

Bulletin of the
American Rock Garden Society

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Foreward

In this issue we bring you reports about two places which ARGS members will visit during the Wilmington convention this summer. Both are exceptional gardens. Winterthur, which has been open to the public for many years is well known. But Mt. Cuba Center at Greenville, DE, which has not been so accessible, will be a special treat because it has a superb collection of Piedmont native plants.

Geoffrey Charlesworth muses on spring in the rock garden, Judy Glattstein discusses hardy members of the Araceae family, and Jim Jones

follows his alpine house through the year.

For travelers, armchair or not, Wally Alberts explains some of the ways to make Alpine plant trekking more productive. Jim Eckenwalder gives us a taxonomic review of alpine and arctic poppies and Joan Means describes some of her favorite crucifers.

We received many comments on the format and size of the Winter Issue of the Bulletin, and would welcome additional suggestions you may have.

Ted Marston

On the Cover: Poppy, a wood engraving from the *Natural History of Plants; Their Forms, Growth, Reproduction and Distribution*, published by Blackie & Sons, LTD, London, 1902.

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Calendar of Coming Events

Annual Meeting (Delaware Valley Chapter) Radisson
Wilmington Hotel, Wilmington, DE.....June 16 - 19, 1989

Eastern Winter Study Weekend (Piedmont Chapter)
Sheraton Imperial Hotel,
Research Triangle Park, NC.....Jan. 26 - 28, 1990

Western Winter Study Weekend (Northwestern Chapter)
Red Lion Inn, Bellevue, WA.....Feb. 23 - 25, 1990

Any Grey Poupon?

Joan Means

Some people will always prefer coarse mustard to Dijon, and some think the only mustard is Heinz. Likewise, many rock gardeners have a mental block about crucifers, to the point of forgetting that some of our favorite plants belong to that huge family with four-petaled flowers. At shows with a crucifer class the entries are nearly always drabas. Yet our gardens are full of mustards — in pink, white and purple as well as yellow — and would be drab (if not draba) without them. *Iberis*, *Aubrieta*, *Alyssum*: they are where most of us start rock gardening, and maybe where we will end as energy fails. But there are many interesting (and some elegant) crucifers, and my purpose here is not to survey the entire field but to enumerate a few which have given me pleasure.

To help extrapolate my experience to other regions of the country: My garden, near the New England coast, is subject to high rainfall, heat, and humidity in summer; winter temperatures rarely drop below minus 10 F., but snow cover is unreliable.

That stalwart of our first rock gardens, *Arabis*, is a good place to start. The well-known *Arabis caucasica* is too rampant for all but the most extensive rock garden. On the other hand, a plant I acquired as *A. sturii* (but it might be *A. procurrens*) I find very useful. It has shiny,

pointed evergreen leaves about an inch high, and in spring erupts into a forest of very good white flowers on 3-inch stems. The dense, ever-expanding mat can be controlled easily, and the plant is sturdy enough to use as a groundcover. I like it around a 12-year old *Chamaecyparis pisifera* 'Tsu Kuomo' which is about 6 in. high and would be overwhelmed by most other ground-covering plants.

There are other good foliage *Arabis* to look for (*A. ferdinandicoburgii* 'Variegata' for one) and there even are a few in the genus which make buns worthy of placement in troughs. They are *A. bryoides*, which I finally got true from seed last year, and *A. androsacea*, which Siskiyou is offering this year. The foliage of both is small and somewhat woolly, and while some gardeners say they can be grown on screes, several authors suggest they are better grown in the alpine house. I haven't tested them outdoors as yet.

While on the subject of *Arabis*, let's discuss the purple-pink horror. You know the one. It makes a nice rosette of attractive dark green leaves which certainly doesn't look like a weed. I've seen it at plant sales and even shows as *Arabis blepharophylla* (a tender Californian), *A. kelleri* (which should have gray leaves) and *Thlaspi* sp (and maybe that is what it is?) I've had it twice

masquerading as *A. androsacea*. Grown in a substantial colony, the 6 in. stems of purple-pink do make a statement in the predominantly yellow and white of early spring, but the plant is a menacing self-seeder. If you have it, I wish you'd keep it to yourself.

Many crucifers have a tendency to seed all over the place, which may be good or not. The wallflowers, for example, are pleasant plants which are short-lived in my garden, and are probably best kept as self-seeding colonies. Wallflowers come from all over the world, and there are even tiny pink ones living in Colorado. One of my favorites is *Erysimum nivale* from the American West. It makes neat tufts of stiff, pointed leaves, and the good primrose-yellow flowers are on stalks about 6 in. high.

Aethionemas are little shrubs from Mediterranean regions which either have lovely pink flowers or skinny insignificant ones. Naturally, it is the latter which self-seed all over the place. *Aethionema pulchella* is a good one, with large heads of lovely clear pink. Out of bloom it makes up into an upright gray bush like an elegant lavender. Good too is the well-known *A. 'Warley Rose'*, which even garden centers (at least in Massachusetts) now carry. Thought to be a hybrid, it has dark pink flowers and green leaves — the garden effect is that of *Daphne cneorum* tumbling over a rock or the edge of a wall. Old plants of 'Warley Rose' may die in open, cold winters so keep new ones coming along via

cuttings. Naturally, seed of 'Warley Rose' offered in the exchange could be anything but the real thing.

Many crucifers make evergreen or ever-gray shrubs which would earn their keep even without flowers. The candytufts, of course, have long been valued not just for their dazzling display of white flowers, but also for their green mounds (aided by shearing) which offer year-long interest. Dwarf candytufts are no harder to grow, and do the same for small rock gardens and troughs. *Iberis saxatilis* is only about 2 in. high; *I. sayana*, named by the nurseryman LePiniec, looks the same to me. Maybe someone can set me straight on the differences. The ptil-trichums also make interesting small shrubs, these under a foot tall. Apparently there are a number of species, and most have white flowers. *P. spinosum*, in its variety 'Roseum' is the one most frequently seen in gardens. The pink can be wishy-washy, but sometimes one comes along with really vivid color which can, and should, be propagated by cuttings.

The drabas. Oh dear, there are so many (250, according to Ingwersen) and so many that really don't do well in my garden. That is, they simply don't often make up into big mounds as I dream they should, but quit when they're maybe half a dozen rosettes across. (I noticed that drabas out West do the same, with big cushions developing only in optimum conditions.) Luckily they self-seed, so there are always some *D. aizoon* or *D. lasiocarpa* or *D. hispanica* or

whatever showing acid yellow flowers with the first spring sunshine.

A few drabas do better in my garden, and a few are wonderful enough to fuss over in the alpine house. Rather similar in habit are three drabas from the Caucasus and Armenia, which form nearly spherical hummocks of tiny green leaves spangled with yellow flowers on thread-like stems. They are *D. rigida*, *D. bryoides* with smaller leaves, and *D. bryoides imbricata* with minute ones. Given sharp drainage, their culture is straightforward once they are established. They are slow growing and the initial rosette is very tiny, so they must be cosseted for the first few years.

Another nifty draba is *D. dedeana*, a gem from the Pyrenees with tight huddled little rosettes of rounded leaves with large white flowers. If you have a plant with pointed leaves and little flowers I don't know what you have, but please don't send the seeds to the exchange.

The American West is full of grand drabas, some of them really cantankerous about watering needs etc. I can, however, recommend *D. incerta*, a mat-former with largish gray-green leaves and curious rounded yellow flowers which look like beads on the short, sturdy stems. It is small enough for a trough and tough enough for the garden. Two more westerners I like are rather similar (in fact I have trouble telling them apart). Both *D. densiflora* and the grayed *D. oligosperma* make neat buns of bris-

tly little leaves, and both are desirable.

Desirable is also the word for two drabas from the Caucasus which, alas, are probably not for the open garden. Small plants may succeed for a while but probably won't achieve the large domes for which these species are famous. *D. mollissima* is almost mossy, while *D. polytricha* has larger leaves; both have yellow flowers which some enthusiasts actually remove so as not to spoil the classic "polster" (German for cushion or pillow) shape. These drabas are too woolly to tolerate winter wet, and maybe even summer wet, but given protection and careful watering they can achieve awesome proportions. A *D. polytricha* in my alpine house overlapped a 14-inch pot before it died in last summer's heat and humidity. Six months later the dome is still firm. I may exhibit it (as Frank Cabot once did - and won a blue ribbon! - with a grey, deceased helichrysum) as variety *rigormortis*.

So many good crucifers come from sunny, dry areas of the world — Spain, Turkey, the American West — that it is easy to overlook the fact that some desirable mustards enjoy cool and shady conditions. *Hutchinsia alpina* certainly isn't in the first rank of coveted rock plants, but it has good white flowers and a mat of neat, pinnatifid evergreen leaves. It does well in light shade as well as sun. Of the woodland crucifers, the dentarias (sometimes listed as cardamines) are notable. Our Eastern native, *Dentaria diphylla*,

makes a deciduous groundcover by slowly expanding stolons; self-seeding, at least in my garden, is not extensive. The white flowers are substantial. The plant co-exists especially well with *Dicentra cucullaria*, which dies down just as the dentaria leaves appear. There are other woodland dentarias, mostly from Europe, which I covet. They have showy pink flowers but for some reason are rarely offered in seed exchanges. Seed may not germinate well: apparently they resent pots, and Linc Foster told me the best bet is to plant the seeds directly in the open ground.

The ubiquitous mustards can appear in some surprising manifestations. Some from the American West and from Africa look more like sedums and sempervivums than anything else. Curiously, the African is easiest to grow. *Eunomia oppositifolia* is actually a little shrub though it appears as a mat of sedum-like fleshy, gray leaves. It has proved easy and hardy in New England, and is probably the first plant to flower — the dark purple buds, opening into nearly white flowers, may appear in late March. Looking more like sempervivums are the physarias of the West. The gray rosettes in some species are huge, and the good yellow flowers on splaying stems develop into round seed pods which are interesting in themselves. Sadly, they have not proved long-lived in my garden, nor have they self-sown.

If a fleshy-leafed African crucifer is hardy, you might think that a mustard with dandelion-shaped

leaves hailing from the Mediterranean would present no problems. Not so. *Morisia monantha* has lovely large flowers nestled among the long serrate leaves and is a most attractive plant. Unfortunately it comes from the beaches of Corsica (an alpine is what you want it to be?) and the great water-seeking roots seem susceptible to cold. It departed my unheated alpine house one winter when the temperature dropped below 15°F. Given good drainage and a more reasonable climate, it is a desirable plant of ordinary culture.

I'll wind up this sampling of mustard with three purple-flowered crucifers. *Matthiola fruticulosa* is one of my favorites, though it can be invasive and is up to a foot tall. This hardy stock will wander through a scree, putting up short tufts of narrow gray leaves from which emerge, for a long period, stems of really large and vibrantly purple flowers which are even good for cutting. Too vigorous to let loose near choice plants, it still deserves a place in the garden. By contrast, *Petrocallis pyrenaica* is a most modest plant with distinctly un-flashy small flowers of pale lavender. Yet for me it has an endearing charm. Closely related to drabas (and sometimes listed as one) it makes a mat of tiny stems clothed in minute, wedge-shaped, cleft leaves. It seems hardy enough in the open garden, but might better be appreciated in a pot, trough, or small raised bed.

Finally, there are the aubrietias. We all know them, though they appear more often in European gar-

dens than American ones. There are all sorts of cultivars, though some rock gardeners think the original wild form of *A. deltoidea* is the best. Now Siskiyou is offering *A. gracilis* which sounds delectable. It has, they say, "tiny leaves forming a hard-textured mound" some 3 in. high and 12 in. wide. Of course I ordered one. As with all newly acquired plants, it will go into a pot to stay until cuttings can be rooted and tried in the

open ground. Will it prove hardy? Easy to grow? Time will tell. As you may have gathered from this discussion, the mustards are many and surprising in their diversity, even if not all are Grey Poupon.

Joan Means, Georgetown, MA, and her husband, Bob, have been rock gardening seriously since 1976. They also grow many other garden plants, including perennials and cut flowers.

The Rock Garden in Spring

Geoffrey Charlesworth

Some time after mid March one or more of the following significant events occur: Canada geese fly over headed North; cold frames are left open all night; a snowdrop bayonet drops its head and opens; redwings, cowbirds, robins, starlings, grackles arrive, grosbeaks, juncos, red squirrels leave; a warm rain thaws the ground; the first windless 70 degree day since fall arrives; turkeys scratch the parking lot, raccoons quarrel after dark, chipmunks scabble in the leaves, hawks circle - all looking for food; the first seedlings sprout; the grass greens. Some combination of these events signifies the onset of Spring. There will be setbacks later: major snowstorms, heavy frosts and floods, but we know that these tiresome delays cannot change the basic fact that days are longer than nights and the sun, given a chance, will get warmer.

Seed is still arriving by mail but is reduced to a trickle- stray packets

from tardy friends, or leftovers from a fellow seedaholic. Seed sowing has stopped except for the annuals and these will probably be done before mid April. What do we do in Spring? Garden work is mostly cosmetic - if you didn't weed in the fall you have to start right away (it may already be too late), if you didn't edge in the Fall, the garden won't look right until you do it. It would be impossible to have picked up all the fall leaves so you can do that too, along with all the branches and twigs shed through the winter by wind battered trees. And you can pick up the bits of plastic pot you stepped on last November, the broken trays, plastic bags, styrofoam packing and other detritus of the busy winds. As you weed and scavenge you can carry with you a bunch of fresh labels to replace the sad, shattered shards that litter the March garden. You will also need a pencil and a flat object to double as a writing desk. Labels written on your knee while

you balance yourself on your heels in a stiff breeze with cold hands and a runny nose are seldom decipherable later in the year.

By the beginning of April the garden is mostly cleaned up and you are ready to receive the plants you ordered in so prodigally from the mail-order nurseries in January. Like buses in New York City these ignore prearranged schedules and arrive a cluster one day then nothing for two weeks. On days you get a multiple delivery everything has to stop except plant handling. First, though, you have to get into the box after guessing which side is up. then you have to get rid of several cubic feet of newspaper/ styrofoam/ excelsior/ peat moss/ and unravel several feet of sticky tape/ rubber bands/ aluminum foil/ plastic wrap. All this is part of an obstacle course to test your love of alpine plants and as partial penance for ordering more than you can handle. As you disinter and disentangle the plants one by one you should pot them up. I use ordinary seed compost. Never plant them directly in the garden. I used to do this and had many failures. The only exceptions are plants that are simply too big for the pots you have available. Then you must plant out whatever the weather, water in and cover with a bucket. If it is actually snowing you might want to sit each plant in shallow water until planting out is less harrowing. If a plant looks sickly or small, treat it as a cutting by starting it off in sand. If plants arrive in the pots they were grown in, you may feel that you can just put them in a

cold frame until you are ready to plant out. However, it is usually sound policy to repot. Replace their soil with your own mixture and comb out the roots. Potbound plants almost never establish if you just plug them into a big enough hole and firm down the soil. I have a little rake designed for indoor gardening that acts as a root comb. Heathers and other plants grown in a peat mixture need fairly rough treatment and of course a similar compost. Beware of woody plants that have an underdeveloped root system; these should be left in peace in the pot they came in until they have a decent set of roots.

Buying plants is fun and the nurseries do us a great service in offering new plants, rare plants, well grown plants, beautiful forms. But any consignment can contain a disappointment. Expect this and try not to write endless complaining letters to nurserymen at shipping time. For reasons never fully explained there is always a nursery that ships in late May when you requested early April. This too requires patience. Once in twenty years I failed to get any order at all. Once or twice I have actually called a dilatory merchant. This is not worth the cost of the call, they have perfectly good excuses and you have to back down.

