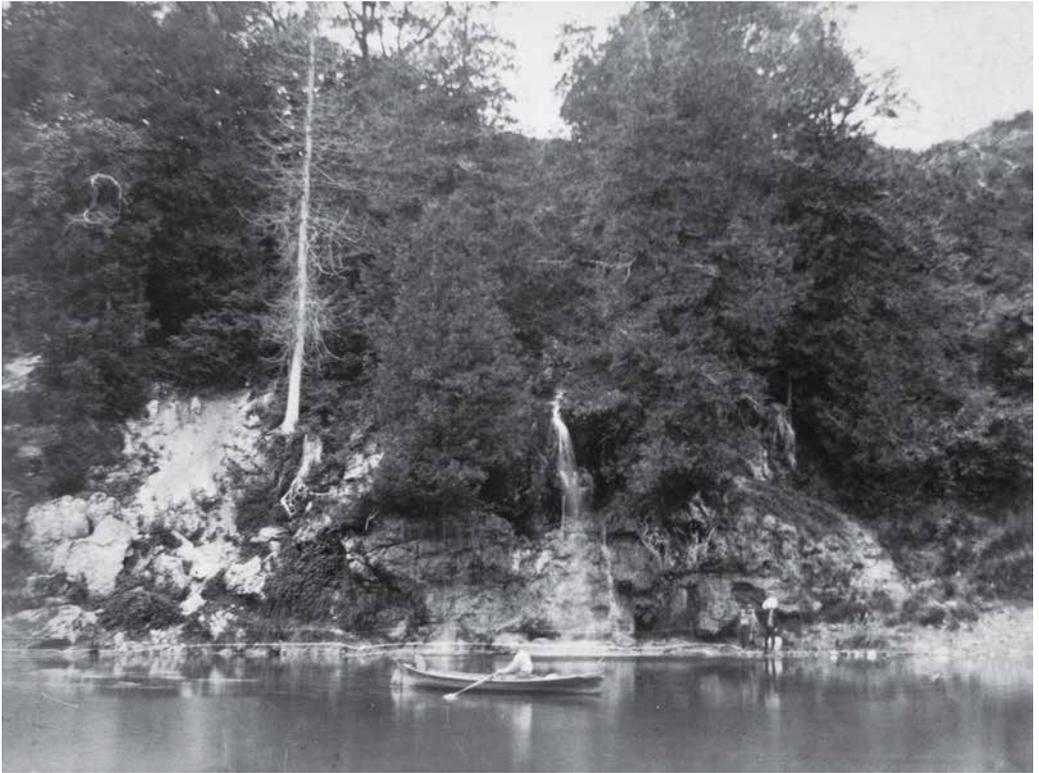
Fossils in tufa (clockwise from top left: moss *Scorpidium* (determination courtesy Bill Buck, New York Botanical Garden); snail shell; cast of *Equisetum hyemale* stem showing jointing; vertical plant stems imbedded in tufa as they were standing.

These “chemical limestones” take several forms. In some caves it is deposited as stalactites and stalagmites. In hot springs, it may be deposited as travertine. In lakes, it precipitates as fine particles, often on plants, and, mixed with clay and organic matter, forms whitish bottom sediments known as marl. And when water at normal (cool) temperatures emerges from the ground at seeps or springs, either on flat areas (such as in fens) or on hillsides, it forms a rock similar to travertine, but softer and more porous: the tufa beloved of rock gardeners.

Tufa deposits are often highly restricted and difficult of access. Many of the more accessible deposits were utilized for building material or other uses. Near large tufa deposits, as in northern Ohio and areas near the Thames River in southern Ontario, walls, foundations, and even stone veneer were all made from the easy-to-shape tufa. In pioneer times, tufa, and also marl deposits, were an important resource and extensively used as a source of lime. Tufa springs were also converted to wells or occasionally even exploited commercially on a small scale as mineral springs.

Most people think of rocks as ancient, and all our sedimentary rocks in the southern Great Lakes region are indeed hundreds of millions of

years old. But another interesting feature of tufa in our area is that it is a very recently formed rock, relatively speaking, and the process of tufa formation is ongoing. While the tufa used by rock gardeners is mostly hundreds or thousands of years old, that is very young compared to



Historical photograph (ca. 1884-1891) by John Hood of large tufa cascade near Komoka along the Thames River, Ontario. Photo courtesy London Public Library.

the ages we usually associate with rock. Tufa is still actively forming in many areas, though usually on a small scale. The late Fred Case famously had an old beer can partially encased in tufa – he used it as a demonstration, not as a rock garden feature.

Tufa is irregular in shape and variable in density and texture depending on the circumstances of its deposition. Much of this variability is due to the tufa forming on and around plants that are growing in the sites where the tufa wells up, typically lime-loving algae, mosses and smaller herbaceous wetland plants, such as sedges, grasses, and horsetails. Indeed, certain mosses and algae have been thought to be important in the formation of tufa. On very active hillside springs that form “tufa cascades,” branches, trunks of small trees, and

other rocks from the slope are all incorporated; the organic materials, of course, decaying over time, leaving holes. A very large tufa cascade existed on the north bank of the Thames River, near Komoka, Ontario until destroyed in the early 1900s, though large tufa boulders are still present along the river there. Many pieces of tufa are decorated by smaller but recognizable tracteries of various mosses, horsetails, and other plant parts enshrined in calcite. Indeed, tufa springs are sometimes described as “petrifying springs.” Some macroscopic terrestrial animals may also be incorporated, especially snail shells. These irregularities can make the surface rough with many fine sharp points; handle tufa with gloves!

Tufa deposits in the portions of the Great Lakes region with calcareous soils are not necessarily rare, but they are hard to find, usually being concealed just under the ground, in wetlands (or former wetlands), or at the bottom of slopes in valleys. Occasionally, tufa boulders will lie on the surface near riverbanks, having had the soil eroded from around them. In parts of northern Ohio, where vast wetlands with calcareous seeps and tufa springs (locally called “blue holes”) were drained and are now farmed, tufa near the surface is sometimes hit by tilling equipment and then piled in the fencerows and field edges, forming the primary source of tufa for rock gardeners in the region. River valley deposits are usually more localized, and intrinsically more difficult of access. A few rock gardens in Michigan have tufa from river valley deposits. These were mostly laboriously hauled out of the valleys; but rarely, good fortune places a road in the river valley below a slope with a tufa deposit one is permitted to harvest. In southwestern Michigan, where extensive deposits of tufa occur along the St. Joseph River, there is even a tufa cave, Bear Cave, locally a minor tourist attraction near the small town of Buchanan. For many years, the primary source of tufa for northeastern United States rock gardeners was the Ilion Gorge, in New York, where the tufa also was formed by seeps and cascades coming out of the slopes in a river valley.

The porous and soft (relative to other rock) nature of tufa would seem to be responsible for its utility to rock gardeners. It can hold large amounts of air or water, like a sponge. Anybody lifting a large piece of tufa quickly learns to do it when it is dry, when the tufa is significantly less heavy. Then you can make quite a macho display, lifting surprisingly large chunks of tufa. I weighed a fully dry piece of tufa of modest size at 2.82 kg. Then, as a simple experiment, I soaked it overnight in a bucket of water. Taken out and weighed after it no longer dripped water produced a weight of 3.31 kg. So this little piece of moist tufa held almost half a kg. of water – roughly 15% by weight! So clearly, tufa has a large capacity for holding both air and water. Not only that,

but with its fine porosity, a piece of tufa sitting on moist soil, can wick up water to stay somewhat moist, especially if dug into a bank, but will also not become waterlogged, even sitting in wet soil. Used properly, it can thus achieve that seemingly contradictory (at least in parts of the Great Lakes region) prescription for growing many of the plants we love – “moist but well drained.” Given that tufa wicks up water from the soil – which then may cool the rock through evaporation, tufa may also help with that other oxymoronic prescription for siting plants one often reads in rock gardening books written by people who have never gardened in the Great Lakes region – “sunny but cool.” And, beyond all that, tufa is soft enough that plants will easily root directly into the rock, and many plants seed readily onto tufa.