April is seed germinating time. A few sprout in late March but April sees a steady parade of emerging cotyledons. Some break through tentatively in ones and twos, some spring up thick and green and uniform as though by consensus every one chose the same hour, some send

up a two inch string of pale arching thread that looks doomed to collapse but usually doesn't. Peculiarities of timing make you want to ask profound questions about the vagaries of Nature. Why, for instance, did *Penstemons albidus*, *centranthifolius*, *francisci-pennellii*, *fendleri*, *pallidus*, *palmeri*, *pinifolius*, *subulatus*, *superbus* and *triphyllus* all germinate on April 27 last year, and next day nine more penstemons germinated? While eight *Dianthus alpinus* seedpots germinated on April 6, 15, 17, 20, May 1, 7, 8, and 24, spread over a seven week period! Looking is a daily event in April. I sowed about 1700 pots of seed from different sources; if a species was very desirable I sowed two pots at different times. These were placed 26 at a time in open lattice trays with a second tray on top to keep heavy rain, animals and other accidents from disturbing the soil, then a hunk of wood to stop the trays from flying off. This meant close to 100 trays to inspect each day. Sprouted pots are collected into trays, recorded for the computer records and then left open to the sun and weather. They don't usually need care until they are ready for transplanting or until hot weather threatens to dry them out. This seed watch can be very exciting. Howard Pfeifer explains: "You have to get your kicks wherever you can." What seed freaks enjoy may not have universal appeal.

One of the biggest joys is to get germination from pots you kept from last year. It isn't worth keeping every pot that failed to germinate. I no

longer keep Composites for instance (though viable seed will usually remain viable a second year), but Androsaces must never be discarded until they have been given at least two years to appear. It is normal for *A. ciliata*, *cylindrica*, *villosa* and *vandellii* not to show the first year, and the same with Douglasias. Iris, hostas, lilies and bulbs in general can be late germinators. Some seed of course will never germinate - *Salix*, *Jeffersonia*, *Cypripedium* - while some germinates sporadically over weeks - *Astragalus*, *Oxytropis*. I usually transplant the first flush and discard the rest, which may mean finding a stray *Astragalus* sprouting in a *Dianthus* pot. The real treasures such as *Aquilegia Jonesii*, *Physoplexis comosa* and *Dicentra peregrina* seem to be oblivious to time and weather and try to surprise you in July or October.

In May you are still very much on the watch for seeds but by now fifty percent of them will have germinated and your attention is turning to transplanting and planting out. Transplanting is a very personal operation. I use the same compost as for seeds (50% coarse sand and 50% commercial peat-based mix), but other opinions abound. Transplant "when they are big enough to handle" and "before the roots are too difficult to disentangle". Both rules vary from species to species. If it grows slowly enough (*saxifraga*) and you have sown the seed thinly enough, you could leave these until September or the Spring. If growth is too thick (*Meconopsis*, *Primula*) but the roots

are tiny and flimsy you may want to transplant small bunches intending either to thin down to one plant in each pot (I never do this) or separate them again when they are larger. They often grow better after separation and sometimes one or two vigorous plants take over and the rest die off mysteriously and without fuss. Nature makes the choice of which plants to save. Most of the time (Anemones, Aquilegia, Delphinium) there will not be much doubt about when the seedlings are ready to transplant: the first and possibly the second pair (not always a pair) of true leaves has formed and the root system has reached the bottom of the pot. Some plants (Allium, Geum, Anemone) will separate easily into singles without any great pulling or scrabbling; sometimes roots, leaves or both (campanulas) will get entangled and disengaging them one at a time is tricky. I like to comb out the roots before trying. The ideal wetness of the compost is also very personal. Some composts fall apart when dry so it is sometimes recommended to dry out the pot then drop it on to the bench, the seedlings will then fall apart. I have not found this method works for me, and in cases where the seedlings can be separated with soil clinging to the roots it is best to have the compost moist and separate into small plugs easily potted up. Anyway there are no universal rules and you have to find your own way. If your seedlings die within a week or so suspect: compost too airless, too soggy, contaminated, seedling underdeveloped, roots damaged, slugs.

If your seedlings dry out too quickly suspect: compost too loose, not planted firmly enough, too little humus in the mixture. If you get moss and liverwort stop using garden soil in your compost and keep your workbench clean. If your seedlings are stringy and weak they probably didn't have enough light after germination. This is usual if you try to grow seeds on a windowsill.

But ultimately spring is about the glory of the rock garden; our reward for the months of waiting and the years of preparation. The first wave of color is the yellow of Drabas. I have a small raised bed devoted solely to Drabas. They are really grown for their satisfying mats and buns in greens that range from the gray of *D. rosularis* to the deep green of *D. cuspidata*. The flowers have a narrow range of deep yellow plus a very few good whites, not many whites being worth growing. Nevertheless drabas are very welcome and as a group have a long period in flower with often a spotty preview in October and November. The easiest mats (*D. sibirica*) can be used to edge a border. Alongside Drabas the bulbs erupt into a splendor of yellow, purple and white crocus, galanthus, erantis and iris. Connoisseurs and collectors see bulbs as precious individuals with subtle differences in form and color and degree of rarity. Landscapers think in drifts and use *Crocus Tomasinianus* or *Galanthus elwesii* to cover large areas hoping eventually for self sown seedlings. Most of us grow bulbs in units of a dozen and think ourselves lucky if we

get two or three of that dozen flowering a second year. Chipmunks and mice take their toll but many a group decreases spontaneously without help from rodents. Because of this unreliability and because maturing foliage adds very little beauty to the May-June garden it probably pays to plant very sparingly in a small rock garden and keep your display 'drifts' for the edge of a perennial or shrub border. Or invent a place that seems conspicuous in April and 'invisible' in June.

In amongst these early birds are the tiny *Narcissus asturiensis* and *N. juncifolius*, *Corydalis bulbosum*, *Anemone blanda*, *Muscari azureum* and two ravishing rock plants *Eunomia oppositifolia* and *Jeffersonia dubia*. The next wave creeps in before this first group is exhausted but we are soon aware that the blue and gold of *Narcissus* and *Scilla* have taken over along with a scattering of early tulips. The order of flowering varies from year to year and garden to garden. Compare last year's diary entry with what is taking place this year. Somewhere along in early April *Adonis amurensis* astonishes us with enormous gold heads and ferny leaves which begin by framing the flowers and gradually overwhelm them as they fade. And the earliest shrub which has been trying to flower even before the snows left, *Daphne mezereum*, opens. By the time the second wave of bulbs recedes tulips come into their own and complete the rainbow spectrum with brilliant reds, oranges (*T. whittallii*), and an almost mauve (*T. humilis*). Fritillar-

ias and *Erythroniums* too; there seem to be a number of fritillaries that tolerate life outside an alpine house (*F. camschatcensis*, *F. ionica*, *F. assyriaca*, *imperialis*, *persica*, etc.) but only a few erythroniums are permanent for me (*E. dens canis*, *E. 'Pagoda'* and *'White Beauty'*). *E. americanum* has beautiful leaves but is native here and very weedy. If a clump gets established in good soil there may be flowers, but always several thick carpets of shiny, mottled leaves without flowers.

By this time the nonbulbous plants are in flower and the other crucifers take over from the drabas. *Arabis* (*sturii*, *ferdinandi-coburgii*, *caucasica*, *blepharophylla*), *Alyssum* (*cuneifolium*, *handellii*, *saxatile*), *Schivereckia* (*podolica*, *dorfleri*), *Kerneria*, *Hutchinsia* and later *Iberis* (*saxatile*, *pygmaea*, *sempervirens*). The *erysimums* also start flowering and hardly stop the entire season. Particularly attractive are the low ones *E. amoenum*, *E. nivale*, *E. kotschyianum*. Saxifrages start to open with the drabas, first the *Kabschias* then the silvers and the mossies. When they start to brown and die back you can fill in the gap with sandy soil and sometimes end up with two or three plants instead of one. Sometimes none at all, so you should take cuttings if you want to retain the mossies.

Troughs and containers are also an important part of spring. It is the best way to grow *Androsaces* and *Douglasias*. In pots in the alpine house they are victimized by aphids, and since I am not prepared to fight

pests with a spray gun all winter, I plant androsaces in containers and winter them in a cold frame. The easiest to keep are *A. villosa*, *A. mathildae*, *A. carnea*. The most spectacular are *A. vandellii* and *A. aizoon coccinea* (*A. bulleyana*) (just the color). Others that seem possible are *A. ciliata* and *A. hausmannii*, but all the ones that increase by rosettes (*A. sarmentosa*, *A. sempervivoides*, *A. chamaejasme*) are perfectly easy in the rock garden. So are all the forms of *Vitaliana primuliflora*. Don't despise the annuals and biennials; *A. albana* is delightful and some of the annuals (*A. lactiflora*) produce a gay haze when allowed to self sow.

Half way through May is probably the height of everybody's garden. Lewisias, Veronicas, Aquilegias, *Gentiana acaulis* and *G. verna*, Iris pumila and more are starting. The shrubs are flowering- *Spiraeas*, *Malus*, *Exochorda*, *Cytisus*. The first cactus buds on *Neobesseya missouriensis* are forming. A Baltimore oriole has been spotted. Heaven!

Near the end of May the first *Paeonia* opens (*P. tenuifolia*) and this is an omen that the rock garden might soon have to take second place to the border. But early in June there is still a lot of interest left as the penstemons, arenarias, campanulas, dianthus and lupines hit their stride. Ramondas are in bloom and erigerons and edraianthus. But so is *Iris sibirica* and *Campanula glomerata*, *Centaurea dealbata* and the first Oriental poppies. We are now torn between looking and doing. The bor-

ders have to be weeded so that you can actually see the effect of purples and oranges that demand our attention. We garden in Two Worlds - the subtle mauves and blues of *Penstemon aridus* and *P. eriantherus* and fifty others which defy our ability to photograph, charming *Dianthus* and the rich purple of miniscule *Edraianthus serpyllifolius* and *E. pumilio* and the World of the border with its robust forms and colors. Most gardeners have a Third World that is neither 'perennials' nor 'rock plants.' It may be woodland plants, prairie plants, succulents and cacti, rhododendrons, primulas, bog plants, ferns. If we have a woodland garden or primulas our attention has already been diverted by hepaticas, anemonellas, trilliums, cyripediums, uvularias, pulmonarias and dicentras, and the cowslips, oxlips, primroses and polyanthas that carpet the edge of the woodland. It is a classic *embarras de richesse*. To complete our delight the black fly have stopped.

The end of spring brings a feeling as close to contentment as gardening allows. We have put behind us the losses of winter, the anguish of weather related problems. If there has been a drought, the effects are not yet visible. More than likely the worst drought is yet to come but meanwhile the air is soft, the sun is warm and the garden never looked better.

Geoffrey Charlesworth, Sandisfield, MA is recording his impressions of the seasons in the rock garden. This is the second in the series.

Winterthur's Rock Garden: An Early Experiment

Marnie Flook

Rock garden and alpine plants were one of Henry Francis du Pont's early horticultural interests. In the early 1900's, he made lists of plants which he admired in the Harvard Botanic Garden and on visits to English gardens. He joined the American Rock Garden Society shortly after it was organized in 1934 and remained a member throughout his life. Mr. du Pont's correspondence contains references to several rock gardens he built between 1910 and 1930, and his garden diary from 1910 to 1961 includes the blooming dates of many rock garden plants. His most ambitious and largest rock garden was one built in 1930 on the steep slope below the terrace, east of the house. This area is now called the Glade and Pool Garden, but traces of the old rock garden still remain.

In the late 1920's, Mr. du Pont planned an extensive development of the grounds around Winterthur. He remodelled and enlarged the house and asked landscape architect Marian C. Coffin to undertake the landscaping project which was to include a rock garden with a waterfall, pools, and paths. Her plan, labelled "A Planting Plan — Rock Garden — February 1930" is in the Winterthur Archives, drawn on a four by seven-foot sheet of tracing paper.

The plan shows a waterfall and

stream bed, with every rock carefully outlined. The stream goes under a path and empties first into one pool, then into a second. The location and quantities of over 140 species of rock garden and native plants are marked. For example, the area to the right of the waterfall above the path (now called the Grotto Path) was to contain 200 *Trillium grandiflorum* (great white trillium), 200 *T. undulatum* (painted trillium) and 100 *T. cernuum* (nodding trillium). Just below were to be 50 *Dodecatheon meadia* (shooting star), 100 *Anemone thalictroides* (rue anemone) and 100 *Galium odorata* (sweet woodruff). Across the path were to be an equal number of trilliums along with 500 plants of rue anemone and 200 plants of the white form of wild blue phlox (*Phlox divaricata alba*).

Closer to the rocks and waterfall were to be many varieties of ferns, native lilies and some rare western fritillarias, as well as 50 to 100 each of common rock garden plants such as *Alyssum* (basket-of-gold), *Armeria* (thrift) and *Aubrieta*, plus rarer ones such as *Lewisia* and *Saxifrage*. Native orchids were to go across the path below the waterfall, 50 each of *Cypripedium acaule* (pink ladyslipper), *Cypripedium spectabile* (now *C. reginae*) (showy ladyslipper), *Habenaria ciliaris* (yellow fringed orchid)

and *Orchis spectabilis* (showy orchis). Moisture-loving wildflowers were closer to the stream — 100 *Lobelia cardinalis* (cardinal flower), 100 *Myosotis* (forget-me-not), 50 *Mimulus ringens* (monkey flower). Two hundred tulip bulbs were to be planted with 250 more *Narcissus* 'Queen of Spain' along the path. Two shrubs of *Enkianthus campanulatus* also were planted here.

Further along this path (nearer the present stone steps) were more shrubs - *Kalmia latifolia* (mountain laurel), *Rhododendron carolinanum album* and *Cornus mas* (Cornelian cherry). Under these were to go a number of native plants: 250 *Uvularia grandiflora* (giant merrybells), 250 *Smilacina racemosa* (false Solomons seal), 300 *Mertensia virginica* (Virginia bluebells), 200 *Galium odorata* (sweet woodruff), 100 *Silene pennsylvanica* (now *S. caroliniana*) (wild pink), plus many others. Plants to be laced around the two pools included *Primulas* (primroses), *Caltha palustris* (marsh marigold), *Gentiana andrewsii* (closed gentian), *Iris* and ferns.

The first known reference to the construction of the rock garden is found in a letter from Marcel Le Piniec, owner of Mayfair Nurseries in Bergenfield, New Jersey. Dated October 7, 1930, it is a cost estimate of the waterfall "to be built in the woodland garden." Work must have started immediately, since three weeks later Mr. du Pont wrote to Mrs. Nevius, Miss Coffin's assistant: "The man who is doing the waterfall is doing a very good piece of work."

A bill for \$3,326.25, sent November 3, 1930, covered 18 days' work by the foreman, Mr. Studerus, and his assistant, Mr. Schoenholzer, plus cartage of 135 tons of lime rock. An additional 30 tons of rock was used in building the bridge and grotto and around the pools. The total paid to Mayfair Nurseries between November 1930 and May 1931 was just over \$8,000.

There are no other references to the rock garden in the archives after this time, except for a few bills and letters about planting the garden. There was an exchange of letters, however, between Mr. du Pont and Hans Studerus, who, on August 10, 1931, wrote that he was leaving Mayfair Nurseries and would appreciate a reference to his work in building natural rock gardens, waterfalls, and pools. On September 12, 1931, Mr. du Pont replied: "I take great pleasure in writing you that the natural rock gardens, pool and waterfalls you constructed for me last summer have been a great success. This spring in fact it looked as if they had always been there — so much so that I am simply telling my friends that I had just pulled away the dirt from the existing rock ledge, and what is more, everybody believes it. The effect is very charming and naturalistic in every way, and I was not only fortunate, but it was a pleasure to have you do this work."

Nursery orders dated 1930 and 1931 list many rock garden and native plants. An attempt to match the names and numbers of the plants ordered with those on the original



The rock garden shortly after completion .