“Currently working my way thru my second pick-up truck.” Jacques Thompson





A view of of the Thompson tufa rock garden



Tufa

The Ultimate for Alpines

JACQUES THOMPSON

WITH THE EXCEPTION of the lucky few, most all of you reading this do not reside in an alpine environment. Yours truly, along with everyone else in the Great Lakes Chapter of NARGS, is not counted among those lucky few. In fact I ask you to imagine a flat, packed, clay path, wandering back for almost five unbroken decades. That would be an apt analogy of my gardening life here in southeastern Michigan. So of course, I have taken up rock-gardening, here in the Midwest, the very epicenter of the alpine gardening world! It is after all, merely the naturally rational destination (horticulturally speaking) in a landscape dominated by such soaring peaks as are found on a billiard table, combined with gritty, open, free-draining soil that grows tile-works and endless subdivisions.

You see, the ravages of time, as well as the stellar rise of my career-path, have failed to provide me with sufficient disappointment. Nay, I want to grow *Androsace* and *Eritrichium*, in the rarified air that wafts between Chicago and Detroit! In pursuit of this fool's errand, I have stumbled my way over every conceivable mistake one could make. I have even created new categories of original blunders. Oh, and the unspeakable dollars traded for uncountable, orphaned plant labels. Well there will be no more about that. Yet with the passing years, small victories build up one upon another, and hard-won gains have been made in the garden. I am currently working my way thru my second pick-up truck: the crushed-down bed can now hold about as much rainwater as our dogs' wading pool.

You might well surmise that after all this time I should have amassed a treasury of sage gardening wisdom to share. Alas, I am for the most part a life-long amateur who was lucky enough to have settled right smack-dab in the middle of real rock gardening giants. What's more, it was at a time when alpine nurseries, as well as seed purveyors were plentiful. All of those plantsmen and plantswomen have shown me nothing but generosity and patience, their words and written notes always encouraging and helpful. That I have arrived where I am today with the garden we have, must be credited to all of those wonderfully generous people that Andrea and I have come to know from our association with the Great Lakes Chapter locally, in addition to the many more kindred souls we've met via the broader scope of NARGS, be they visiting speakers we have hosted, friendships formed at National meetings and those we've met right here in the pages of the *Quarterly*, and *Bulletins* of the past. All of the ideas, the tips as well as the tribulations, the decades of amassed gardening knowledge that has been poured at my thick skull. This fellowship of passionate gardeners,

Ramonda myconi 'Alba'



that's the real source of any success I have had as a rock gardener.

I hope I have established that I am no rock gardening-wiz, in fact I am known to have the "Brown Thumb" among my closest cohorts of stone. So, what I would ask you to consider is that a bungler like myself, from as unlikely a rock-gardening state as Michigan might seem to be (with a soil and climate that is far from the "Alpine Ideal" - and let's face the facts, people, less than the "Alpine Ideal" is where most of us are gardening), can



Saxifraga 'Jenkinsiae' - a classic *Porophyllum* saxifrage

succeed with alpines. Whether you are truly a "Master of Gardening" or merely a muddler like me, I believe that one of the greatest equalizers in successfully growing the classic alpines in a non-alpine environment is to grow alpines on tufa.

O.K. O.K. I can hear the collective groans, "Oh sure any yum-yum can grow alpines on tufa." And that is the point I am going to try and make. Just about anyone can grow alpines on tufa as long as those alpines have any chance at growing where you garden. Tufa or no tufa, no one I know is growing *cremanthodiums* or *Himalayan meconopsis* in southeastern Michigan; it's just too hot here. There are countless genera I have as yet to try, or have tried and not yet found the proper siting for them to succeed. However there are many challenging alpines which have performed very well for us here in "Fly-Over-Land:" *Eritrichium*, *Porophyllum* saxifrages, *Phyteuma comosum*, and *Jankaea*, to cite but a few.

Tufa is a soft, porous, water deposited mineral. As Tony Reznicek discusses in his article on tufa, when mineral-rich water exits from the side of a hill, as in a seep, or wells up from below ground as a spring, the calcium-carbonate precipitate adheres to anything it comes into contact with: mosses, grasses, equisetum, even soil. This process continues and the above items become encrusted with minerals to the point where they become entombed within the ever-growing mineral deposit. Additional plants grow, more detritus falls, the mineral plating

continues week after week, month after month, year after year. These tufa deposits grow larger and larger, forming mounds and ridges, covering hillsides, or rimming springs and stream banks. There is a small tufa spring that drains into a secluded segment of the Huron River not far from our home. Tufa has been deposited over the bank and along the riverbed, even coating discarded junk sitting on the riverbed. I have found tufa-coated items such as an old serving fork and a four-inch diameter iron collar nut.

It's when you get tufa into your garden that the magic begins. The relative softness of tufa enables it to be shaped easily, whenever a "just-so" fit is required. My tools of choice when performing tufa alterations include an old claw hammer, brick chisel, and hacksaw. When setting tufa, I bed the chunks of stone directly on top of, or partially nested down into my heavy clay soil. By doing so, the tufa can wick moisture right from the damp clay below, in addition to any moisture that percolates down from above as rain. The gaps between neighboring chunks of tufa are backfilled with a mixture of sand, loam, sharp gravel, and any tufa fines. I have covered a sizeable portion of a hillside in this manner, with very good results.

Having seen pictures of Harry Jans' tufa wall I knew I had to try and incorporate one into the garden. When stacking tufa vertically (in my case against a supporting bank), I paid extra attention to ramming the clay-loam soil into the bank-side of the tufa, filling any voids in and between the stacked pieces. This was done to promote moisture transfer from the bank to the tufa wall covering it. This soil ramming is done with each course laid. I also lay down a thin layer of clay-loam mix before I set the next course, just enough of the mix, so that when I press down the next chunk of tufa that I am setting, the mix is squished into any pockets and voids until each chunk of tufa is resting on the one below it. As with laying a dry-stacked wall, one must pay attention that previously set stones completely support their neighbors without any wiggling of a loose stone. But I am no mason and I do a bit of cheating by mixing up batches of a hypertufa-like mixture; however, I substitute sand in place of perlite, and double or even triple the amount of peat moss, to get the consistency I want. Concrete pigment is added so that my mixture matches the tufa's hue. With judicious placement, I utilize the mixture to blend disjointed chunks of tufa together, and cement in place small, wedging pieces of tufa. I think the results are a realistic-enough-looking tufa bank.

It is tufa's porosity that makes it such an ideal medium for growing alpiners. This porosity is due to the myriad spaces within the tufa's make-up. All of those tiny to not-so-tiny spaces were created by the spaces vacated by decomposed, organic material that became entrapped

The tufa wall





Edraianthus pumilio

within the tufa as it was formed. This mineral, sponge-like matrix allows plant roots to penetrate into the tufa interior, seeking out the moisture and minerals the plant requires. The rest of the plant, sitting out on the bare rockface, reaps the benefits of the water-shedding surface in addition to the added air exposure, especially important in our often-stagnant airflow conditions.

Once in the garden, any new tufa addition is quickly colonized by nearby alpine seedlings themselves. Aquilegias, drabas, small poppies, *Sedum pilosum*, as well as many of the penstemons, readily sow themselves onto tufa. Sadly many weeds will also take advantage of tufa's attributes so you need to be vigilant. If dandelions are allowed to become established they are nearly impossible to extricate from tufa without actually gouging them out!

I have found *Eritrichium howardii* to be quite amenable to sowing directly onto tufa. I empty a packet of seed into the palm of one hand, pick up a dead spruce needle (they are the handiest) touch one end of the needle to my tongue, then grab a seed with the wet end of the needle, and tuck the seed into a tiny pore hole in the tufa. I have followed this technique with many seeds that are too dear to simply sprinkle around. For some reason *Eritrichium* survive the best, though that is probably due to predation by roving herds of pill bugs with no taste for *Eritrichium*. I have had flowering mats of *Eritrichium howardii* up to 4 inches in diameter! Oh yeah; I've got this figured out!

You would think after all of the repeated history, I would know there is no surer call for doom than to think those thoughts. These past two summers, around the time that young robins have fledged, I find remnants of my treasured gems scattered at the base of the tufa wall, shredded, like hair clippings around a barber's chair. Whoever the culprit is, this year they took even last year's seedlings!

When establishing plants onto tufa, it seems most of my fellow gardeners utilize the drilled-hole method. Using a masonry drill-bit such as a 3/8-inch diameter, a hole is drilled into the face of the tufa down into its interior. A rooted cutting, or else a very small division, is selected and its roots are carefully twisted down into the borehole. The hole is backfilled using the tufa dust excavated during the drilling, or a tiny lump of tufa smashed with a hammer. This method of installing plants into tufa seems to work for most; however, I have rarely succeeded with this approach. I take a different path, one that works very well in my garden; I call it "greasing."

As I live in the land of clay I make use of what I have. And I always have a bucket or so of dried-out clods on hand of the stickiest, greasiest clay that I happen to come upon. Once these clods dry they are rock-hard, so it takes a hammer blow to break them into marble-sized pieces. I'll throw a handful of pieces, a dozen or so, into a small plastic bowl and add just enough water to cover the lower quarter of the little clay bits, and let them sit long enough to soak up all the water until they are malleable yet firm. I work them between my index finger, middle finger and thumb, kneading, rolling, and pinching. If I added too much water it won't hold together especially when it dries. I need to add some clay dust and rework it. I want to be able to work each ball, have it hold any shape I make it, compress it without having any cracks open up. If this occurs they are too dry and I work in a tiny bit more water, and rework it until I can compress it without cracks. Think of sculptor's clay, if you have ever had the opportunity to work with any. Somewhat firm, yet with enough slippery-greasiness that your finger slides across it – that's the texture.

Once I've got what I am after, I take a bare rooted-cutting and find an appropriate siting on the tufa. When you've worked with tufa for a while you can recognize the softer areas; they are rougher, more pitted, somewhat darker. I lay out the bare roots across such a patch of tufa and while holding the plant by whatever (stem, crown, or what have you), I take the greasy little ball of prepared clay, set it onto the roots of the cutting, and as I push the clay down onto the roots, I drag or swipe my finger downward from the crown towards the root tips, sandwiching the roots between the tufa face and the clay. It is as quick as wiping toothpaste off your finger, once you've gotten the hang of it. If the cutting has enough of a root system to splay them out on the





tufa face, I'll swipe the clay out in similar fashion. I try and get a clay layer about $\frac{1}{8}$ inch or so in thickness. I have found that this is sufficiently thick that when it dries like adobe it will last for a couple of years. By the time it has weathered away, the roots have penetrated into the tufa's interior. If the clay curls up behind your finger when you swipe it across the roots, the clay is still just a bit too dry; add a couple of drops of water and rework the clay. Also dribble a tiny bit of water onto the tufa where you plan on placing the cutting and try again. Using this approach, I have affixed rooted cuttings of various alpiners onto tufa including *Arenaria*, *Daphne*, *Dianthus*, *Eritrichium*, *Gypsophila*, *Phyteuma*, and saxifrages.

This once-hard-to-come-by stone has become far more available due to the huge deposits of tufa in western Canada. Now garden clubs can pool their resources and purchase tufa by the boxcar load.

But if you attended the 2003 Eastern Winter Study Weekend, you will recall the bounty of local tufa offered on the silent auction tables. That will be repeated at this year's upcoming 2015 NARGS Annual Meeting hosted by the Great Lakes Chapter. What's more, there will be local tufa available by the pallet-load at very reasonable prices and for advanced information contact Michael Greanya <mfg10@comcast.net>.

So forgo the hassle of flying, rent a truck or a trailer, come to Michigan in May and go home with your own tufa bed in the making.

View of tufa hillside looking toward the house

Photo Contest 2015

Give yourself and your friends a treat - see your pictures published in the Quarterly and win a free membership for a friend.

GET YOUR CAMERA OUT NOW - TAKE SOME PICTURES FOR CLASS 1.

Class 1: THE ROCK GARDEN IN WINTER - NEW CLASS

This new class can feature an individual vignette or a more general picture - it doesn't have to be your own garden but please identify the owner. Hint: Frame your image carefully to exclude unattractive and unintended objects ... or move them!

Class 2: PORTRAIT OF A PLANT IN CULTIVATION

Image focused on a single plant, group of flowers, or small group of the same plant in the garden, or in a container (pot, trough or other container).

Class 3: PORTRAIT OF A PLANT IN THE WILD

Image focused on a **single plant** in its native habitat. Ideally, the entire plant should be visible, not just a flower, which is more appropriate to class 5.

Class 4: NATURAL SCENE WITH PLANTS

Image including both wild plants and their surrounding habitat and scenery. This need not be high mountain scenery. Please identify the site. Hint: This is not the same as class 3, and should not foreground a single plant specimen; the emphasis should be on the general scene. Depth of field is a strong consideration.

Class 5: CLOSE-UP

Close-up image (macro or otherwise) of **single flowers** or other plant parts.

Class 6: NORTH AMERICAN NATIVE PLANT

Image may be of any North American native plant in the wild or in cultivation.

Send in your pictures, share your enthusiasm with others—and perhaps win a gift membership for a friend.

In addition to the fame, and the gratitude of the editor, you can win a year's NARGS membership as a gift to a new member of your choice. Entries should be submitted as digital images on CD. Photographs will be archived for future publication. All published photos are credited, and copyright remains with the photographer. Entering the contest grants NARGS permission for one-time use of all images submitted.

INSTRUCTIONS for ENTRIES

Digital images may be submitted in JPG or TIF format. Other formats may cause problems. Submit all your images on one CD or memory stick, with each image file renamed (if possible) with the subject and your initials (e.g., *Phlox hoodii JM.jpg*). If you are entering several classes, it is very helpful to make a separate folder for each class.

Include a text document listing your entries by class, with plant names fully spelled out and any other information you feel should appear in a caption when the photo is published. Please submit this list on paper and also put it on the CD or memory stick as a ".doc", ".docx" or ".pages" file.

You may enter a maximum of ten images in each class but you are free to enter as few as you want. If you just have one perfect picture do send it in.

**The deadline for entries is
April 15, 2015**

PUT THE DATE ON YOUR CALENDAR NOW

ENTRIES SHOULD BE SENT TO :

**Bobby Ward, NARGS Executive Secretary,
PO Box 18604, Raleigh, NC 27619-8604.**

Judging criteria are technical quality, aesthetic appeal, adherence to parameters of the class entered, and suitability for publication. Different judges are recruited each year by the editor and remain anonymous.

Alpine meadow above Krishensar





Boyd Kline: The Old Man of the Mountains in Kashmir and Ladakh

BARRY STARLING

IN THE SPRING of 1978 Boyd Kline wrote to me inviting me to join him and Reuben Hatch in an expedition to Kashmir to see its wonderful flora.