Courtesy, Henry Francis duPont Wintherthur Museum Library: Winterthur Archives.

plan indicates that there were many substitutions and changes. It seems probable that many were either unavailable or were never ordered, and that others were ordered in smaller numbers.

A letter from Esther George, secretary of the Forests of Ecnerwal, Inc., a wild flower and native plant nursery in Pitman, New Jersey, explains why *Anemonella thalictroides* (rue anemone), *Campotosorus rhizophyllus* (walking fern), and *Mitella diphylla* (bishop's cap) were not available: "These are rare varieties — supply exhausted — found the territory where they grow to be entirely denuded." In 1931, almost all wild flowers and ferns were collected from the wild; today's awareness of conservation was almost non-existent. Besides the 2,500 plants listed on the bill from the Forests of Ecnerwal, many hundreds of plants were ordered from nurseries in New England, Pennsylvania, North Carolina and Oregon. Bills for the rock garden all have Marian Coffin's stamp initialled by Ethel Nevius.

On December 30, 1930, Mr. du Pont wrote to Miss Coffin: "Please arrange to be here on Tuesday the 7th of April. I shall expect you to have all the plants here that day that we are putting in the rock garden, and I shall want you to have the specifications beforehand of what kind of soil to use, which is to be under cover and kept perfectly dry . . . send me a list of all the plants you propose to use there."

What has happened to this garden? Since it was rarely mentioned

after 1931, it is possible that Mr. du Pont was becoming more interested in rhododendrons, azaleas, and other shrubs, and less interested in rock garden plants. It is also possible that many of the plants did not survive the heat and humidity of Delaware summers. As the trees grew and the area became more shaded, sun-loving plants would have faded away. Alpines, orchids, and rare bulbs probably would not have lasted more than a few years. One clue may be in the letter Mr. du Pont wrote to Miss Coffin on September 30, 1938: "We have had a very bad horticultural summer here . . . I am cutting down as much as I can on the place . . . planting the flower garden in practically all perennials, mostly hemerocallis and that kind of thing and only keeping up the beds around the pool."

Today, the hillside is covered with ivy (15 plants ordered from Cedar Hill Nursery in 1931). Many of the alpine plants have disappeared, but there are still ferns and wild flowers, plus the delicate little *Corydalis cheilanthifolia* which has seeded itself among the rocks. The *Enkianthus* shrubs have become small trees. The mountain laurels and Carolina rhododendrons are now enormous. In March and April the ground becomes blue with thousands of glories-of-the snow. In early summer white hydrangeas and orange daylilies nod by the pools. The rock garden has become a peaceful glade.

Plants Growing Today In Glade Garden

- Arum italicum*
 Italian cuckoo-pint
Asarum canadense — wild ginger
Galium odorata —
 sweet woodruff
Brunnera macrophylla (*Anchusa*
mysotidiflora)
 heartleaf forget-me-not
Convallaria majalis —
 lily-of-the-valley
Cornus mas — Cornelian cherry
Corydalis cheilanthifolia —
 fern-leaved corydalis
Corydalis thalictrifolia —
 columbine corydalis
Coystopteris fragilis —
 fragile or brittle fern
Diplazium thelypteroides —
 silvery spleenwort
Dryopteris marginalis —
 marginal shield fern
Enkianthus campanulatus —
 red-veined enkianthus
Ilex pernyi — Perny holly
Kalmia latifolia — mountain laurel
Leucothoe fontanesiana —
 drooping leucothoe
Mertensia virginica —
 Virginia bluebells
Narcissus cultivars — daffodils
Osmunda cinnamomea —
 cinnamon fern
Phlox divaricata — wild blue phlox
Polystichum acrostichoides —
 Christmas fern
Rhododendron carolinianum —
 Carolina rhododendron
R. carolinianum album —
 white Carolina rhododendron
R. vaseyi — pink-shell azalea
Sarcococca hookeriana humilis —
 dwarf Himalayan sweet-box
Smilacina racemosa —
 false Solomons seal
Tiarella cordifolia — foam flower
Viola sororia — common violet
Marnie Flook, Wilmington, DE, is
archivist for ARGS.





Arisaema thunbergii (Page 93)

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Arisaema sikokianum (Page 93)

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Corydalis wilsonii (Page 101)

Jim Jones



Merendera raddeana (Page 101)

Jim Jones

Hardy Aroids in the Garden

Judy Glattstein

Though not showy plants and with only a modest following among plant lovers, the hardy aroids are interesting, display many virtues in cultivation, and attract "a different class of gardeners".

The Arum Family, or Araceae, consists of about fifteen genera, most of them tropical but of wide distribution. Some of the tropical members of the family have long been under cultivation, especially in eastern Asia and the Pacific Islands. Taro (*Colocasia esculenta*) and several species of *Xanthosoma* (yautia), for example, are grown for their edible tubers as staple sources of starch. Other tropical species are handsome foliage plants used in the temperate zones for summer bedding (*Caladium*) or as houseplants (*Aglaonema*, *Dieffenbachia*, *Monstera*, *Philodendron*). Others are used by florists as cut flowers (*Anthurium*, *Calla*).

Some members of the family are hardy, notably *Arisaema*, *Arisarum*, *Arum*, *Lysichiton*, and *Symplocarpus*. The Araceae might seem a poor prospect for garden-worthy plants to those familiar only with the skunk cabbage (*Symplocarpus foetidus*) of New England's swamps. I have enjoyed cultivating representatives of several genera, some for their flowers, some for their foliage.

Aroids have a modest following, appearing in an occasional article, mentioned briefly in gardening

books. Visitors to my garden have admired them; they have several points of appeal. Many of the aroids I discuss in this article are rare in cultivation, especially in the United States. They are, therefore, unusual and have the appeal of novelty.

Aroids contain a bitter substance, calcium oxalate, and are little bothered by pests. Slugs, mice, rabbits, and deer find them decidedly unpalatable. When aroids are used for food, the calcium oxalate first must be destroyed by heat. Gardeners should be careful to wash their hands after handling berries or a bruised tuber. Once, after cleaning *Arisaema* seeds, I inadvertently touched my mouth. The resulting unpleasant tingling and numbness took several hours to wear off.

My garden in Wilton, Connecticut, is shaded by mature white oaks (*Quercus alba*). Understory trees are dogwood (*Cornus florida*) and black birch (*Betula lenta*). The Araceae I raise are quite hardy in Wilton, which is situated in Arnold Arboretum Hardiness Zone 6 (-5 F. to 5 F.). In fact, the temperature once dipped to -8 F., and there were no losses. The soil in the garden is a good loam, which I keep mulched with leaves for a constant supply of humus; as in most of Connecticut, the pH is rather low (acid). Other plants I use in the garden include such American wildflowers as *Trillium*, *Sanguinaria*

canadense (bloodroot), *Hexastylis* spp. (evergreen gingers from the southeastern states), *Phlox stolonifera*, *Phlox divaricata*, and many kinds of ferns. Other shade-tolerant plants, such as hostas, epimediums, and primroses, also do well under these conditions.

Since I have to obtain most of the aroids from abroad, I prefer to receive them in the autumn. They are completely dormant at this time, and the tubers travel well and arrive in excellent condition. If they are shipped in the spring, there is the risk that they will break dormancy while in transit. New growth can be damaged either by the confines of the shipping container, or by rot. As soon as the tubers are received they are planted directly in the garden. The area is spaded over, and extra compost is added if necessary. I fertilize with muriate of potash and superphosphate. Soils in the Northeast are low in phosphorus, and potash is especially useful for tuberous plants. It is not safe to use bonemeal in my garden because it attracts skunks, which dig up the tubers looking for bones. They do not eat the tubers, but it is a nuisance to replant them. Nitrogen is applied in the spring, in the form of dried blood, cottonseed meal, or leather tankage. Fertilization after the first year is usually not required. The constant mulch of leaves seems to keep the plants growing in good condition.

An alternative way of obtaining these plants is to raise them from seed. I soak dried berries in a little tepid water for an hour or so, until the coat softens. Then, I rub the seeds

gently between paper towels and separate the seed. Each berry has one to four seeds. I sow the seeds in a sterile mix of half potting soil and half Jiffy-Mix or Pro-Mix, with enough sharp sand for good drainage. (I sow them thinly enough that I won't have to prick them out for a year.) I cover the seeds well, water them, and wait. Fresh seeds will germinate promptly under growth lights. Older seeds will germinate more slowly, and outdoor conditions slow the germination process somewhat.

My biggest problem has been to keep the plants through their dormant stages. While the garden site may be quite damp, pot-grown plants rot with the greatest of ease. At the same time, small tubers dry out quickly. It is difficult to find the correct balance. Second-year plants can go into a prepared site in the garden and should begin flowering in their third or fourth year. I have used this method with several species of *Arisaema* and with *Arum italicum*. *Arisaema* seeds do not need a period of stratification but will germinate during the autumn they ripen if they are sown indoors. Sown outdoors in the autumn they will, of course, germinate the following spring. The production of seeds is generous, one spadix of *Arisaema sikokianum* having from one to four seeds in a berry, for a total of five hundred eighty-seven seeds. Plants of *Arisaema sikokianum* often begin to flower in their third year. Once established, the plants are most agreeable. I have dug one up in full bloom, potted it for a

rock garden show, and replanted it in the garden without any difficulty or damage to the plant.

The flowering of *Arisaema* follows an unusual pattern. Immature corms, from either seeds or offsets, are asexual and have a single foliage leaf. As corms increase in size after their first year, they reach sexual maturity, producing two leaves and one scape. Smaller (lighter) corms are male, heavier corms are invariably female, the sexual state having progressed from an asexual to a male and finally to a female state, remaining in the last state. Many plants - *Ilex* and *Myrica*, for example - have single-sexed plants that are either male or female and that remain so for the life of the individual plant, a condition called "dioecious." The transitional nature of the sexual state of *Arisaema* is referred to as "paradiceous."

Arisaema

In North America there are two species of *Arisaema*, *Arisaema triphyllum*, which has four subspecies, and *Arisaema dracontium* of the southeastern states.

Arisaema triphyllum (Linnaeus) Torrey is found from the Gaspé Peninsula, southern Quebec and Ontario, Wisconsin and Minnesota south to eastern Texas and southern Florida, growing in moist, shady woodlands. There are four subspecific populations, with widespread hybrid swarms.

Arisaema triphyllum ssp. *triphyllum* is the most widespread. Its height varies with growing conditions. I have seen specimens that

were dwarf in the wild reach two feet in height in the garden with richer soil and ample water. Typically, it has one or two leaves, each bearing three leaflets, which are glaucous beneath. The spathe may vary in color from green to green-and-purple striped, to chocolate purple. The name 'Zebrinum' is often applied to cultivars whose spathes are purple to bronze and have whitish longitudinal stripes inside. An interesting variant has recently been discovered by Peggy French in Wilton, Connecticut. It has pronouncedly white-veined leaves and comes true from seed.

The second subspecies, which I have seen in several gardens, is *Arisaema triphyllum* ssp. *stewardsonii*. This is a northern variant in which the spathe is green and strongly fluted with white ridges on the outside. It tends to appear later in the spring than the other subspecies and grows consistently in moist sites. Its leaves are never glaucous.

The third subspecies is *Arisaema triphyllum* ssp. *pusillum*, which grows in the same habitat as *Arisaema triphyllum* ssp. *stewardsonii* although farther south and at lower elevations. Its leaves, too, are never glaucous. There are no ridges on the spathe, and the coloring is nearly always completely green or completely purple, occasionally with thin, green stripes.

The fourth subspecies, *Arisaema triphyllum* var. *quinatum*, has a very restricted range in the deep South, growing in moist, shaded locations. It is smaller than the other sub-

species, and its leaves are usually five-parted and glaucous beneath, although there may be fewer leaflets, and the leaflets may not be glaucous. The spathe is green and bears no markings.

Arisaema dracontium, the green-dragon, has a solitary leaf with seven to nineteen segments. The spathe is more tightly furled than in the previous species and is green, without stripes. The long, slender spadix protrudes and hangs down from this. Plants can reach an overall height of three feet (0.9 m).

In western China, Japan, and the Himalayas, there are at least one hundred species of *Arisaema*, forty-two in Japan alone. Some of them are among the most beautiful, exotic, interesting, and easily cultivated plants that could be grown in the garden.

Arisaema candidissimum W. W. Smith is a Chinese species discovered and collected by George Forrest in Yunnan in 1914. It is found in pine forests, indicating a preference for acid soil. Under cultivation, it does not need a very moist site. The leaf is solitary, three-parted, and a glossy mid-green; it appears after flowering, which occurs early in June. The spathe is very beautifully marked with pink and white stripes. Mature tubers make numerous offsets, which form a good-sized clump in a few years.

Arisaema sikokianum Franchet and Savatier comes from Honshu, Shikoku, and Kyushu in Japan. Mature plants have two three- to five-parted leaves that often have attrac-

tive silver markings. Its Japanese name, *yuki-mochi-so*, means "snow rice-cake plant," in reference to the pure white, clublike spadix. The spathe is a deep chocolate brown on the outside, green shading to white inside. It flowers in late April and early May.

This is an extraordinarily beautiful plant. In the garden, I combine it with the Japanese *Primula sieboldii*, especially the deep-pink forms that contrast so nicely with the dark spathe of the *Arisaema*. One colony is growing with the Japanese painted fern, *Athyrium goeringianum* (*nipponicum*) 'Pictum', whose silver fronds complement the markings on the *Arisaema* leaf. Seeds are freely produced and germinate readily. Plants that produce seeds are more resistant to cold and go dormant later than non-seed-bearing plants. The seeds are ripe before the berries turn red, which is fortunate because the growing season in Wilton is too short for the berries to redden.

Arisaema thunbergii var. *urashima* (Hara) Ohashi and J. Murata is found in the wild on the islands of Hokkaido, Honshu, and Shikoku. The leaf is solitary, with eleven to fifteen pedately arranged leaflets of a dark, glossy green. It appears with the flowers. The Japanese name of the plant, *urashima-so*, refers to the odd-even amusing-flowers and is based on a folk tale. Taro Urashima was a young fisherman, and it is for him that the plant is named. The dark bronze-purple spathe of *Arisaema thunbergii* var. *urashima* arches strongly over the

spadix, narrowing abruptly to a tail-like tip. The spadix has a threadlike appendage as much as twenty inches (50 cm) long that trails on the ground like a fishing line. It flowers in mid-May in my garden. Seeds germinate freely. The tubers may make offsets. A colony of this variety is attractive, not only for the unusual flower but for the attractive leaf.

Arisaema japonicum Blume and *Arisaema serratum* Thunberg probably are one and the same species. A common and very polymorphic species, minor variants in color and size have been accorded specific rank in the past. Dr. Creech of the United States Department of Agriculture introduced it into the United States. The pseudo stem may be up to two feet (0.6 m) tall and pale green or pale green with "snakelike" purple mottling. Plants with mottling are more attractive in the garden than those without it. It flowers in late April to early May. One of my correspondents, with true Oriental courtesy, has written, "I sent yesterday a parcel with the plants. I think they are of less value in Japan but good plant for shady garden."

Arisaema ringens (Thunberg) Schott is noted in English literature as coming into growth as early as February or March. The colder winters in Connecticut must keep it dormant over a longer period, as I have not seen any growth as early as that. Its leaves are large, glossy green, and thick. Mature plants have two leaves, both of which have three leaflets. Each leaflet ends in a little, threadlike tail. The spathe of *Ari-*

saema ringens differs from those of other members of the genus, having an inflated, curving upper part resembling a very large snail shell. The main part of the spathe is green in forma *praecox*, dark purple in forma *sieboldii*. The spathe's margins are folded over like an auricle and are chocolate brown. The leaves are unaffected by a light frost but are damaged when temperatures drop below 28 F. The tubers of *Arisaema ringens* have grown larger than those of any other species of *Arisaema* I have raised, reaching three and one half inches (8.5 cm) in diameter. Offsets are formed to a moderate extent.