In the year following our expedition, Boyd wrote an account in the *American Rock Garden Society Bulletin* (now the *Rock Garden Quarterly*) vol. 37 no. 3, about perhaps the richest areas for plant treasures that we visited during that trip. Characteristically modest, he presents himself as the guy that just tagged along, but his contribution in the form of knowledge of the plants of the area was invaluable. At the time of the article, color was not used in the *Bulletin* so just five black-and-white photographs were published although Boyd had taken many excellent color shots. He described himself at the start of the article as “the old man of the mountains” so the following, fuller account of our travels is dedicated to that grand old man of the mountains.

Early on the morning of 18th July 1978, I picked up Boyd and Reuben from London’s Heathrow Airport for an overnight stop before all three of us were to continue to Delhi. There was time for a tour of my

garden before lunch, and then we visited Kath Dryden, one of the most noteworthy of alpine gardeners of her time and a friend of Boyd's for many years although they had never met. Kath conducted us around her collection of alpiners and the plant talk flowed freely between the two old friends. Eventually, we settled down into comfortable armchairs in her house while she went off to make some tea. Returning shortly she found Boyd sound asleep. A transatlantic night flight followed by two garden tours had taken its toll.

Next day we set off for Heathrow at 4.45 a.m. The flight to Delhi and from there to Srinagar was uneventful apart from a few delays, and from Srinagar airport we made our way to a houseboat on Dal Lake which was to be our base for a few days. Many of the houseboats were modern but decorated with ornate wooden carvings – ours, however, was elderly and had seen better days. After a tasty supper we retired to our rooms tired from the journey. I tried to switch off the light but nothing happened: twice more I tried but still the light stayed on. The door was ill-fitting and did not close easily so I slammed it. Success – the door closed and the light went out simultaneously.

On 21st July we travelled west to Gulmarg, famous for its high-altitude golf course, but our sights were set on the magnificent mountain range which formed the backdrop to the course. We hired a guide and set off over the meadow, a land already rich with alpine flowers. *Anemone obtusiloba*, 15 cm. (6 inches) high, with petals blue, white, white with blue backs and vice-versa, flowers 2.5 cm. (1 inch) in diameter, studded the turf for as far as the eye could see. Tall elegant *Arisaema tortuosa*, a flower-arranger's dream, displayed its curvaceous pale green spathes in the shade of boulders where the soil was moist. *Pedicularis bicornuta* held up spikes of cream, pouched flowers on 20-cm. (8-inch) stems. As we climbed higher there were two *Corydalis* species among the rock rubble – the yellow *Corydalis racemosa*, and yellow, purple-lipped *C. thyrsiflora*. At this point my American colleagues felt it necessary to correct my pronunciation - "You don't say cory-dal-is" they said - "It's cor-rid-alis" not with an emphasis on "dal" as in "pal" but with the stress on "rid" as in "kid". I was outnumbered so learned to say it their way. Two years later, talking to a group of plantsmen from the eastern USA, I commented "I know how to pronounce the name of that plant, you say cor-rid-alis." "Oh no we don't," they chorused, "we say cory-dal-is." I couldn't win.

In sunny situations, flat-as-a-pancake rosettes of dark green leaves had at their centers blueberry buns of composite flowers. This was *Jurinea dolomiaea*, while close by were truly alpine in character mats of *Androsace sempervivoides*, each tiny rosette having at its center a five-petalled, rose-pink flower. Approaching a bend in the path we could smell fox but on rounding the corner we saw the source of the odour, a *Codonopsis* with large pale blue bells hanging from stems which trailed down the face of a large boulder. We were too late to see spectacular



Cremanthodium decaisnei

Fritillaria roylei in flower, only the green immature seed capsules and tired leaf stalks indicating its presence. Star-like *Saussurea lappa* was here in dark purple flower together with low mats of deep red-flowered *Sedum quadrifidum*, the flat heads being borne on 10-cm. (4-inch) stems.

Taller, and dotted sparsely among the boulders of that rocky landscape were the nodding yellow daisies of *Cremanthodium decaisnei* together with blue-purple to lilac-purple *Primula macrophylla* each with a deep purple eye. Close to my heart were two ericaceous plants: first the dark green mats of *Gaultheria tricophylla* studded with little white bells tinged pink, which would give way to turquoise-blue fruits nestling among the foliage. Secondly, *Rhododendron anthopogon* subsp. *hypenanthum* made low thickets with just a sprinkling of small creamy-yellow heads of tubular flowers. A persistent drizzle did little to dampen our spirits but we were not to know that this visit to Mount Aphorwat was just the aperitif to the feast of plant treasures that we were to see later.

On returning to Srinagar we started to plan for our trip to Leh, capital of Ladakh, but more specifically to the 4000m. pass to the north of that city. This we believed to be home to many plants that we were unlikely to see elsewhere as it was an oasis endowed with a higher

rainfall and snowmelt water whereas the surrounding area was dry and somewhat barren.

Gulzar, our driver, introduced us to Abdul, the cook, and to our mode of transport, an ancient Jeep with tyres worn down in places to the canvas, and as we were to learn later, a dodgy battery and temperamental armature. In this we were about to embark on a 560 km. roundtrip on dirt roads and with very few centres of civilization where spares or repairs could be obtained. As it happened, the state of the Jeep often worked to our advantage as, once mobile, our driver was reluctant to stop for us to botanise. Frequent breakdowns, however, allowed us time to explore the surrounding plant habitats. On one such occasion our stoppage blocked the road, bringing a 200-vehicle army convoy to

Lamayaru monastery in the starkly beautiful landscape of Ladakh



a halt. A colonel, quite large and fearsome-looking, approached, looked under the hood, picked up a rock and struck the engine, or something adjacent, a hard blow then told our driver to try the starter. The engine roared into life and we were on our way again.

About a third of the way to Leh we crossed the Zoji-la, a high pass from fertile Kashmir into arid Ladakh. So startling was the change in vegetation that we began to question why we had come to this place.

It soon became evident that the plants of this region had evolved to protect themselves from grazing animals. Thistles and thorns were the order of the day and although often colorful, plants had an air of “touch-me-not” about them. We stopped by one of the few streams for lunch and Boyd cut slices of mango for some of the local children who had gathered round – this for them was a rare treat. Here was *Lancea tibetica*, a low, mat-forming herb with purple lobelia-like flowers. Boyd discovered a couple of interesting ferns and a corydalis with tall yellow spikes and blue-green ferny leaves. Here too we had our first encounter with *Pedicularis tubiformis* var. *longiflorus*. From tufts of pinnate hairy leaves, yellow flowers with a corolla tube nearly 7 cm. (3 inches) long emerged, the tube broadening into a wide, hooded flower with a crimson blotch at its centre. Standing out in the increasingly grey stony landscape were cushions of rose-pink *Acantholimon lycopodioides*, their stiff pointed leaves giving them the appearance of dark green hedgehogs on their way to a party. A thistle, *Carduus thomsonii*, though not in flower, was impressive with flat green rosettes, 30 cm (12 inches) wide, covered with a multitude of large, silver spines. More subtle with its defences was *Astragalus cicerifolius*, appearing as harmless-looking balls of soft, grey-green foliage. This had flowered and we could see seedpods deep within the plant, but attempting to get at them resulted in stabbed fingers. The midribs of the previous year’s leaves had persisted and hardened to become needle sharp – an effective defence against grazers and grabbers.

Eventually we reached Leh and set up camp on the edge of a field just outside of the town. Next morning we decided to walk into Leh to get a few provisions for our expedition up to the pass and Gulzar was to pick us up later after more tinkering with the Jeep. About halfway to our objective, alongside the road, was a bank about 3 m. (10 feet) high from which gushed a spring liberally sprinkling water over the roadside, and under this natural shower stood a young western woman, blond, slender, attractive and stark naked. We three very respectable gentlemen continued along the road as if we had not even noticed that she was there. I have to admit that out of the corner of my eye I thought I glimpsed an amused smile on the face of this brazen young lady. Gulzar picked us up and we headed for the pass only to be turned back at a military checkpoint.

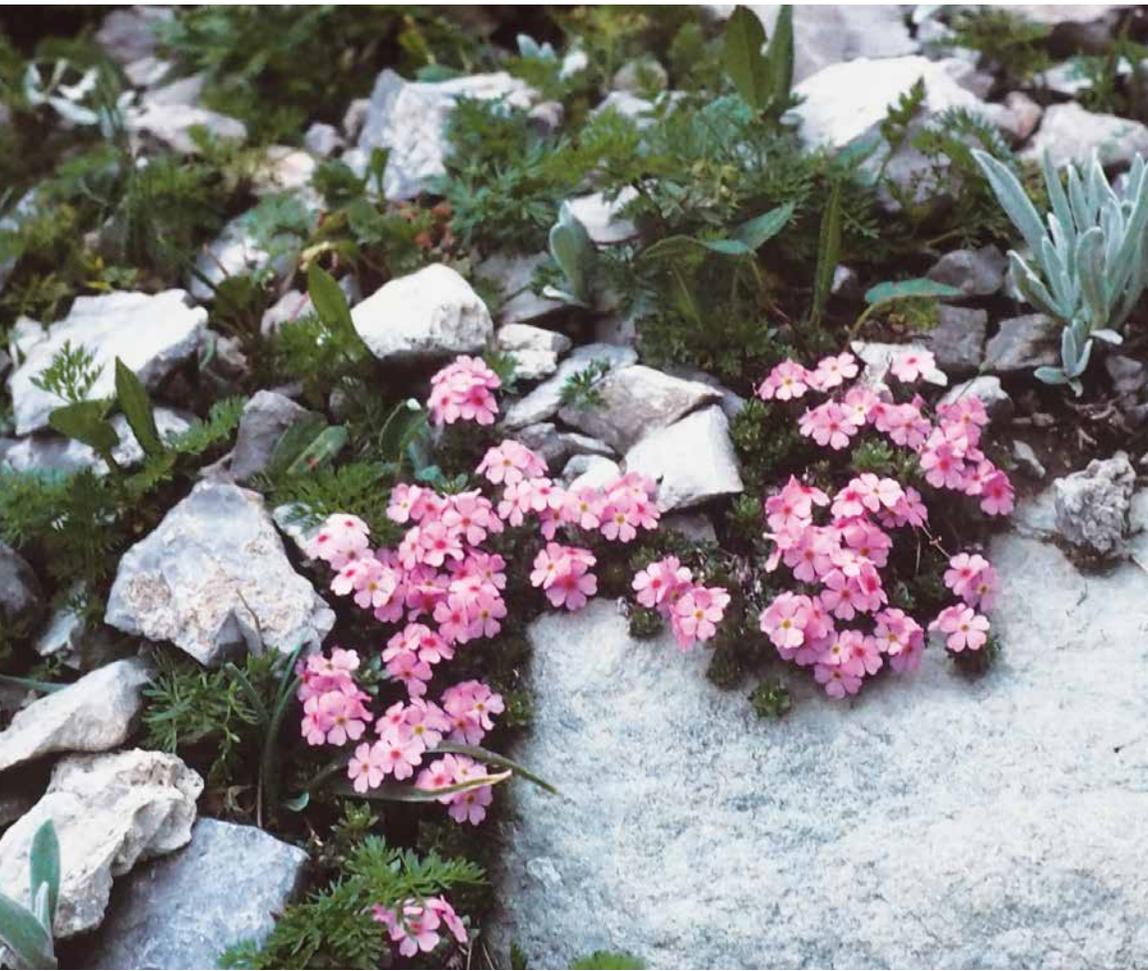


We returned to Leh and sought out the local chief of police to ask for permission to visit the pass but were told that he was unwell but he did emerge from his office for just long enough to tell us in no uncertain terms that we could not proceed to the pass. Undaunted we went to the District Commissioner, a pleasant, educated man who was sympathetic to our cause but explained that he could not even get permission for his wife, a Scottish lass interested in wild flowers, to go up to the pass. We gave up and decided to return the next day to Zoji-la where the grass was greener and the flora richer. That evening we passed on the tail of a bottle of whisky to our driver and cook before retiring to bed. Sleep was prevented by the increasingly vocal output from Gulzar and Abdul and soon after midnight a third voice joined in, an argument ensued ending in sounds of violence, and then silence. Next morning we emerged apprehensively from our tents expecting to see bodies strewn around but all seemed normal. Apparently the owner of the land on which we were camped had arrived demanding rent. Our driver and cook, no doubt with the best interests at heart, had refused and driven away the unfortunate landlord.

During our stay in Leh the only plant we saw worth recording was *Iris lactea*, a beautiful “weed” of the irrigation channels through cultivated fields. This very hardy species produced pairs of pale blue

Androsace muscoidea





Androsace sempervivoides

flowers, each 5 cm. (2 inches) wide, on 40-cm. (15-inch) stems

Finally, at 10.30 a.m. on July 29th we arrived back at the Zoji-la to a fanfare of colour from brilliant scarlet *Potentilla nepalensis*, golden *P. argyrophylla*, and summer-sky blue *Myosotis alpestris*. We left the Jeep and eagerly climbed the mountain slope to the north, soon finding *Androsace sarmentosa*, a familiar plant in our gardens, followed by *A. sempervivoides*, first seen on Aphorwhat; *A. chamaejasme*, with the centre of the white corollas yellow initially but then turning red with age or pollination; and *A. muscoidea* with hairy grey mounds studded with white flowers.

Small clumps of electric blue *Gentiana argentea* were common, though more rarely seen were the hard mounds of *Saxifraga jacquemontiana* bearing plentiful yellow flowers on 5-cm. (2-inch) stems. This member

of the *Hirculus* (now *Ciliatae*) section is unusual in the tight compactness of its rosettes.

The hillside was dotted with goats, one standing close to a particularly photogenic *Rosa macrophylla*, low-growing with sumptuous pink blooms 8 cm. (3 inches) in diameter. Boyd made to shoo the goat away so that he could photograph this beauty whereupon the goat turned towards the rose, plucked a prominent flower and ate it. Reuben, however, had gone on ahead, and soon we heard him bellow "Paraquilegia." We clambered breathlessly up to an area of bare rock to find *Paraquilegia grandiflora* in plenty, sprouting from the fissures and grit-filled hollows. Sadly it was over flowering but we were able to harvest numerous seed capsules from amongst the beautiful ferny green foliage.

Heading downwards we discovered a tiny, prostrate shiny-leaved willow, possibly *Salix lindleyana*, the Himalayan edelweiss (less spectacular than its European counterpart), and the large, white chalice of *Anemone rupicola*, each with a central yellow "button" of stamens. On close scrutiny we discovered that the reverse of each petal was soft pink. On reaching the Jeep we found that Abdul had prepared lunch which we ate amidst the black clouds of exhaust fumes from passing trucks.

Our next stop was Sonarmarg and it was the trek from there to Lake Krishensar and Lake Vishensar that Boyd Kline described in such detail in his 1979 article. His portrayal of the plants we saw and of our trials and tribulations make excellent reading so in this account I will mention just a few of the plants that made a lasting impression on me.