Arisaema fargesii, which is native to Mount Omei in China, is the least common species I grow. Carla Teune, curator of the Leiden Botanic Garden, sent me some seeds she had collected in China in 1980, among which were seeds of an unidentified species of *Arisaema*. (Since the spathe is an important character for identifying species of *Arisaema*, a fruiting plant cannot be identified with a taxonomic key.) The seeds germinated well, but some plants succumbed to the winter. Each winter I lost a few more tubers from rot. Finally, in the fall of 1983, I felt that the two remaining tubers were large enough to be put into a propagating-holding bed. May 1984 came and went, as did June, but there was no sign of either remaining tubers. The winter had been too cold for them, I thought, and I hadn't planted them deep enough. Or I should have protected them from the many mice, voles, and chipmunks that infest my

garden. I doubted that the latter was true, for all parts of an *Arisaema* are laced with crystals of oxalic acid, which renders them unpalatable, and I had never had a problem with such animals before. I was ready to admit my guilt. Then, in mid-July, two large buds appeared. They grew swiftly and continued to grow, until the single leaf of each plant was bigger than my outspread hand. The spathe and spadix appeared as rapidly. The spathe reminded me of a little owl, with the tip falling forward for the beak and an opening on each side resembling the eyes. It was a fine plant, but anonymous!

Ohwi's *Flora* is for Japan, and this was a plant from mainland China. When in doubt, find an authority. I told myself. I took some photographs and sent them off to H. Lincoln Foster, the *doyen* of American rock gardeners. He replied in early August:

By studying my xerox of the pages of *Flora Republicae Popularis Sinicae* concerning the arisaemas, even though the text is Chinese, from the rather good drawings I feel confident that your plant is from the Section Franchetiana. This has 6 species, including *candissimum*. Your species is, I think *A. fargesii*.

A name! An identity! Though one plant had male flowers and the other female, there has not been any setting of seed. The foliage is very tender, being killed by the first light frost.

Arum

The genus *Arum* Linnaeus consists of approximately twelve species, most of them native to the Mediterranean basin, two of the British Isles. All are tuberous. Their flowers are unisexual, but unlike that of *Arisaema* the spadix *Arum* bears both male and female flowers.

Arum maculatum is the species commonly found in Great Britain. The large, green, arrow-shaped leaves emerge in the spring. Often the leaves are splashed with black or purple spots. Flowering occurs soon afterward. In autumn, clusters of brilliant orange-red berries appear and make a handsome display. *Arum maculatum* is valuable as a garden plant because it will grow and fruit in heavy shade.

Arum italicum (as *Arum italicum* ssp. *neglectum*) is less commonly found in the British Isles. *Arum italicum* ssp. *italicum*, the form occurring in Europe, has green leaves with veins marked in creamy white; it is thus the more interesting garden plant. In addition, its leaves begin their growth in the autumn, persist through the winter, and go dormant in midsummer. If an exceptionally bad season destroys the foliage over the winter, a secondary set will emerge in the spring. The spathe varies in color from creamy white to pale green. The berries of this species also give a handsome display in autumn. Two especially attractive leaf forms have been given cultivar names, 'Pictum' and 'Marmoratum'. Because of the autumn berries and winter foliage this is a choice species

for adding interest to the shady woodland garden. The seeds ripen in autumn and germinate the following spring.

The hardy aroids are not splashy, showy flowering plants like roses or chrysanthemums. They have a different kind of flower, interesting to a different class of gardener. Perhaps other gardeners will become interested enough in these plants through this article to attempt to cultivate them, as well as other hardy species, and would be willing to share their information with me.

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Arisaema Update

The hot dry summer of 1988 resulted in some interesting observations in the growth patterns of the arisaema in my garden. *Arisaema amurense* went dormant much earlier than was usual. *Arisaema sikokianum* also went dormant early. This species is usually the most prolific in setting seed. While some was obtained, most of the berries were aborted and empty. *Arisaema thunbergii*, early dormancy and poor seed-set. *Arisaema japonicum/serratum* were infected with a rust. This did not respond to treatment with Benomyl (Benlate). At the suggestion of Dr. Gustav Mehlquist, professor emeritus of the

University of Connecticut and knowledgeable plantsman, I tried the old-fashioned remedy of flowers of sulphur (approximately 1 oz. per gallon of water - scaled down from 6 lbs/100 gallons). This was applied every two or three days in humid weather. We may not have had much rain but it was humid. As some of the arisaema have glossy leaves I used a spreader/sticker for better adherence. It seemed to slow the rate of infection but not clear it up. *Arisaema fargessii*, *A. ringens*, and *A. candidissimum* were apparently unaffected by the drought. These species are the last to appear in my garden each season. It may be that they are more tolerant of heat and dry conditions than those species which appear earlier in the year.

In 1987 I had sent some seed of *Arisaema sikokianum* and *A. thunbergii* to Dr. Paul Christian who has a nursery in England (Pentre Cottages, Minera, Wrexham, Clwyd, LL11 3DP) in exchange for seed of several arum species. He reported that "Your *Arisaema* seed was fabulous, the *sikokianum* came up v. quickly and are looking v. good, the other little beasts are being v. v. funny!! half of the tray has come up and they are now 3 1/2" across, the other half are sulking, not one leaf

but still fine below ground." So perhaps in the future there will be plants of these species offered for sale, at least in England. In 1987 Wayside Gardens offered *Arisaema sikokianum*, blooming sized tubers, for sale for \$48 each, limit three to a customer, please. My husband wanted me to sell, make a fortune, better than the stock market. But then I'd have gone broke buying them back again, wouldn't I. I heard a rumor that Wayside had 900 tubers for sale. They are not being offered in the 1988 catalog.

Obviously members of The American Rock Garden Society are horticulturally more sophisticated than much of the gardening public. We are right there on the cutting edge, ready to propagate and appreciate new introductions probably a decade ahead of the merchandising giants.

Judy Glattstein is a landscape consultant who specializes in perennial-border design and the use of native plants in the landscape. An avid horticulturist, she has chaired the Connecticut Chapter of the American Rock Garden Society and teaches at the New York Botanical Garden and the Brooklyn Botanic Garden.

Using the Alpine House

James L. Jones

Like 'alpine plants', the term 'alpine house' remains carefully undefined. In line with that tradition, I won't try to put bounds on what an alpine house may be, but content myself with talking about my own solar greenhouse as though it were a perfectly acceptable alpine house. Perhaps it is: it's heated by the sun alone, it goes as low as -11°C (12°F), and it contains plants of an appropriately small size. Under any name, it's a valuable extension of rock gardening that is very easy to construct and use. I'd like to go into some detail on those two topics, with emphasis on the latter.

There are a number of factors to be considered in using an alpine house—the environment inside it, its operating requirements, and the plants that will grow there—but the first thing to settle on is the reason for having it in the first place, the goals that you the gardener have in mind for it.

Goals

Of course there are goals without number, but some useful order can be imposed: method of heating (solar alone vs supplementally heated); method of growing (in pots vs in the ground); and gardening intent (experimental vs aesthetic).

Heating. I'm all for relying on the sun alone, letting the chips fall where they may in terms of the resulting environment, happily accepting whatever limitations there may be on

plant material. The limitations are not severe, particularly in the house that I find most enjoyable, that has a minimum temperature of $-11^{\circ}\text{C}/12^{\circ}\text{F}$. There, something is always in bloom and even in the coldest months there is no sense of real winter, at least when the sun is shining, just a rather slow and restful spring.

Such a structure is also cheaper and easier to build, and of course to operate. The consequences of poor design or construction are not higher heating bills, but simply a lower minimum temperature. Construction can be as elaborate as you like, but elaborations aren't at all necessary to achieve a thoroughly rewarding alpine-house environment. My most recent sunhouse is simple in the extreme: panels of semi-rigid reinforced fiberglass (Kalwal) fastened to a wood frame, nested to a framework of 2x2's from which they can be removed for the summer, with the framework sitting on a brick foundation and fastened to the south face of the house. The only thing at all clever that I did was to design the panels for easy removal and storage. This one faces due south and has the house at its back, both of which are necessary to achieve its minimum temperature of 12°F .

Nonetheless, supplemental heating is more the rule than not, and is a perfectly reasonable choice if you wish to grow frost-tender plants. (But are those alpiners? A knotty

question).

Growing. Initially I believed that I would be restricted to in-ground growing in an alpine house that went below freezing, assuming that the roots of potted plants would be much too vulnerable. Some cautious experimentation has shown that this is not the case for at least quite a range of species, some of which have little hardiness below the 12°F. Therefore, even in this situation it makes sense to consider the pros and cons of both methods: 1) In-ground. This is true gardening, where plant can be pressed against plant in artistic order and each work out its appropriate form and destiny. It is easier, with the plants less vulnerable to careless watering or feeding. It is also easy to lose track of individual plants in the overall shuffle, which has been a significant impediment to getting some species established, and some plants actually perform better in pots. This has been true of *Narcissus bulbocodium romieuxii*, which gives nothing more than sulking green spears in the ground but multiplies and blooms industriously in a pot. 2) In pots. Plants grown in pots can disappear, too, just like that, with just a moment's inattention. The pots are also to one degree or another unsightly, inevitably looking like clutter. However, if you **do** pay attention you are likely to garner some information on a plant's demise that can be applied to the next try, and plants in pots can be moved out of the alpine house over the summer if dismantling isn't the grower's choice; and moved not only outside

but to plant shows etc., a powerful goal indeed for many.

Aesthetics vs. Experimentation. The code word here, of course, is 'labels'. It is hard to run a successful experiment without keeping the plant well labelled; it is well-nigh impossible to have a thorough-going garden experience if an array of labels, no matter how discreet, keeps pulling one back to a different reality. I was not handling this dilemma at all well, so in some desperation I put up another sunhouse (the one mentioned above) strictly for experimentation, though I certainly don't object to touches of beauty here and there. This has worked out very well; for instance I have followed *N. bulbocodium romieuxii* (an interesting yellow-flowered strain from the Archibalds) from seed to flowering while it was right there in the ground, a process that took 3 years. Why mere force of observation should do the trick, I cannot say.

Environment. The environment within a glassed-in enclosure is superior for plants to the outdoors for more reasons than just the higher minimum temperature, with the primary additional advantage being the shelter from chilling, drying winds. This means that species that wouldn't be hardy outside in an equivalently warmer zone may well thrive here. It also means that the gardener will feel more comfortable than the temperature might suggest, while being protected from the various annoyances of precipitation. All in all, the alpine house is the optimum place to sow all those seeds that

arrive in fall and winter, particularly if it is a sub-freezing one that will offer the proper stratification.

This benign environment shows a different face all too early in the spring, when the extra warmth becomes too much of a good thing; and in the summer, when it becomes quite impossible without aggressive ventilation. I bypass this by removing all the overhead panes (made of plastic to make it safer and easier) and most of the side ones, an exercise that doesn't take over an hour. As it is, the space inside remains perceptibly hotter and drier than the outdoors.

The most important parameter of a given sunhouse environment remains the minimum temperature it experiences. This will of course vary from winter to winter, but not as drastically as the outdoors temperature since there is a good deal of buffering by the thermal inertia of the mass inside, and cold, cold nights usually follow cold but sunny days, which give the sunhouse a good head start. In general, the higher the minimum temperature, the wider will be the range of choices of species, but at some point one will cross the line that separates the alpine from the tropical, the *Ramonda* from the *Saintpaulia*.

Operation. If yours is an electrified sunhouse then operation is easy: you plug in the heater in winter and the fan and vent opener in summer, and that's it. If it's not, if it's all solar and manual, things become more complex and a good knowledge of the local climate becomes important.

There are three crisis points: first frost outside in the fall, last frost inside and last frost outside in spring. It is worthwhile (but not essential) to close in the alpine house before the first frost, but on the other hand it is necessary to get the plants properly hardened off if the temperature inside is going to go below freezing. This results in a guessing game with the weather, holding off until frost is clearly imminent. The stakes aren't all that high, however; the light frosts of the season may mar the appearance of some plants but won't do any real damage.

Once winter is well underway it is unwise to do any extensive gardening in the alpine house (anything that involves digging up or otherwise disturbing plants) until the last frost inside signals the time of renewed activity on the plants' part. This occurs quite abruptly (in the 12°F house) in the third week of February, as the rapidly strengthening sun, shorter nights, and slightly warming days work in combination.

After the last frost outdoors, plants, including all the clamorous seedlings, can be moved out of the now rather hostile environment of the sunhouse. There is no real hurry, however, and April is fickle, so although I have never had frost after the third week in April, I wait until May 1 for the big move. But before you chance this step you had best know your local conditions.

Otherwise operations are the same as with any other gardening — watering, feeding, moving here and there, dividing, weeding, etc. — dis-

tinguished only by the relative comfort in which they are done.

Plants. There are several hundred species growing in my alpine houses, not all of them appropriate to the rock garden. I will describe some of the more successful of the appropriate ones, organized by the month that flowering begins, ending up with species that are being grown primarily for their foliage. (1-3 after indicated January start, March end).

January:

Cyclamen orbiculatum 1-3.
Cyclamen trochopteranthum 1-4. Probably a form of *C. coum*. The various *Cyclamen* species have tended to be touch and go, lasting for a few years then fading out. I suspect I haven't been feeding them enough.
Iberis saxatilis v. *candolleana*. (Sold by Siskiyou as *I. candolleana*) 1-4. A 3 cm high, 6 cm wide, slow-growing, free-blooming candytuft.

February:

Cyclamen coum, 2-4
Daphne odora 2-4. At 1 m or more certainly stretching the limits of a rock garden plant, but very attractive, dependable, and fragrant.
Galanthus rizehensis 2. The snowdrops haven't done all that well, but this one comes along in a moister spot.
Hyacinthella millengenii 2. A real gem, like a miniature hyacinth
Iris histrioides 2-3. Striking, but not too dependable, likely to disappear after several years. Feeding again?
Merendera raddeana 2. A very modest bulbous plant, retiring but nice. Its high point is probably the red tint

to the buds, which open to white.
Scilla tubergeniana 2-3. Better in the promise than the realization, the tight buds thrusting through at ground level, then rising and rising to a somewhat lanky 20 cm. White.

March:

Arabis koehleri 3-4. Relatively durable and restrained. Pink.
Bongardia chrysogonum 3. Bulbous. Yellow flowers, distinctive feathery foliage.
Draba olympica 3-4. The drabas have not been very successful, blooming once then dying.
Erodium chamaedrioides 4-10. Just notice that period of bloom!
Lithodora diffusa 3-5. Brilliant blue flowers. It took several tries for the right niche to reveal itself: super good drainage but a good supply of moisture running through from a downspout.
Morisia monantha 3-4. A tiny, yellow-flowered tuft. Showed great promise but died over the last, hot summer.

Oxalis brasiliensis 3. Wine-red flowers. Nice flowers, but the plant is somewhat aggressive, and untidy when going dormant.
Romulea tempskyana 3. Bulbous. Small, bright violet flowers.

April:

Berberis stenophylla corallina compacta 4-5. The *corallina compacta* is necessary to get the really compact, slow-growing shrub. Yellow flowers.
Brimeura fastigiata 4-5. Bulbous. Purplish-white blooms.
Calanthe discolor (white and violet);
C. sieboldii (yellow) 4. Two good

ground orchids with pleated leaves, probably best with some shade and moisture.

Corydalis wilsonii 4-6. I've tried any number of the corydalises but this is the only one I feel comfortable with. It has the advantage of being evergreen so one can observe its comings and goings. Yellow flowers, wonderful blue-green foliage.

Daphne x mentoniensis 4-5. Pretty good, but it doesn't really take off and go.

Erodium acaule (or it may be *E. daucoides*) 4-10. Not quite as long a season as *E. chamaedrioides*, but the magenta flowers are larger and showier, held up on long stems.