Soon after leaving Sonarmarg the moist grassy floor of the valley was home to countless *Iris hookeriana* with comparatively large, blue-purple flowers on 25-cm. (10-inch) stems. Towards the head of the valley where the sides became steep and rocky a corydalis had made its home in the rock faces. This was *Corydalis crassifolia* with thick fleshy leaves, blue-green and fan-shaped, surrounding a short, stocky stem bearing typical lavender and white flowers. Some had large inflated seedpods but each contained only one or two seeds. Close by on the same terrain were the starfish rosettes of *Saussurea gnaphaloides*, 10 cm. (4 inches) in diameter, with fuzzy, bright purple-pink centres; and the plant which alone was worth coming all this way to see – *Paraquilegia grandiflora* in full and glorious flower, its 3-cm. (1.2-inch) "poppies" of lavender-blue or white waving on slender stems above delicate glaucous leaves. These were always found in a narrow band between about 4000 m. and 4200 m. on limestone or granite, in sun or shade but always in well-drained situations.

Intensely coloured natural rock gardens were made up of short-stemmed clumps of deep blue *Mertensia tibetica* interspersed with cushions of *Androsace microphylla*. A little earlier, *Aquilegia nivalis*, just



Corydalis crassifolia

Saussurea gnaphaloides





Paraquilegia grandiflora

Aquilegia nivalis



10 cm. (4 inches) tall with blue, black-centred flowers would have added to the display but here it was over although we saw it elsewhere. An aristocrat among the alpine flora was the shiny, gold-petalled *Adonis chrysocyathus*, equally attractive later when the flowers gave way to silky, silvery tasselled seedheads. This made plants 30-cm. (12-inch) high, in the wetter spots. Two garden favourites which it was good to see in the wild, also growing in wet areas, were *Primula rosea* and the “golfball” primula *P. denticulata*. Less common were purple or pink forms of *P. elliptica* and rose-pink *P. macrophylla*. After seeking *Cassiope fastigiata* high and low we eventually found it sparsely colonising cracks towards the summit of the mountain. Some years later I was to see it in Sikkim at 4000 m. growing like heather amongst the grass of the alpine meadows – a totally different environment.

Boyd has written of the icy dip we took in the glacial pool close to our camp. Freshened up by this after our day’s toil on the mountain we returned to camp to see a large pot bubbling away over our campfire. The two chickens that we had become accustomed to seeing scratching around the camp had disappeared, presumably into the pot. We sat around the campfire talking until nightfall, observing fat-bodied white moths attracted to the light of the fire. Eventually our meal was served – it tasted good and we were surprised to find crunchy croutons in the soup – an unexpected touch of sophistication in so remote a spot. On complimenting Abdul on his culinary prowess he laughed and pointed to the fat-bodied moths which we now saw were committing suicide into the pot. There seemed no point in throwing up our arms in horror, after all we had quite enjoyed them.

Next day we headed back to Sonarmarg and with the Jeep disabled took a tortuous journey in an overloaded bus the 135 km. back to Srinagar. From there we flew to Chandigar and then took a taxi to Simla where we booked in to the somewhat jaded Oberoi-Clarke Hotel and spent a couple of nights of rest and recuperation. On 6th August we headed north to Manali in the Kulu Valley from where we planned to set out for a few days camping beyond the 4300 m. Rhotang Pass. After a night at the Pinewood Guest House we decided to hire a Jeep to take us to the Rhotang Pass on a mission to reconnoitre and establish if the flora warranted a further excursion. Apprehensively we rented a ramshackle vehicle complete with driver and co-driver to take us up to the mountains for a day. Reaching the pass, we discovered firstly that the goats had beaten us to it and secondly that the flowering season for many alpine species was well on the way to being over. Nevertheless we soon found a large-flowered deep blue *Cyananthus lobatus* in the short cropped turf, followed by *Rhododendron anthopogon* subsp. *hypenanthum* and *Cassiope fastigiatum*, more robust and plentiful here than in Kashmir. In the rock garden *Cyananthus* species are always good for extending colour well beyond the usual spring season.

Suddenly Boyd called out - he had found a beautifully compact form of *Gaultheria tricophylla* with broader-than-usual dark green leaves topped by a multitude of small white bells each with a pink tip to the corolla lobes and red calyces. Apart from three primulas and a corydalis we had seen earlier there was little else and we decided to abandon further exploration.

Getting back to the jeep after four hours, we found the two drivers had been smoking cannabis with all the windows closed and our doubts about their ability to drive us back down the mountain road were considerable. Reuben ordered the co-driver into the back and took over the seat beside the driver. A thick mist had descended and our driver assumed that what he could not see was not important. The journey back was a nightmare; the clutch was failing, doors kept flying open, and our driver sat placidly in place while the jeep gathered speed towards the first of many hairpin bends. By some miracle he negotiated this but approached the next bend at impossible speed. Reuben hauled on the handbrake while shouting to the driver to slow down and just in time we rolled to a halt. Reuben now ordered the driver out of his seat and got his slightly less stoned companion to replace him. We continued our perilous journey, during which the brakes finally burned out, the engine kept stalling and, before we got back to Manali, the exhaust system fell off.

On reaching the town we learned that further landslides would hold up the re-opening of the road so we decided to spend a couple more days exploring the local hills and then head back to Delhi early to allow for inevitable delays. Next day, while Boyd and Reuben headed into town to find a bank, I climbed a hillside to the west of Manali where the giant Himalayan lily, *Cardiocrinum giganteum* was reputed to grow. After three and a half hours searching I had not found it but did come across *Wulfenia amherstiana* growing on shady wet rocks, its multitude of small-flowered, lavender-blue spikes giving an ethereal appearance to the massive boulders. Sadly, the drier conditions of my English garden have prevented me from recreating this scene in cultivation. Growing on a rotten stump was a clump of *Calanthe tricarinata*, its 45-cm. (18-inch) stems bearing numerous typical red and yellow orchid flowers towards the tip. Easing away a small section of the clump I was later able to divide this into three to share with my colleagues and to subsequently enjoy many years flowering in a sheltered spot in my garden.

Unusually, in deep shade a campanula was growing, its pale grey-blue bells and trailing habit suggesting *Campanula cashmeriana*. Down by the river two impressive ferns grew between wet boulders. These proved to be *Onychium lucidum* and *Polystichum acanthophyllum*, the former with pale green 50-cm. (20-inch) fronds of most intricate filigree foliage, somewhat similar to those of the well known hare's foot fern. As the specific name suggests, *P. acanthophyllum*, has fronds reminiscent of *Acanthus* in shape, dark green and firm textured. Subsequently both



of these ferns received Awards of Merit from the Royal Horticultural Society but neither proved totally hardy in the face of an extreme winter.

Next day Reuben and I took a taxi to Naggar, a small village further down the Kulu Valley where we visited an art gallery in the house of Nicholas Roerich, where his paintings are still housed, and then took a walk along a side valley. Growing in the bank alongside our path were hundreds of seedling conifers of various species. I gently eased a few from the bank, placed damp moss around the roots and put them in the pocket of a plastic raincoat. On our return to Manali I inadvertently left the raincoat in the back of a taxi. The following day we called a taxi and set out for Delhi and by coincidence this was our transport of the previous day. There was my raincoat complete with conifer seedlings. Two of those young plants, *Picea smithiana* and *Cedrus deodara*, are now 15-m. (50-foot) and 18-m.(60-foot) trees in my garden, serving as a frequent reminder of a fantastic trip with the best of companions.

Boyd, mango, and local children



NARGS 2015 From the Floor Nominations

Elections of Recording Secretary, Treasurer, and Directors

The first nominations were closed on November 1. The names of those nominated so far can be viewed on the NARGS website at:

<www.nargs.org/2015-election-officers-and-directors>

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

The combined list of candidates will be published on the NARGS website and in the Spring 2015 *Quarterly* which will be dispatched around March 20.