Rhodohypoxis bauerii 4-7. Another long bloomer. Very tidy; pink, red, or white flowers above sword-shaped leaves.

May:

Asperula sintensisii 5. All right, but grows lax in this environment. Probably better outside.

Convolvulus cneorum. 5. A gorgeous, silver-leaved plant, a bit on the large side but excellent in the background. White morning glory flowers.

Helichrysum frigidum 5-6 Low-growing, silver-leaved, white flowers. After several years mine succumbed, probably to summer wet.

Iris regelio 'Vera' 5. Interesting rather than beautiful or appropriate, with bruise-colored flowers on 40 cm stalks.

Isotoma (Laurentia) fluviatilis 5-7, 9-10. A wonderful but pushy groundcover, less than a centimeter high, studded with pale blue flowers.

Jasminum parkeri 5. A good, twiggy,

low-growing shrub. Yellow flowers.

Lavandula stoechas 5. There is some difficulty here since I have two cadres of plants from seed labelled *L. stoechas* that aren't all that similar, though I do believe they're both lavenderers. **This** one is hardier and slower, forming a good 30 cm bush. Violet flowers.

Leucojum nicaense 5. White snowflake flowers on a dwarf, grass-leaved plant.

Linum salsaloides nanum 5-6. Wonderful large white flowers, though the growth habit is somewhat straggly.

Parodia chrysacantha 5. A sturdy though slow-growing South American globular cactus with yellow flowers.

Rebutia miniscula 5-7. Smaller than the above, with out-sized salmon-red flowers.

Sedum senense 5-6. Fairly aggressive, with nice foliage and yellow flowers.

Teucrium aroanium 5. A good but miffy subshrub with gray leaves and really strange violet flowers.

June:

Convolvulus cantabricus 6. Not entirely successful, but close. The flowers are very nice, large and pinktinged, but they are sparse and born on gangly stems, and the foliage is no great shakes.

Erica cinerea 6-7. Good pink color, excellent dense foliage.

Sedum dasyphyllum 6. A pest, no doubt, because it spreads so insidiously, but very handy for filling in spaces. Grows more laxly than it does

outside. A good showing of white flowers.

July:

Begonia sutherlandii 7-11. Like it or not, a rock-garden begonia. Attractive low growth; sprightly orange flowers for a long period. A little extra moisture and shade.

Daboicea cantabrica 7-10. A real asset, with cheery sprays of red flowers starting in bleak July.

Habranthus andersonii 7. Bulbous; golden orange flowers. I think this will be good, though for now its blooming period is extremely brief.

Hypericum olympicum & *yakushimanum* Not really first rate since they go through indeterminate periods, neither quite evergreen or quite deciduous. The yellow flowers are nice but sparsely borne.

Lapeyrouisia cruenta 7. A new addition but it looks promising. Spikes of red flowers; sword-shaped leaves in winter.

Origanum microphyllum 7. A pleasant little bush with small pale violet flowers.

Talinum calycinum & *teretifolium* 7-9. Excellent little succulents with wine-red flowers, those of the former being larger. They do look disastrous when knocked down by frost.

August:

Asphyllanthes monspeliensis 8. Distinctive, effective blue-green grass-like leaves, and tiny blue flowers that could be categorized as inconsequential.

Leucojum autumnalis & *roseum* 8-9. Wispy gems that are very endearing if you can get a bunch of them.

September:

Allium callimischon 9-10. Very nice, with starry flowers of palest purple borne quite densely.

Crassula Schmidtii & *simsii* 9-12. Very nice, low floriferous crassulas but undependable, sailing through some winters then failing in others that seem no colder.

Cyclamen hederifolium 9-11. Better in the ground than in pots or troughs, I've found.

Oxalis lobata 9-11. Wonderful golden yellow flowers and a clumping, non-invasive habit.

Salvia greggi 9-10. Worth growing for the dusky scarlet flowers, though they are sparsely borne, but difficult to place because of its 50 cm height and lax habit.

Scilla autumnalis 8-9. Even wispiest than *Leucojum autumnalis*, probably better outside in a dense planting.

October:

Crocus medius 10-11. Lilac purple. The most dependable of the autumn crocuses for me.

Cyclamen cilicium 10-11. This has proven the most successful of the cyclamens in a hot, dry place.

Sinocrassula yunnanensis 10-11. Not a star, but definitely different. Long wands of tiny white flowers rise from good, tight, succulent rosettes.

Sternbergia lutea 10. A lot of leaf per flower, but the large yellow flowers are definitely worth it, particularly when they choose to appear at the same time as *Crocus medius*.

November:

Camellia Sasanqa 'shishi gashira'. 11-12;3. And yes, a rock-garden camellia. Definitely low and slow

enough to fit in, with large deep-rose flowers.

Narcissus bulbocodium romieuxii & *N. 'Nylon'*. I no longer see much of a difference between these two, both blooming from 11-1 as the clumps have matured. Marvellous large crystalline white flowers. *Zaianicus lutescens* and the Archibald strain have yellow flowers.

Nerine bowdenii 11. Quite a show for this dark month, with large umbels of pink flowers held on 40 cm stalks. *Parochetus communis* 11-12. Marginal. The blue pea-flowers are intriguing, but the plant itself goes through boom and bust, surging forward in a threatening way in the fall, then dying to the ground with the first severe frosts.

Rosmarinus officinalis prostratus 11-4. Not showy and really a bit too spreading, but the flowers remain absolutely untouched by the cold.

December:

Crocus laevigatus 12-1. The winter analogue of *C. medius*.

Foliage: *Arenaria tetraquetra granatensis* Very tight, very congested creeping gray-green mat.

Bolax glebaria Rosettes of dark, shining green. New, but looks solid.

Chrysanthemum atlanticum Feathery silver leaves. Protected from overhead wet. May bloom in time.

Gypsophila aretioides Even tighter and lower than the *Arenaria*.

Helichrysum angustifolium nanum A billowing, silver-leafed shrub to 40 cm. intensely pungent leaves even without touching.

Leptospermum humifusum Quite special, a ground-hugging gnarled shrub of distinction, 5 cm high and 20 across. Very, very drought resistant.

Jim Jones, Lexington, MA has been a member of ARGS for 18 years. His rock garden specialty is the alpine house.



Native Plants At Mt. Cuba Center

Claire Sawyers

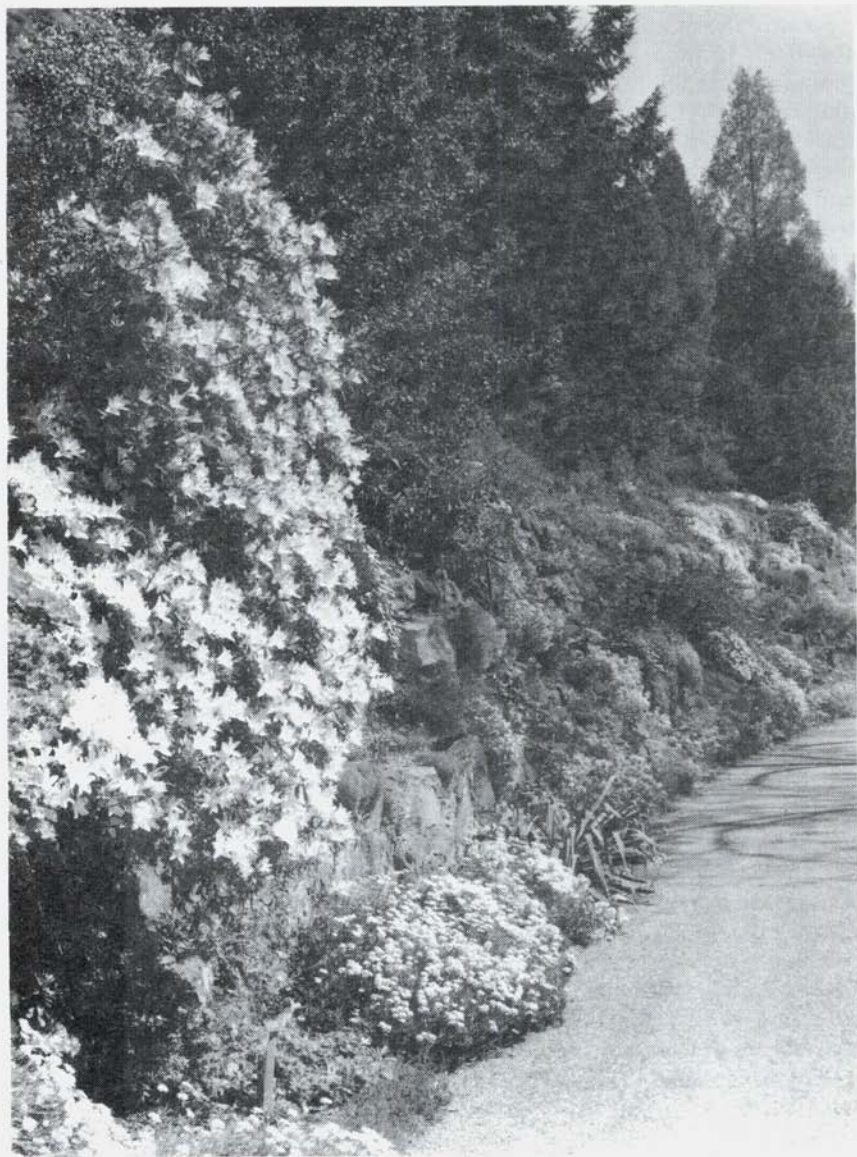
The Beginnings

The Rock Garden at Mt. Cuba came to be by serendipity. When Mr. and Mrs. Lamont duPont Copeland began building their home in the 1930's, near a settlement long known as Mt. Cuba, they had to blast a hillside to lay out the long winding driveway. The result: raw jagged rocks were exposed for about 60 feet. The effect was less than warm and welcoming and since all visitors would pass it, something had to be done. Recalling their early efforts, Mrs. Copeland said, "We decided it would be planted out entirely with greenery so that it would never be a maintenance problem." Fairman Furness of Upper Bank Nurseries in Media, Pennsylvania was called upon to propose suitable greenery. The original plan called for cotoneasters, creeping juniper, firs, Mugo pines, *Elaeagnus*, *Salix*, and *Taxus baccata* 'Repandens'. The few native plants specified were mountain laurels, yuccas, *Cornus stolonifera* (now *C. sericea*), and *Symphoricarpos*. The herbaceous species in this original planting were limited and not unusual: *Alyssum*, *Iris*, and "plumbago" (presumably *Ceratostigma plumbaginoides*).

While some of these plants remain today, the diversity of species is considerably broader, largely due to the

enthusiasm and skills of Fred Brown, who cared for and developed this area from 1976 until he died unexpectedly in 1987. Several hundred species now adorn this dramatic rockface and at peak bloom, in early May, the rocks are smothered in color. Kathy Chambliss currently cares for this area, along with the extensive cutting garden and small formal pool garden.

In 1983, Richard Lighty became director of Mt. Cuba Center. Working with Mrs. Copeland (Mr. Copeland died in 1983), he has identified the goals for the estate when it becomes a public garden: to display and study plants native to the Piedmont Region. This rich floristic region extends from New Jersey south into Georgia and Alabama lying between the Coastal Plain and the Appalachian Mountains. Several factors helped to form this emphasis: Mrs. Copeland's life long interest in wild flowers, the extensive wildflower garden which was developed in the 1960's, and the fact that Mt. Cuba lies on the Piedmont. With this goal in mind, native species have been added to the Rock Garden joining the host of bulbs of Mediterranean origin, the groundcovering azaleas of Oriental descent, and the cherished *Lewisia* from the West.



*The rock garden along the main drive at Mt. Cuba.
Courtesy, Mt. Cuba Center for the study of Piedmont Flora.*

Some of the native plants added to the Rock Garden serve as accent plants or focal points, others provide planes of low foliage for bulbs to pop through, and others provide grassy textures that contrast with cushions and mounds of foliage. Still other natives, not typically thought of as rock garden plants, serve to connect this intensively cultivated area with the surrounding woods.

Corydalis sempervirens is one accent plant whose sprawling nature seems particularly appropriate to counter the severity of the rocks. Its blue foliage and dainty yellow and pink flowers cast delicate patterns against the dark stones. While it begins blooming in mid summer, this year it is still blooming now, the 19th of October. A biennial, this plant carries itself from one year to the next by seeding in the lower corner of the Rock Garden where there is very little soil and sheer rock faces.

Opuntia humifusa, the prickly pear cactus, is another valuable accent plant since it provides year-round interest. In some places its flat, rounded pads mimic the layering of the rock, in other places it scales the rock or cascades over ledges. Its summer flowers are bright yellow; in the fall, its odd fruits turn plum colored. In some spots *Ceratostigma plumbaginoides* (an Asiatic species) creeps in and around it and when its burgundy fall color develops, it harmonizes with the "prickly pears." By spring the *Opuntia* pads have shriveled but nevertheless, they provide greenery and textural interest the entire winter. Some visi-

tors seem to feel the cactus looks odd in the Rock Garden, but I've seen this species along the roadsides in West Virginia in dry rocky outcroppings, so to me it looks at home at Mt. Cuba.

Lonicera sempervirens, a native honeysuckle vine with coral colored flowers, is planted high in the Rock Garden so it falls out and down over the rocks. The flower clusters at the ends of the trailing stems glow against the dark stone. Out of bloom its loose open habit softens sharp angles and edges.

A southeastern native saxifrage which has been tried at Mt. Cuba and is well suited to rock gardening is *Saxifraga michauxii*. Naturally occurring in cracks along sheer rock grasses, it works well dotted here and there in tight pockets. Its rounded leaves look like they've been cut with pinking scissors, the teeth are so distinct, and the small rosettes are more noticeable than you might suppose since, even during the summer, they each have a few orangish-red leaves. The flowering stalk, with a puff of small white flowers, rises out of the middle of the rosette, similar in character to other saxifrages and heucheras. In the wild, this plant frequently grows on rocks dripping with water. We've lost it in the wildflower garden, so I suspect it requires ample moisture. Of the native plants which form mats of foliage, two jump to mind: *Potentilla tridentata* and *Phlox subulata*. The three parted leaves of the *Potentilla* create a handsome mass 3-4 inches tall. The leaves turn red and maroon in the fall and persist through the winter.

While foliage is this plant's greatest asset, white flowers, reminiscent of strawberry flowers appear during the summer. Even novice gardeners are familiar with the mats of needle-like leaves of *Phlox subulata*, the moss pink, and the intense patches of color they become in bloom. Some of the cultivars grown at Mt. Cuba are 'Blue Hills' ("sky blue"), 'Millstream Daphnie' (clear pink with a yellow eye), 'Red Wings,' 'Chalky' (white, reblooms in the fall), and 'Maiden Blush' (white with a rose eye).

Grassy tufts and clumps help balance the showy plants in the Rock Garden. The native plants which function in this way include true grasses (*Deschampsia flexuosa* and *Festuca* species), sedges (*Carex filifolia*), wood rushes (*Luzula acuminata*) and other plants with narrow foliage, such as *Hypoxis hirsuta* and *Sisyrinchium atlanticum*. The *Deschampsia* and *Festuca* are also wonderful when their flower stalks dry to a straw color and they are backlit by the sun. *Deschampsia flexuosa* 'Aura' offers bright yellow-green tufts of foliage. We acquired this selection from Siskiyou Rare Plant Nursery. The *Carex*, mixed in with heaths and heathers at the upper end of the Rock Garden, is native to Mt. Cuba. Realizing its potential, several gardeners began propagating and planting it. It forms dense clumps but is not weedy. *Luzula acuminata*, a member of the Rush Family, closely resembles *L. sylvatica*, a European species which is more commonly grown. It performs well in shade. *Hypoxis hirsuta*, forms

sparse, erect clusters of leaves about 8 inches tall. Its foliage doesn't bespeak Lily Family, but bright yellow flowers appear sporadically through the summer and fall, clearly showing it isn't a grass. Blue-eyed grass, *Sisyrinchium atlanticum*, another plant not related to the grasses, but giving that appearance, also naturally grows at Mt. Cuba. In the spring it is sprinkled with bluish flowers.

The Rock Garden rises steeply from the driveway to about 15 feet at the top, so small plants on the ridge wouldn't be visible. Surrounding the area are mature oaks, maples, white pines, and other large trees which were mostly planted in the 1930's. A mixture of native plants, most of which are too large for typical rock gardens, fills this area, connecting the rocky area to the maturer, park-like woods which frame it. Here's a mass of sheep laurel, *Kalmia angustifolia* and near it a thicket of *Comptonia peregrina*, the sweet fern, a relative of bayberry with fern-like, fragrant leaves. The sheep laurel is easier to appreciate in bloom planted high, as it is here, because you see the rosy flowers along the stems beneath the spring flush of foliage. The *Comptonia* has spread rapidly by suckers since the initial planting in 1978. Here too, is a stand of *Asclepias tuberosa*, the butterfly weed. Its bright orange flowers and silvery, silk parachutes on the seeds stand out against the shrubbery. And *Vaccinium pallidum* and *V. crassifolium* 'Bloodstone' and 'Well's Delight', planted years ago, are starting to spread their shiny, leathery leaves

over the ground here. Canadian Hemlocks (*Tsuga canadensis*), American hollies (*Ilex opaca*), and American arborvitae (*Thuja occidentalis*) raise the canopy to meet the maples, oaks and white pines.

The other area at Mt. Cuba of particular interest to rock gardeners is the outcropping created on a west facing slope in the wildflower garden. This began just a few years ago with the placement of eight 30-year old *Pinus strobus* "witches brooms" on the lower side of the slope. These shrubs, 10 to 12 feet tall and equally wide, are dense masses of needles. They, were grown from seeds collected from cones on witches' brooms of wild pines. Sidney Waxman, at the University of Connecticut, grew them as part of a research project) Mature flowering dogwoods with wide, low branches create a niche for rocks and dainty plants on the opposite side of the mulched path from the witches' brooms. The rocks used here were found on the property and placed by Mt. Cuba gardeners Ed Allen and Jerry Sterndale who drew inspiration from rock formations in the natural woods surrounding the estate. The area captures the mood of rocky sites with thin soil of upper Piedmont Hills.

A favorite of the small plants found in this area is *Silene polypetala*, now classified as a Federally Endangered Species. Its unexceptional foliage hugs the ground giving no indication of the beauty to come. In June pink flowers, the size of silver dollars, open with 5 petals intricately fringed on the outer edge. (Jim Alt, now

working in the Experimental Greenhouse at Longwood Gardens, crossed *S. polypetala* with *S. virginica*, the bright red flowering since known as fire-pink. When slides of his results were shown at a native plant conference last summer, the audience gasped.) I look forward to seeing the elegant *Silene polypetala* (and its handsome descendents) in more gardens.

Equally novel and ornamental in this planting is *Conradina verticillata*, also on the Federally Endangered Species list. It naturally grows in shady and gravelly open places and open woods in just Kentucky and Tennessee (it is not found on the Piedmont). Brushing the foliage of this low, bushy, woody mint releases a rosemary scent; crushing a few small leaves under the nose of visitors always gets their attention. In bloom, small purplish-white flowers borne in the leaf axils turn this plant into an attention-grabber for 2 weeks in June. Mt. Cuba gardeners have propagated and spread it to several spots in the garden since its arrival from Environmentals Nursery in 1984.

Near it another charmer grows in the gravelly soil: *Viola pedata*, the bird's foot violet. A number of these violets are planted on both sides of the path and illustrate the variation in flowering found in the species. Some are bicolored - the upper 2 petals a dark purple, the lower three a pale lavender - some are near white or white, others are the typical pale lavender, but unusually large flowered.

Here, too, tucked under the dogwoods, creating a carpet over the ground with mosses, is *Sedum ternatum*, a native stonecrop that thrives in shady moist situations. It produces masses of stems only a few inches tall, each topped with a circle of flat, light green and overlapping leaves. Throughout the growing season it has a fresh, new appearance. Short sprays of white flowers appear in spring and when the flowering stalks dry to a straw color, they are still attractive. At home, slugs ravaged my patch of *S. ternatum*, but with regular slug patrols at Mt. Cuba, this planting shows no damage.

Across the path on the side with the witches' brooms, another classy ground covering plant, *Chrysogonum virginianum* var. *australe*, creeps about the rocks. The rounded leaves of green-and-gold, as it's appropriately called, are always dark green. (It would be interesting right next to the light green of *S. ternatum*.) With dark foliage and a dense habit, this plant has a strong presence despite its diminutive stature. Gree-and-gold starts blooming in March, gains momentum to its peak in May, and sporadically continues blooming into October. Its yellow composite flowers are buttons of pure cheerfulness.

One of the first to bloom in this rockery is *Collinsia verna*, blue-eyed Mary. Although an annual, it seems to have become established, seeding itself in amongst the rocks. The patches of white and near true blue flowers seem special in the spring

when pastel flowers reign. One of the last to bloom in this area is *Cunila organoides*, American dittany. Wiry stems with tiers of tiny purplish flowers splay over the rocks as late as mid-October. Nearby *Hedyotis purpurea* sports late, dainty flowers similar in size and shape to its relative *H. caerulea* or bluets. In all other respects, it's larger than *H. caerulea*, making 6 inch tall and equally wide mounds of halfinch long leaves. Across the path *Spigelia marilandica* is still blooming strong too. Its red tubular flowers with yellow-green throats show up dramatically against the fine needles of the witches'-brooms.

This fall, grasses (*Deschampsia flexuosa*, *D. caespitosa* 'Goldgehaenge' and 'Bronzeschleier') as well as mountain laurels are being added to the area and the rock outcropping has been extended through the witches' broom to the meadow beyond. As with the original Rock Garden, plants will be added and the composition refined, no doubt, for years to come

Native plants grown in the Rock Garden and rock outcropping at Mt. Cuba:

Adiantum pedatum var.

subpumilum

Amsonia tabernaemontana

var. *salicifolia*

Aquilegia canadensis

Arctostaphylos uva-ursi

'Massachusetts'

Asarum canadense

Asclepias tuberosa

Asplenium platyneuron

- A. trichomanes*
Aster acuminatus 'Alert'
A. novi-belgii
A. Patens
Athyrium filix-femina var.
minutissima
Campanula divaricata
C. rotundifolia 'Compacta'
Chamaedaphne calyculata
Cheilanthes lanosa
Chrysogonum virginianum
australe
Collinsia verna
Comptonia peregrina
Conradina verticillata
Coreopsis auriculata 'Nana'
Corydalis sempervirens
Cunila origanoides
Deschampsia caespitosa
 'Goldgehaenge'
D. caespitosa 'Bronzeschleier'
D. flexuosa 'Aura'
Dodecatheon amethystinum
D. media
Erigeron pulchellus
Festuca spp.
Gaultheria procumbens
 'Phoenix'
Gaylussacia brachycera
Goodyera pubescens (rescued)
Hedyotis caerulea
H. purpurea
Hepatica nobilis
Heuchera pubescens
H. villosa
H. villosa var. *purpurea*
Hexastylis shuttleworthii
H. shuttleworthii 'Callaway'
Ilex opaca
Iris cristata
I. verna
Kalmia angustifolia
K. latifolia and cultivars
Leiophyllum buxifolium var.
prostratum
Lobelia siphilitica
Lonicera sempervirens
Luzula acuminata
Mitchella repens
Mitella diphylla
Oenothera perennis
O. speciosa
Opuntia humifusa
Phlox bifida
P. divaricata and cultivars
P. stolonifera and cultivars
P. subulata and cultivars
Pinus strobus witches' brooms
 seedlings
Polemonium vanbruntiae
Polygonatum biflorum
Polypodium virginianum
Polystichum acrostichoides
Potentilla tridentata
Rudbeckia fulgida 'Goldsturm'
Sanguinaria canadensis
 'Multiplex'
Saxifraga michauxii
Scutellaria integrifolia
Sedum nevii
S. ternatum
Silene caroliniana
S. polypetala
S. virginica
Sisyrinchium atlanticum
Smilacina stellata
Spigelia marilandica
Thalictrum thalictroides and
 several forms
Thuja cordifolia
T. cordifolia var. *collina*
Tradescantia x andersoniana
 'Snowcap'
Tsuga canadensis and dwarf
 cultivars
Vaccinium caespitosum

V. crassifolium 'Bloodstone'
V. crassifolium 'Wells Delight'
V. pallidum 'Hamilton'
Viola pedata
Woodsia ilvensis
Yucca filamentosa

Clair Sawyers, Newark DE is Administrative Assistant on staff at Mt. Cuba Center, Greenville, DE. This garden will be visited by ARGS Conventioneers this summer.



*The wildflower garden in spring.
Mt. Cuba Center for the study of Piedmont Flora*

Classification of Arctic and Alpine Poppies

Jim Eckenwalder

The most suitable and widely grown true poppies (genus *Papaver*) for the rock garden are the arctic and alpine species of the section (group of related species within a genus) usually called *Scapiflora*, (but the correct name is apparently *Lasiotriclophylla*). These species make up one of the most distinctive groups of the genus. They can easily be told from all other poppies by combining perenniality (although they often live only 2 or 3 years in cultivation) with solitary flowers emerging from the dense basal tuft of leaves on a leafless stalk (botanically a scape, hence *Scapiflora*). Other commonly cultivated poppies are obviously different. Oriental poppies have the flowers topping a tall, leafy stem and shirley poppies and opium poppies (still a commonly weedy ornamental in Ontario gardens) are annuals and also have leafy flowering stems. That's the end of the easy part.

Unfortunately, for practical as well as philosophical reasons, botanists can't agree on many things about the classification of the *scapiflora* poppies, including how many different kinds there are. Luckily, there does seem to be agreement on one thing, that there are three main groups of species that are more or less recognizable, even if the individual

species that have been described are not. None of the three groups has been given any formal taxonomic name, but most authorities use them as informal groupings. I will discuss each group in turn.

Alpine Poppies

The best understood group includes the diminutive alpine poppies of the scree slopes and fell-fields of the southern European mountains. They are dwarf plants, no more than about 15 cm tall with flowers no more than 5 cm across, usually with white or yellow petals in wild plants, but adding orange and red in cultivated progeny. The yellow cast of these flowers is due to a pigment named nudicaulin, which darkens slightly upon drying. The plants are often largely hairless, sometimes with a grayish bloom on the leaves (glaucousness), and the leaves are usually cut repeatedly (bi- or tripinnate). The pods (capsules) are more or less densely covered with distinctive bulbous-based white bristles. Invisibly but importantly, the alpine poppies have a diploid genetic constitution consisting of the normal 7 pairs of chromosomes found in most poppy species. They are self fertile so isolated plants can produce in abundance the tiny seeds needed for their propagation. Of course, if you allow

them to go to seed, they will have a shorter flowering period.

Originally, Linnaeus included all of the European alpine poppies in his **Papaver alpinum* (throughout this article the * denotes names I have found in seed exchanges or plantsmen's catalogues), making it difficult to decide just which species should bear this name when several species are recognized. As a result, some references, such as Flora Europea, don't use the name *P. alpinum* at all. As with the section *Scapiflora* as a whole, there is some agreement on a tripartite division of the alpine poppies, with some authorities recognizing three species and others subdividing them further.

**Papaver suaveolens*, from the Pyrenees and the mountains of southern Spain, is rarely grown in gardens and is not particularly garden worthy. It has the smallest flowers of the alpine poppies, with yellow petals only about 1 cm long that are so narrow that they don't overlap to form a cup. Extending from the Pyrenees to the Alps and the Apennines is the "large"-flowered, hairy, broad-leaved **P. pyrenaicum*. By some authorities, the yellow-flowered variants of these poppies are called **P. rhaeticum*, the white flowered forms, **P. sendtneri*, the orange, **P. auran-tiacum*, and the name *P. pyrenaicum* disappears. An intermediate between *P. rhaeticum* and *P. sendtneri* is sometimes called *P. ernesti-mayeri*. The third group of European alpine poppies, also with relatively large flowers but with hairless (glabrous), narrow leaves,

extends from the Alps into the Balkan mountains. These are the plants most likely to deserve the name *P. alpinum*. However, the yellow and white-flowered variants are again often treated as different species, this time as **P. corona-sanctistephani*, *P. taticum*, **P. degenii*, and **P. julicum*.

Many of these proposed species are hard to tell apart and they can freely interbreed. In fact, genetic experiments by A. C. Faberge in the 1940's showed that most of the characteristics that differentiate them are under very simple genetic control, usually via variations on a single gene. This makes the named species seem like fairly trivial variants. Perhaps we should return to the broad species concept and call all of them (possibly with the exception of the *P. suaveolens*) by the old Linnean name *P. alpinum*.

In addition to the European alpine poppies, a Rocky Mountain species from the Waterton Lakes/Glacier region, *P. pygmaeum*, is clearly a member of this group and closely resembles *P. alpinum*. This rare pink-flowered species should be amenable to our gardens although I have never seen it listed. Some other species from Alaska and the Siberian and Central Asian mountains might also belong here, but they are so poorly known that we just can't be sure yet. **Papaver alboroseum*, with flowers blushing pink to a yellow center (it is grown nicely at the royal Botanic Gardens Edinburgh), is the best candidate, but unlike *P. alpinum* and *P. pygmaeum*, it is a

tetraploid, with four sets of 7 chromosomes each, rather than two sets. It seems to form a link with the arctic poppies. Some more obscure Soviet and Alaskan species that doubtfully belong here include *P. microcarpum*, *P. Walpolei*, and *P. nivale*, among others.

The garden strains of the alpine poppies have been selected for their success in gardens, and many of the wild kinds of the groups are likely to pose some difficulty in cultivation, particularly during the muggy parts of our summer. In some way, the variability developed in the garden strains offsets these presumed difficulties. However, I also suspect that our own *P. pygmaeum*, if we could only pursue it, would be a notable addition to our garden repertoire.

Iceland Poppies

Iceland poppies are the giants among the scapiflora poppies, with scapes up to 75 cm tall bearing white, yellow or orange flowers up to 8 cm in diameter in cultivated forms. Despite their name, they are not indigenous to Iceland but to the meadows, steppes, and river gravels of Siberia and Central Asia (and perhaps Alaska). They are the least well known group, at least to western botanists and gardeners (many of their habitats are not all that accessible to Soviet botanists either). They vary from glabrous to densely hairy and, when present, the bristles on the capsule are tan or rufous-colored and lack the bulbous bases of the white bristles of the alpine poppies.

**Papaver nudicaule* (a name meaning "naked stem", referring to

the scape), the garden Iceland poppy, is the most widespread species of the group in nature (the only species recognized by some authorities) and the only one in general cultivation. Even more than with the alpine poppies, breeding has led to a great array of forms and flower colors in this species. Obtaining stable forms is more difficult with the Iceland poppy than with the alpine poppy because, although it too is a diploid, it is self-sterile and so seed can only be obtained by crosses between two distinct individuals. The cultivated Iceland poppies may even have resulted from hybridization between *P. nudicaule* and some of the closely related species (like **P. croceum* and **P. rubroaurantiacum*), just like the cultivated alpine poppies. It is even possible to cross Iceland poppies with alpine poppies, with about a 5 to 10% success rate, to produce intermediate plants that are highly floriferous, but also highly sterile. Like those of the alpine poppy, the yellow flowers of the wild Iceland poppies are produced by the pigment nudicaulin, which obviously took its name from this species. Red and orange colors are provided by cyanidin, the pigment of raspberries, and pelargonidin, the pigment of florist's geraniums (hence its name, from *Pelargonium*).