Election online April 15-30 prior to early May AGM with the announcement of election results at the Annual Meeting in Ann Arbor, May 7–10, 2015.

WE STILL NEED NOMINATIONS for the post of TREASURER. If you think you can do this job please think about standing.

From the floor nominations for any post should be sent by post or emailed to:

**NARGS Executive Secretary, PO Box 18604, Raleigh, NC 27619-8604
or emailed to <nargs@nc.rr.com>**

Nominations should include:

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

All nominations and required nominee information must be received by February 1. The bios and pictures of all candidates will be published in the next (spring) issue of the *Quarterly*.

NORTH AMERICAN ROCK GARDEN SOCIETY		
	<i>The Rock Garden</i> QUARTERLY	<i>winter</i> 2014 2015
		volume 73 1
NARGS Bulletin Board		

From the President

I am hardly a hero, but as many of you know, I do work with many of them – Spiderman, Ironman, Wonderwoman – and what do they all have in common? They care. Really. Because if they didn't care, they wouldn't be superheroes at all. Caring is what drives them. Heroes aren't paid, they aren't elected into their positions. They don't get promoted because they are heroes, they just do what they do for the greater cause because they simply can't help themselves: they care. I'll happily admit that I am far from a hero, but I do care; and NARGS really needs more of you who care to get involved.

It's true that NARGS has a few heroes already but we need more if NARGS is going to survive and flourish. Our capable and dedicated officer team manages many activities, including the day-to-day administration, the *Quarterly*, the Seed Exchange and government liaison, the Speakers Tour, and the website, all active roles which are continually shifting into an uncertain future. Are you ready to get involved? Please consider being part of it all – get involved in any capacity – whatever your expertise is NARGS needs you more than ever before.

You say that you don't have enough time? Believe me – no one understands the "I'm already too busy" excuse more than I do. With my blog, a full time corporate position, and of course my garden, I barely have time to do laundry, but I do all this because I care and because I enjoy it. If you too care about NARGS, and this wonderful pastime we all share – then please get involved. You will benefit our community and you will enjoy it as I do.

I remember my parents telling me that the older one gets, the faster time flies by – I now realise just how true this is. Santa Fe was just a few months ago, and here we are looking forward to our 2015 AGM in Ann Arbor – which should be awesome, by the way, and this special issue of the *Quarterly* gives you a flavor. The passage of time also

NORTH AMERICAN ROCK GARDEN SOCIETY

Donation Form

Your financial support for NARGS programs is important and appreciated. We are a 501(c)(3) tax-exempt organization and accordingly your donation may be tax deductible. The purpose of the society is to encourage and promote the cultivation, conservation, and knowledge of rock garden plants, their value, habits, and geographical distribution.

Please consider giving to any of the following:

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Web site (Instructional videos, stand-alone membership database) \$ _____

Seed Exchange \$ _____

Speakers Tour \$ _____

In Memoriam \$ _____
(In whose name: _____)

In Honor of \$ _____
(In whose name: _____)

Norman Singer Endowment Fund \$ _____
(Supporting projects for research, plant exploration, and other extensions of NARGS mission)

Geoffrey Charlesworth Rock Garden Quarterly Writing Prize \$ _____

General Fund \$ _____

Your name and address: _____

Okay to be listed as a donor on the NARGS website and in the Quarterly? _____

Please mail completed form to:

Bobby Ward, Executive Secretary NARGS, P.O.Box 18604, Raleigh, NC 27619-8604 USA

or you can donate online at <www.nargs.org>

makes one conscious of the need not to waste time when essential changes are needed. I will share more of these ideas with you soon with exciting changes to come but I ask each of you to please consider how risky it is not to change sometimes.

I would hope that our membership will see the value of a sleeker board, a more efficient budget, and hopefully at the same time, more events to participate in. All of these things won't happen unless we accept change, and work together in helping others be more comfortable with change.

I believe that NARGS has an exciting future, but it is at risk due to our budget. So I am not beating around the bush – our budget needs some creative minds working on it, and we need substantial donations, gifts, and endowments. All this also needs a new treasurer (since Bill Adams is coming to the end of his term) and a clever and brilliant investment committee to help oversee investment decisions (which we are building, but it needs more involvement). So if you are a retired accountant – here is a spectacular opportunity to be a numbers hero as our new treasurer or a key member of our investment committee

In the end, during this slow season of reading, garden planning, and list making – I ask you to add to your New Year's resolutions "BECOME MORE INVOLVED" – whatever your expertise, NARGS needs you.

Be a NARGS hero – no tights required.

Matt Mattus

President <mmattus@charter.net>

NARGS Donations

**Donations between August 2, 2014 and November 3, 2014 - \$960
Applied to the general fund and in memory of Boyd Kline and Morris West.**

William (Bill) Brown (New York)

Graham Egerton and Anne Redfern (New York)

Elizabeth (Betsy) Knapp (New York)

Mason-Dixon Chapter of NARGS (Maryland)

Siskiyou Chapter of NARGS (Oregon)

Marna Tallman (Oregon)

Jean Worthley (Maryland)

Elisabeth Zander (Connecticut)

Peter George

Berkshire Chapter Award for Service

Peter George joined the Berkshire Chapter of NARGS in 1996. He tells the story of sitting down at an empty table; it was his first meeting, an annual luncheon. The next person to sit down there was Geoffrey Charlesworth, then, naturally, Norman Singer. Eventually they were joined by Fred Case, the featured speaker. It took a friend of his whispering, "Do you KNOW who you are sitting with?" for him to get his first inkling of the rarified air in which he would eat his lunch.

Was that really 18 years ago? Well, in that 18 years Peter has filled many important roles and worn many different hats. He was the driving force behind the chapter hosting a winter study weekend; the one we all will cherish forever, as the final speaker was the last talk ever given by Geoffrey. Peter was the instigator of a very successful annual luncheon with at least four NARGS chapters with members in attendance. Peter has held the position of chapter chair and has run the lion's share of our monthly plant sales and auctions. He has done many of these things simultaneously. But without a doubt his talents have shone brightest as editor of our newsletter, ranking it up there alongside the best in the society. He knew how to coax an interesting article out of almost anyone. He also seems to know almost everyone, so could call in an article from far-flung contributors. He had a light, gracious hand with the editing and a more lavish one with encouragement and praise. And he has served three years as NARGS president.

Someone once called Peter "a Force of Nature." He is talented at recognizing where change is needed and good at galvanizing people into action.

There are plenty of times in an organization like this when key positions goes wanting, needing to be filled. After so many times stepping into the breach for us, I think it is time to thank Peter George for all his work.

Submitted by Lori Chips

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

Jack Lambert, Ithaca, New York

S. Morris West, Jr., Red Lion, Pennsylvania

Some of you have never supplied NARGS with an email address. Would you provide it for an occasional message from NARGS? We do not share email addresses and it helps us keep in touch with you.