The only other species of the group that may be found with some frequency in cultivation, if only in botanical gardens, is **P. anomalum* from the Amur region of the USSR and Northeastern China. This species is sparingly hairy and usually

has very large white flowers. Other described species closely related to *P. nudicaule* include *P. ajanense*, **P. amurense*, *P. ledebourianum*, *P. leiocarpum*, *P. pseudostubbendorffii*, **P. stubbendorffii* and *P. tenellum*. From the sketchy data available, it is apparent that, as well as diploids, there are some tetraploids and even hexaploids (three sets of 7 pairs of chromosomes) among these species.

Also ascribed to this group is *P. lisae* from the Caucasus, far from the other species. This species departs from all other scapiflora poppies in having flowering stems with a short leafy segment at the base. A leafy flowering stem is not a true scape and so *P. lisae* is considered intermediate between the arctic/alpine poppies of section *Scapiflora* and the Mediterranean/Caucasian/Iranian perennial poppies of section *Pseudopilosa* (including *P. lateritium*, *P. monathum*, and *P. atlanticum*, among other species, the latter occasional in gardens, including ours).

Finally, at high elevations of the Tien Shan and other Central Asian mountains, are a few species of low-growing poppies that may be alpine derivatives of the Iceland poppies, as suggested in the Flora of the USSR. On the other hand, most of them have white bristles on the capsule, suggesting, as does their alpine habitat and diminutive stature, a relationship with the alpine poppy group. There's simply not enough information available to decide for sure at the moment. These species include *P. angrenicum*, *P. canescens*, **P. pseudocanescens*, *P. involucratum*,

and **P. tianschanicum*. Seed I received under the latter name from the ARGS seed exchange proved to be the unrelated *P. atlanticum* mentioned above, a species from Morocco that is a fine hardy perennial here but not overly suitable for the rock garden (although I can't resist keeping a few of the plants that self-sow in part of our rock garden).

Most of the species of this group, if they were available, would probably be amenable to cultivation in our "Siberian" climate. However, the silky-haired species of the Mongolian steppes, *P. rubroaurantiacum* and *P. ledebourianum*, are likely to yield only to those lucky enough to have an alpine house or cold frame. The Central Asian alpine species are also likely to provide a good challenge for the ambitious. Here is a chance for some snob appeal.

Arctic Poppies

Scapiflora poppies of this group are found throughout the arctic tundra all around the northern hemisphere above 70 degrees N. latitude in Eurasia and 60 degrees in North America, and extend southward a little in mountainous regions, to 35 degrees N in the Rocky Mountains of New Mexico at the southernmost extreme. Like the alpine poppies, they are diminutive, tightly tufted plants, but differ in the dark, often almost black, nonbulbous bristles of the capsules. Like both the alpine and Iceland poppies, the predominant floral color is yellow, but this time a different pigment, gossypetin, (named after cotton, *Gossypium*, which has the same pigment in its

flowers) is responsible. A consequence of this difference in pigment is that the petals of arctic poppies dry a greenish-yellow rather than orangish-yellow.

We find some of the same sorts of variations in the arctic poppies as in the other two groups: different degrees of hairiness, leaves ranging from simply three-lobed to highly dissected, and flowers from white through yellow to orange and even red. However, some additional characteristics have been used in this group to discriminate species. Most important are the tightness of the clump (of interest to the discriminating bungrower), the shape of the capsule (whether round, elongate, or whatever), and the color of the milky sap (latex) characteristic of most poppies (opium is the dried latex of *P. somniferum*). This sap, when fresh, ranges from white, through cream to yellow and orange (but paler than that of our native bloodroot, *Sanguinaria canadensis*, also in the poppy family). Some of the variability in these plants is associated with the type of tundra habitat in which they grow, but we don't know which features are genetically fixed and which respond plastically to environmental differences.

Unquestionably, this is the taxonomically most difficult group of all the scapiflora poppies. To the site-to-site variation found also in the other two groups is added a further major complication: the arctic poppies form a highly polyploid group. That is, while the alpine poppies are predominantly diploid (with a few pos-

sible tetraploids) and the Iceland poppies are diploids and tetraploids (with a few possible hexaploids), the arctic poppies reach from tetraploids up to dodecaploids (six times the basic genetic complement of 7 pairs of chromosomes). Plants at different polyploid levels are generally incapable of interbreeding successfully. Furthermore, G. Knaben, who studied some of these species in the 1950's found that even at the same chromosome level (she studied with particular care decaploids, with five times 7 pairs of chromosomes), different races had chromosomes which differed from each other by small rearrangements of their parts that inhibited crossing between races. Thus, there are endless, largely reproductively isolated races (one of the definitions of a species) of arctic poppies.

When you add to this the fact that few botanists can make more than fleeting visits to the arctic, it is not surprising that more species have been described in the arctic poppy group than in any other two groups of scapiflora poppies combined. No two books on the arctic flora accept the same range of species, not even those embracing exactly the same area. How valid are all of the described species? We simply don't know yet, and the uncertainties are much greater than for those of either of the other two groups.

The basic species for the arctic group is **P. radicum*. Like *P. alpinum* and *P. nudicaule*, this name can be used for its whole group by the conservative-minded. In a restricted sense, it applies only to decaploids or

octaploids (four times 7 pairs of chromosomes), depending upon the interpretation of the original description, but, with a circumpolar range in dry tundra, it is still the most widely distributed species in the group. If the true *P. radicum* is decaploid, then the corresponding octaploid is called **P. lapponicum*. If the octaploid is the true *P. radicum*, then the widespread decaploid is called **P. Norhagenianum*. About 20 subspecies have been named in decaploid *P. radicum*, most of them confined to just a few sites in Scandinavia, while others have much broader ranges.

Relatively few of the sites containing arctic poppies have been sampled for chromosome constitution and so this potentially important feature is known for only a few of the described species. Low chromosome numbers appear to be restricted to the western arctic of North America and to northeastern Asia. **Papaver macounii* (named after John Macoun, Canada's first official post-colonial botanist and author of the first flora of all of Canada) is a tetraploid or hexaploid that grows in grassy tundras of Alaska, the Yukon, and perhaps eastern Siberia. There are three known hexaploid species, *P. hultenii* of Alaska, **P. Miyabaeum* of the Kurile Islands, and **P. kluanense* of alpine habitats in the Rocky Mountains, from the Yukon to New Mexico, skipping the habitat of *P. pygmaeum*. The highest known chromosome number, dodecaploid, is found only in *P. cornwalliensis* of northwestern Greenland and nearby Canadian islands.

The two remaining chromosome constitutions, octaploid and decaploid, are found throughout the range of the arctic poppies. Additional octaploid species that have been named are *P. laestadianum* of Scandinavia and **P. Fauriei* of Kamchatka and the Kurile Islands (most plants cultivated as *P. Miyabeanum* have the chromosome constitution of this species). The known decaploids also include **P. dahlianum* of the North Atlantic, *P. relictum* and *P. oelandicum* of Scandinavia, and **P. islandicum* of Iceland.

All of the other named species of arctic poppies are cytologically unknown. Additional species described from the arctic of the Soviet Union include **P. chibinense*, *P. tolmatchevii*, *P. lujaurensis*, *P. langeanum*, *P. leucotrichum*, **P. pulvinatum*, *P. angustifolium*, **P. minutiflorum*, **P. gorodkovii*, *P. uschakovii*, *P. paucistaminum*, *P. indigiricense*, and *P. kurilensis*. In the North American arctic, we have *P. alaskanum*, *P. mcconnellii*, *P. denalii*, *P. keelei*, *P. walpolei* (unique in growing in muskeg tundra), *P. nigroflavum*, *P. freedmanianum*, and *P. scammonianum*. (Note that more of the Russian species have been listed in seed lists than have those of our own arctic.) Some of these species were named within the last few years and new ones are undoubtedly still to come. A large number of the described species are explicitly treated as synonyms by at least some authors, but they are highly inconsistent from one to another. There is a real hornet's nest of opinions.

Cultivation of the arctic poppies runs into one very severe difficulty stemming from the arctic home of these plants. Most of them flower during the long days of the arctic summer. Knaben found that even sources from northern Norway would not flower in Oslo, where she worked, without supplementary lighting to increase the day length, and we are a further 15 degrees south of Oslo here in Toronto. If the same kinds of restrictions apply generally to arctic poppies, our best bets are the Rocky Mountain alpine *P. kluanense*, the east Asian *P. Miyabea*/*P. Fauriei* and some of the Alaskan species, such as *P. alaskanum*.

I think you'll agree with my statement at the outset of this article that the classification of the scapiflora poppies is pretty confusing. Trying to identify a specimen can be a nightmare because there are no up-to-date world-wide identification guides to these species, and even if there were, hybrids and intermediates abound. Furthermore, if you succeed in germinating seed listed as one of the

narrowly defined species in a seed exchange list, the chances are very good that the name it came under is wrong. These plants provide a great opportunity to add an esoteric botanical challenge of identification to the formidable horticultural difficulties of cultivating the less usual species. Only time will tell how taxonomists will resolve their extreme disagreements over the number of species of scapiflora poppies, but if your head is reeling from an excess of names, perhaps your best course is to return to Linnaean simplicity and call all of the alpine poppies *P. alpinum* (and *P. pygmaeum*), the Iceland poppy and its relatives all by the name *P. nudicaule*, and all of the arctic poppies *P. radicum*. If you want to collect and cultivate these engaging plants, try this simple approach to their nomenclature first.

Jim Eckenwalder, Toronto, Ont., is a Professor of Botany, University of Toronto. The article is updated from one which appeared first in the Ontario RGS Newsletter.



Ethical Scrounging

Morris West

A great deal is written and said about the ethics of collecting plants in the wild. I do believe it would be appropriate for the ARGS to take an official position against the collection of rare or endangered species, unless officially sanctioned as a rescue operation. Also members should avoid the purchase of wild collected plants from nurserymen. Except in cases of eminent habitat destruction, no more than a very small percent of the plants in a natural stand should be collected. Many rare and endangered species are difficult or impossible to maintain as garden plants, and it is hard to believe that ethics would take a front seat if a nurseryman is confronted with a choice between high sales and limited collection.

Let me make one thing perfectly clear — I'm a collector. For instance, I have no qualms about taking the small mats of *Epigaea repens* and *Mitchella repens* that seed along the shaded banks of the township road that adjoins my property. They never escape the snowplows for more than a few years unless saved by a collector. Regardless of what you might read these are easy to transplant when young.

In many western areas one road grader will scrape away in a single

day more alpine than the entire membership of the ARGS would collect. I have seen thousands of mats of *Phlox hoodii* and clumps of *Aster alpigenus*, *Erigeron compositus*, *Aquilegia Jonesii*, and numerous *Penstemon* sp. roman obliterated in a few hours time. In the northeast an entire rich and diverse woodland can, in a matter of days, be replaced by acres of asphalt. Road maintenance destroys only the edges of vast fields of alpine or small colonies of eastern woodland plants, but parking lots totally annihilate the entire flora. Rather than discouraging collecting in such areas, it would be ideal if local, state, and federal bureaucracies officially publicized and encouraged collecting in areas slated for habitat destruction. Unfortunately the normal procedure never assesses potential damage to an area much less sponsors an environmental impact study.

Let's be ethical scroungers and:

Not collect rare and endangered species (except to rescue).

Not buy plants from nurseries that collect rare and endangered species (just those that propagate).

Morris West, Brogue, PA, is a frequent contributor to the Bulletin.

A Lift UP

Wally Alberts

Sessellift, Kabinenbahn, Luftseilbahn, Gondelbahn — sound strange? If you ever have a day or two (or more) to spend in the Alps of Europe, these could be magic words. Armed with a copy of Lionel Bacon's *Mountain Flower Holidays in Europe* and a map which clearly shows the lifts (chair lift, cable car, funicular, gondola respectively) even a day or two can be time enough to go where the alpinists grow in such profusion. Bacon's book, which may be purchased from the Alpine Garden Society of England, is invaluable. It has chapters on the mountain areas of European countries and tells which flowers are found in very specific areas. It tells how to get there, and often where to stay. Local maps will show many other areas with lifts, perhaps new since Bacon's trips. This is not a listing of the plants we have seen, but some suggestions which we hope will encourage you to take "A Lift Up".

Not all, but many of the lifts run in the summer. Saying "hoch" or "high" with a finger pointed skyward, ought to tell the toll taker you wish to go way up. This can sometimes mean three or four different lifts and, unless there is too much snow, the top is where you find the special flowers: gentians, androsaces, primulas, soldanellas, orchids, ranunculus, and so many others. There is usually a map that shows the lifts available

and also the hiking trails. A walk down to the tree line is often very rewarding.

In June and July for 4 of the last 5 years, my husband Bob and I have taken a great many of these magic carpets to the tops of various mountains in the Alps. We have rented a car at the airport in Frankfurt or Zurich; however, numbers of the mountain towns are accessible by train. (Many of Bacon's trips were done by train.) We have started in the Swiss Alps, which are in the Bernese Oberland, then on to the Engadine Valley, over to the Dolomites in Italy and then to southern Austria. We have had a month to travel; getting there is the largest portion of the travel budget. Since I speak "basic" German, we often stay in Bed and Breakfasts (the European style, not American). These are easy to find. Usually a street sign showing a large blue "I" will denote a well-staffed information center where someone will speak some English.

I feel very strongly about going to the areas I mentioned AFTER the 25th of June. On three of our four trips, this timing worked very well; the time it did not, we were too early. On the 28th of June our favorite trail, from the top of Mannlichen over to the Lauberhorn, was still snow covered and not open. If the season is an early one, you will still see many flowers, but if the season is late, even



Papaver fauriei (Page 116)

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Papaver alboroseum (Page 116)

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Thlaspi rotundifolium (Page 124)

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Eritrichium nanum (Page 124)

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mid-June may mean most of the high trails will be closed, though there are still flowers to be seen on the lower trails and in the meadows. There are of course many flowers which will not bloom until later in the season.

We start off around 9 a.m. Breakfast is seldom earlier than 8 o'clock, and although usually only rolls and coffee, the rolls are soft and delicious. Then we're off to a grocery store for fruit, cheese and crackers, etc. These go into our backpacks along with film and a heavier jacket, head covering, light rainwear, gloves, and zip-lock bags. No, we do not collect, we take books, and the bags have come in very handy for protection of those and of camera equipment. Despite the heat in the valleys, heavier clothing is often needed at the top.

I readily admit hiking boots take up lots of room in a suitcase, especially for those of us who are in the "upper bracket" sizes. But since enthusiasm will surely take you off the trail, you do need real hiking boots, with ankle support. Today's boots are so lightweight and comfortable. You will see sneakers and even clogs — so foolish. If I took a tour group into the mountains, hiking boots would be required.

Any non-gardeners in your group will find these mountains most enjoyable; the scenery is absolutely breathtaking, the trails are very clean, most of these mountains have restaurants at their tops, and people all over are friendly. Also we have seen snow rabbits, ibex, marmots, chamois, and many birds.

Favorite spots? Lauterbrunnen

Valley is tops. Trains from Zurich or Geneva to the city of Interlaken, and then on to the village of Lauterbrunnen or Grindelwald, put you in a valley where the cog railway makes a grand, but slow, loop around with stops at many little towns, all with lifts. We usually take the cog to Wengen, a lovely spot, halfway up a mountain, where no cars are allowed. Wengen has its own lift, up to Mannlichen, where there are many trails and other lifts. There are also many trails out of Wengen, walks up, down, long, short, open or woodland. Grindelwald, Murren, Kleine Scheidegg, the botanic garden at Schynige Platte or back to Interlaken, all available by rail.

Pontressina in the upper Engadine Valley is another village which has public transportation to the surrounding ski lifts. Though near St. Moritz, the towns of Celerina and Pontressina are less expensive, but still have many hotels, and busses and/or trains going to the numerous lifts. Bernina Pass is perhaps only available by car or taxi — get to it somehow if you are near.

In the Dolomites we have gone to the Val de Gardena, in Italy, and stayed in the town of Selva-Wolkenstein. There is not the ease of travel in this area, unless you have a car. With a car there are four passes we have explored extensively, every time finding flowers not seen before.

We enjoy the southern areas of Austria. We have befriended a family there, but not many speak English, so language could be a problem. In upper Austria, however, many do

speak English and even Innsbruck and Salzburg have their mountains.

Bob finds driving in Europe no different from here. The road signs are all international signs; often English wording is used in the cities. The roads, sometimes narrow, are, however, very well maintained, and road maps are available all over. An advantage in having a car is that it makes the passes so accessible—just get out and walk all over. There, too, are many well-marked trails. Also boots, heavy jacket, and so on, can stay in the car. In fact, I have learned to pack a small bag to use for a few days rather than lug a large suitcase up and down to our room.

Caution. Most lifts are closed at noontime. Geschlossen means closed. Offen means open. Also be sure to check the time of the last trips down, always posted near the lifts. Wanderweg markings give hiking times. Europeans HIKE (as in Hup 1-2-3), even so, the pacer must have had long legs. Pay no attention to the times listed unless to triple or at least double them for an estimate of how long it will take you. "Ice" will get you that creamy stuff or a blank look, not a cool drink.

Do. When you spot someone bent over, nose to the ground, go talk to him or her. Nine times out of nine you have found an English person who will not only be able to understand you but will likely know the name of that flower as well as other likely spots to seek out more alpine.

All in all the European Alps do give a lift up, both literally and figuratively.

What You'll See

Switzerland:

The Lauterbrunnen Valley

Androsace helvetica is found in rock along the ridge path which leads to the very top of Mannlichen. The view from here, back to Wengen, down to the Lauterbrunnen valley and up to the peaks of the Eiger, Monch and Jungfrau is one of the most spectacular.

Out of Grindelwald, on first walking down the side of the mountain, we found many pink and white forms of *Primula auricula*.

Thlaspi rotundifolia grows in the loose scree at the base of the cog railway tunnel, at Kleine Scheidegg. In the turf, just off the path one finds *Leucanthemum alpina*. *Crocus albiflorus* is in the meadows on the way from Kleine Scheidegg to Wengen, also *Caltha palustris*. You'll see *Polygala chamaebuxus* along the path in open woods on a walk from Murren to Grutschalp. *Globularia cordifolia* was lunch for a very large Snail.

The Upper Engadine

The Bernina pass is the place to see and study Primroses. *P. hirsuta*, *P. latifolia* and *P. integrifolia* were some I was able to identify.

The Julier pass has a stream, along which *Daphne*, *P. longiflora*, *Soldanellas*, *Pinguiculas* and *Primula farinosa* are abundant. *Loiseleuria procumbens* covers a large part of rock outcropping on the other side of the pass. On Piz Nair above Corviglia, we met an elderly English woman, precariously bent over, on a

sheer outcrop, looking at a lonely blooming *Ranunculus glacialis*. Men from the lift were just opening a path to the very top. Bob followed through knee high-snow - this in July - and urged me to come up. We were well rewarded - the top was full of blooming *Eritrichium nanum*.

Italy, in the Dolomites:

Above Ortisei, a 2 stage, long Gondola ride takes you near the top of Seceda. Here too one can find *Androsace helvetica*, just off the path. On, above and even in the path grows *Vitaliana primuliflora*. Lovely patches of *Primula longiflora*, some *Pulmonaria montana* and *Primula elatior* all in the open meadows, as well as *Pulsatillas*, *Gentianas*, and so many others. On the large boulders, always worth investigating, we found the best specimens of *Leontopodium alpinum* we have seen in the alps.

We parked our car on the Pordoi pass one day, and walked Farrar's Bindelweg. A long walk, around a group of mountains and then we took the trail up and over the top. *Eritrichium nanum* lay like golf balls and in between were salad plate size clumps of *Ranunculus glacialis* as well as *Geum reptans*.

On a few large boulders in the Sella pass we made a real find — tiny *Gentiana bavarica* var. *subacaulis*. This is a compact, slender dainty form of *G. bavarica*, but the same vibrant blue. *Thlaspi rotundifolia* was in abundance on the loose limestone screes.

Austria:

In the Turacher Hohe, on Rinsen-

nock, directly beneath the lift are *Primula minima* and *Primula glutinosa*, *Campanula alpina*, and lots of foliage - one flower only - of *Saponaria pumila* - all growing together, covering the entire top of the rise. A bit lower down, still under the lift, *Loiseleuria procumbens* was in flower, still further a few blossoms of *Rhododendron ferrugineum*. Higher up, silhouetted against the sky we found dozens of *Pulsatilla alpina* nodding their heads. *Campanula barbata* is abundant along the roadside, as are many other campanulas.

Southwest of the town of Hermagor in southern Austria we felt privileged to see *Wulfenia carinthiaca* in bloom. This makes headlines in Austrian newspapers yearly and tourists flock to see this as it is reportedly only found on this one hillside and one other place in Albania. It reminded us of a coarser *Primula* with *P. candelabra*-type foliage, a foot high stalk and tubular blue-purple flowers.

West of Vienna, out of Puchberg, one can take the cog railway to the Schneeberg. A very large, flat surface to this mountain makes exploring easy. You'll find *Dianthus alpinus*, dozens of *Primula auricula* and lovely clumps of *Potentilla clusiana*. In the meadows we found another tiny *Gentiana*-possibly *G. pumila*, which is reported to be here. We also saw *Veronica fruticans*, *Geum montanum* and *Ranunculus alpestris*.

Wally Alberts, Amherst, NH, has been a member of ARGS for 25 years and grows many plants from seed.

EDITORS NOTE: Due to a pasteup error, several paragraphs of this article in the Winter Issue were left out. Following is the beginning of the article through the deleted portion. The balance of the article is accurate as it appears in the Winter Issue.

Phabulous Phloxes

Panayoti Kelaidis

Creeping Forms for the Garden

Late April and May are synonymous with phloxes in the rock garden. These are invariably hybrids of *Phlox subulata*, the commonest mat-forming species growing wild along the eastern seaboard. Discriminating rock gardeners have sought cultivars with more vivid flower color or some special quality of form or habit, but it's surprising how few of these are available from more than a handful of specialist nurseries, and even extensive rock garden collections sometimes lack the better forms. Judging from most rock gardens in America, the numerous species and endless variations of creeping phloxes that are found west of the Mississippi are largely figments of the late Dr. Wherry's imagination.

Eastern Creeping Phloxes

The first phloxes to be introduced to cultivation were naturally the eastern species that grew wild where America was first settled. Reginald Farrer has written that: "The day that saw the introduction, more than a century since, of *Phlox subulata*,

ought indeed to be kept as a horticultural festival." Most garden centers sell these just as they do peonies and irises, by color. The cultivars are usually of the Emerald series — 'Emerald Pink', 'Emerald Blue', and so forth. These are mediocre selections of this highly variable plant. Anyone who has seen the dazzling cultivars available from rare plant nurseries (or even everyday garden centers in Europe) will have nothing of these emerald mediocrities. A few of the better cultivars include the following:

Phlox subulata 'Scarlet Flame'. Fast spreading and large, the flowers are a vivid, deep rosy red that is the closest thing to scarlet in a creeper. It was obviously named before the Mexican phlox came on the scene.

Ph. s. 'Red Admiral' and 'Crackerjack' are both miniature red-pinks with rather small flowers that smother the cushions. The plants rarely exceed a foot in width after several years. 'Crackerjack' is slightly more vivid in Colorado — one of the brightest of miniature phloxes.

Ph. s. 'Ellie B.' is usually listed as

a *subulata* variety, although it has the shallowly cleft flowers characteristic of *Ph. brittonii*. It is a miniature white.

There may be some confusion currently in the trade between this tiny plant and the somewhat larger, but equally bright-flowered 'Sneewitchen' with slightly coarser, lighter-colored leaves.

Ph. s. 'Ronsdorf Beauty' is a cultivar selected in Europe that also forms compact cushions studded with rosy pink flowers with dark purple eyes quite a dramatic departure. The petals are rounded, and give the flower a pleasingly softened

form.

Ph. s. 'Laura' has delicate, pale pink flowers of a luminous shade with no eye markings whatsoever.

Ph. s. 'Coral Eye' is utterly distinct with pale — almost white — petals set off with a deep pink eye.

There are three other species of creeping phloxes that occur to the east of the Mississippi. (see **balance of article in Winter Issue 1989**)

Panayoti Kelaidis, Denver, CO, is curator of the Rock Alpine Garden, Denver Botanic Garden. This is an updated article which first appeared in the Chapter Newsletter.

Gordon Pollock 1896-1988

After a long and full life, Dr. Gordon Pollock died in Connecticut on August 20, 1988.

He was a special man, gentle, quiet, but highly interested and enthusiastic about many things. Rock gardening was one of them. Joining the American Rock Garden Society in 1953, he and his wife Tanya participated in many of the Society's activities from working on local plant sales to attending study weekends and taking trips to visit the mountain homes of the plants they enjoyed so much. Gordon also held the office of chairman of the North Atlantic Chapter from 1966 to 1967.

In his own garden in New Ca-

naan, Connecticut, he grew and cherished many rare plants, which he happily shared with fellow gardeners and members of ARGs. Many a fine plant has grown to maturity from the seed Gordon collected in his garden.

He loved life and saw in plants, as he did in music, another of his great loves, the embodiment of some of the best there is in life.

Gordon has touched many lives and will be missed by all his friends, but remembered, especially when the plants and seeds he shared bloom, flourish, and resow to be given again to other friends.

Viki Ferrenica

Threat to Bog Plant

Many rock gardeners with a bog grow the spectacular "white-top pitcher plant", *Sarracenia leucophylla*. This plant comes from bogs in the Southeast; mainly Alabama, Mississippi and Florida. However, it has proven hardy as far north as New England. The tall pitchers are topped with white coloration and translucent "windows", making them a striking accent.

Recently the international florist industry has "discovered" this plant. The cut pitchers are being used in exotic floral arrangements in this country and overseas. In 1988 an estimated 4 million traps were harvested from wild populations in southeastern bogs. It is estimated that if the trade continues to grow as rapidly as it has in the past few years,

the annual harvest will soon reach 20 to 30 million traps! Commercial collecting in delicate bog communities may have a potentially disastrous impact on the pitcher plant and many threatened plant and animal species that share the bogs, including the possible extinction of some species.

Dr. Thomas Gibson of the Department of Botany, University of Wisconsin, Madison, Wisconsin 53706, is attempting to organize a boycott of the pitchers by the florist industry. Contact him for further information or to offer help. Information can also be obtained from the Natural Resources Defense Council, 1350 New York Avenue N.W., Washington, DC 20005.

Jim Rugh.

Books for the Specialist from a Regional Press

Book Reviews

After the shovel, the rake and the trowel, books are the most important garden tools. Serious gardeners amass garden books the way they amass plants; wholesale and with avidity. On the other hand, they are a discerning bunch, and it can be as instructive to look over the culls as the cream. Mad keen gardeners may be suckered by a pretty cover like

anybody else, but books that don't match that early promise with pith and substance aren't left on the shelf very long. One regional publisher that has done a lot to increase the ratio of pith to pith-poor in garden books is Timber Press of Portland, Oregon. They have consistently encouraged experts in a wide range of specialties to write readable intro-

ductory books; this is something that no dedicated gardener can be without for long. We all start out planting what's widely available, but before long, most life-time gardeners get bitten by some bug or other. Within a few years, their plot is transformed into a hot bed of dwarf conifers, a tapestry of alpines, or a blaze of border perennials. Timber Press is always standing by to fuel the flames of such passions, for which we can all be grateful, specialists and generalists alike. Following are some of their recent offerings that will be of particular interest to ARGS members.

Richard Jaynes' delightful book, *Kalmia, the Laurel Book II* is the best possible introduction to a native American with charms for all seasons. All seven species kalmias are lovely in their own right, and several forms deserve placement in the rock garden (notably *K. microphylla* var. *microphylla*, *K.m.* var. *occidentalis*, *K. latifolia* var. *myrtifolia*, and the rare (*K. hirsuta andericoides*). Until quite recently little hybridizing or selection had been done amongst them, but Dr. Jaynes and a handful of dedicated nurserymen have been working steadily to make the best examples of this connoisseur's plant more readily available. Jaynes' well illustrated, engaging and very readable book ought to go a long way toward popularizing the genus. (1988, \$29.95 hardcover)

Nowhere do the daffodils blow so charmingly and in such profusion as here in the Northwest. If your yard is fast filling up with these enchanting spring bulbs, a copy of *Daffodils for*

Home, Garden and Show could open your eyes to a whole new range of possibilities. The Author, Don Barnes, is the secretary of the English Daffodil Society, and a persuasive, knowledgeable enthusiast who will soon have you dabbling happily in all sorts of esoterica-perfectly harmless, and requiring no special equipment. Why not? What could be more thrilling than to breed a worthy new daffodil? There is good information here on working with species, as well as fascinating biographies of the leading breeders throughout the UK and in the USA. Not perhaps for the most advanced, 'Daffodils' none the less assumes a fair degree of horticultural sophistication. Through it contains all the basics that a newly-bitten neophyte might want, the reader will travel far beyond the usual range of introductory books. (1987, \$23.95 hardback)

New Zealanders are making their way into all sorts of gardens these days, the hebes and parahebes paramount among them. This genus displays a fascinating diversity of size, habit and form, and includes numerous small charmers fit for the alpine bed or trough. In many cases, their relative hardiness is still in question, and many gardeners in borderline zones are experimenting to discover the limits of the local environmental or climatic envelope, as it were. This is well worth a try in any climate, for we are all constantly being surprised by plants. Nearly all hebes root with ridiculous ease, and where the mother plant may be at risk, her offspring can safely winter over in

the shelter of a coldframe or cool greenhouse.

Douglas Chalk's new book, *Hebes and Parahebes* has crossed the water rather quicker than such things used to do, partly in recognition of the increasing interest in this lovely family, partly because of an arrangement whereby Timber Press is co-publishing books with Christopher Helm in London. Chalk is the Chairman of the English Hebe Society, trained at the Royal Horticultural Society garden at Wisley, and undoubtedly knows whereof he speaks. It is wonderful to have clear, concise and authoritative descriptions for the many hebe cultivars and varieties which are so very muddled both in the trade and in our gardens. Best of all, though accurate, the text is not burdened with arcane language that only a taxonomist could love. This is the sort of advanced garden writing we could use much, much more of, and a fine book. (1988, \$32.95 hardback)

Those who go for weird, often stinking, green, brown and sad purple flowers in a big way will gladly pay top dollar for Deni Brown's new book, *Aroids, Plants of the Arum Family*. The admirers of aroids constitute a big group; the Araceae might just be the hippest genus going just now. In truth, of course, not all aroids are odd looking, and some are

simply spectacular, among the most coveted of garden plants. Deni Brown is a splendid writer, witty and warm, experienced, knowledgeable and very able to communicate what she knows. Her book is delightful, exceptionally well illustrated (with her own photographs) and a gold mine of accurate and enticing information. It is well worth its not inconsiderable price. (\$44.95 list, but available at a discount from the ARGS bookstore).

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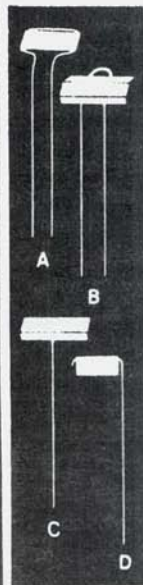
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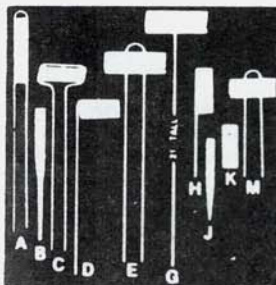
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