Please email <nargs@nc.rr.com>

New Members

*Welcome to all those who joined between
July 24, 2014 and November 3, 2014.*

Ayton, Alan, 64 Huon Rd., Tangambalanga, VIC 3691, Australia
Bassett, Dorothy, 714 Windsong, Trail, Austin, TX 78746
Berg, Harold, 1900 E. Gunn Rd., Rochester, MI 98306
Boulby, Christine, 10 Quarry Ave., Acklington, Morpeth NE65 9BZ
United Kingdom
Brenda & Francis Nossell, 12316 Jerusalem Rd., Kingsville, MD 21087
Byler, Patricia, 2202 Forest Park Dr., Jackson, MI 49201
Cain, Cynthia, 51 W. Kimberly Dr., Fort Thomas, KY 41075
Campbell, Craig, 111 Cadiz Rd., Santa Fe, NM 87505
Cansler, C. Alina, 1617 Stoddard St., Missoula, MT 59802
Constantine, Tracy, 921 Fernwood, St., Emmaus, PA 18049
Einolf, Harriette, 1081 – 8th St., Boulder, CO 80302-7105
Faraino, Richard, 531 47th St., Brooklyn, NY 11220
Feely, Joan, 8644 Plymouth Rd., Alexandria, VA 22308
Flynn, Barbara, 1332 – 232 Pl. NE, Sammamish, WA 98074
Ford, Susan, 2301 Wooded Knolls Dr., Philomath, OR 97370
Gallagher, Lee, 171 Alta Mesa Rd., Woodside, CA 94062-3545
Harnik, Alan, 4 Ridgeway St., Ann Arbor, MI 48104
Jones, Diane, 5218 Castle Dr., Boise, ID 83703
Knepper, Kate, 1407 Winfield, Dr., Fort Collins, CO 80526
Laporte, Adele, 959 Forest Rd., Ann Arbor, MI 48105
Liaw, Jeri, 332 Lincoln Rd., Brooklyn, NY 11225
Miller, Sue, 1807 Hanover Rd., Ann Arbor, MI 48103
Moen, Geir, Togstadvegen 808, Skogbygda 2164, Norway
Portka, Keith, 201 Allegheny Ave., Cheswick, PA 15024
Rawlings, John, 621 Knoll Dr., San Carlos, CA 94070
Redington, Eve & Philip, 170 Hicks Pond Rd., Averill Park, NY 12018
Roselle, Anita, 254 Raines Cove Ln., Brevard, NC 28712
Soto, Susan, 3029 SW Cascade Dr., Portland, OR 97205
Steinhoff, Julie, 106 Sanderson Ave., Dedham, MA 02026
Stevens, Rob, 7563 11th Ave. NE, Seattle, WA 98115
Stikes, Margaret, POB 292, Leongatha, VIC 3953, Australia
Walker, Cindy, 7320 Montagne Circle, Anchorage, AK 99507
Willis, Rosemary, 3 Loris St., Bowral, NSW 2576, Australia
Winchell, Brian, 15500 Roosevelt Rd., Hemlock, MI 48626

Life Members

The following recently became a NARGS Life member:

Urs Baltensperger, Canby, Oregon

SEED EXCHANGE

To those of you who donated seed for the NARGS Seed Exchange: our heartfelt "Thank you!!"

Without your contributions, there would be no seed exchange at all - - and that simply doesn't bear thinking about.

By now the 2014-2015 Seedlist has been completed, and online and mail ordering are well underway. Those picky *seedistas* among you who simply must have only certain seeds (and you know who you are) have very likely completed this annual ritual - and we hope you found the process smooth and satisfying.

New members, and members who are new at ordering or computer-shy, will find the process is quite easy.

If you have changed your email address lately, or have not used the online ordering system before, please be sure that our Executive Secretary, Bobby Ward <nargs@nc.rr.com>, has your most current email address.

To access the seed ordering, you will need to be logged into the NARGS website. So, if you haven't already done it, set your own user name and password - - then store that information where you can easily find it! There are FAQ pages on the NARGS website that explain just how to do it.

There is still time to place an order for the main distribution of seeds: the deadline isn't until February 5.

If you need a printed seed list, please contact me immediately:

Joyce Fingerut
537 Taugwonk Road
Stonington, CT 06378
U.S.A.
<alpinegarden@comcast.net>

A gentle reminder: All members (domestic and overseas) must pay for their seeds in the main distribution. Participation in the seed exchange is no longer included in the membership fee for overseas members.

But wait! There's more! Beginning on March 1, you will be able to access another list for a second round of orders - again, online or by mail. You may order from this list whether or not you participated in the first round. There are always a surprising number of rare and desirable seeds still available, but the ordering period is somewhat shorter: from March 1 to March 20, so be sure to order quickly.

Please Note if you will be mailing your order: Completed orders should be sent to the addresses on the Order Forms. This year, we are very grateful to the following two chapters for handling the two seed distributions:

Piedmont Chapter (Raleigh, North Carolina): main distribution
Rocky Mountain Chapter (Denver, Colorado): second round

Once your seeds are received and sowed, and you're plotting where to plant all those new seedlings, do give a thought to all the seeds that you could donate from your gardens, or your travels, next season. It's only fair to add your own contribution and not rely entirely on others. And don't feel that you haven't anything special to offer: what may be common for you could very well be exactly what someone else is looking for... or very rare in another country.

I wish you great germination... and an early transition to spring!

Joyce Fingerut, Director
NARGS Seed Exchange

Obituary S. Morris West, Jr. 1935-2014

Long-term NARGS member, Morris West, died at age 79 on October 23, 2014, at his home in Red Lion, Pennsylvania. Morris and his spouse of 53 years, Nicholas West, have been members of the Delaware Valley Chapter of NARGS and co-founders of the Mason-Dixon Chapter.

Morris was born in Clarksville, Texas, and worked as a microbiologist in quality control of analytical equipment, retiring from Becton, Dickinson and Company in Hunt Valley, Maryland.

He was a member of NARGS since 1982 and the recipient of NARGS chapter service awards and the Award of Merit. He is the author of six articles in the NARGS Quarterly, including articles on seed propagation and bog gardening. He was a board member of the Horticultural Society of Maryland.

Condolences may be sent to Nick Klise at 127 Halls Road, Red Lion, PA 17356-8833. Memorial contributions may be sent to the North American Rock Garden Society, POB 18604, Raleigh, NC 27619-8604 or on-line at <www.nargs.org>.



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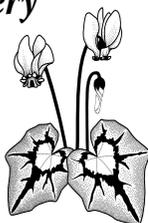
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2015 Election Reminder

If you have not made a nomination for NARGS Board for the three open positions of Director, or for the positions of Recording Secretary and Treasurer, you still have the opportunity to do so. Nominations may be submitted until January 31, 2015.

Nominations to date have been posted on the website but further nominations are welcome.

SEE PAGE 80 for FULL DETAILS

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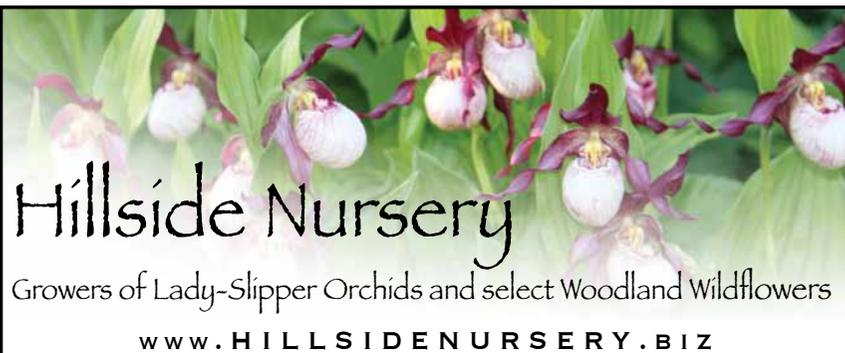
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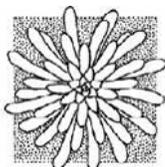


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Genesee Valley (Rochester, NY), Southern Appalachian (Asheville, NC), and Shasta (Etna, CA) chapters are currently inactive.

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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, nine elected directors, and the chair of each NARGS chapter. Chapter chairs are required to be NARGS members by NARGS by-laws.

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.

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Vice President	Betty Anne Spar, bettyannespar@gmail.com 206 Wolfe St., Alexandria, VA 22314
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Executive Secretary	Bobby J. Ward (919) 781-3291 PO Box 18604, Raleigh, NC 27619-8604 nargs@nc.rr.com
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