GREAT LAKES CHAPTER

North American Rock Garden Society (NARGS)

SPRING NEWSLETTER, APRIL 2010

CALENDAR OF CHAPTER MEETINGS **meeting details below**

**SATURDAY, May 8, 2010:

MEETING:	**11:30 AM – ca. 3:30 PM**
PLACE:	**John & Laura Serowicz'** – see map insert
BUSINESS MEETING:	**11:30 AM**
BAG LUNCH:	**12:00 NOON (while touring garden)**
PLANT SALE:	**1:30 PM**

MARK YOUR CALENDARS:

SATURDAY, Sept. 17, 2010: FALL PLANT SALE & GARDEN TOUR
Details will be in the fall Newsletter

UPCOMING NATIONAL MEETING:

Romancing the Rockies

The Marriage of Plant, and Stone

Exploration, and field study of the "edaphic factor": how does limestone or granite substrate influence the flora, and biodiversity?

July 11-14, 2010
Denver & Salida, Colorado

Join the Rocky Mountain Chapter of NARGS for a trip to the **undiscovered** Colorado that is every bit as beautiful as — but somehow more pristine, and authentic — than the famous resorts that grab headlines. The meeting is scheduled to coincide with the peak of the alpine season: Come dance with *Eritrichium*, and primulas on the very backbone of America!

Information at www.rmcnargs.org

From the Chair

What a spring! In our garden the first blooming signs of spring (besides the bulbs) are the Spring Beauties. This year most of our Hepaticas finished blooming before we even saw a hint of the Spring Beauties. Everything seemed to bloom at least 2 weeks earlier this year which means you get to our garden for the spring plant sale we may have nothing left in bloom, but you will bring and buy great plants.

In February we had a meeting at Arrowhead Alpines on plant propagation. Don Lafond from seed, Dawn Paff from cuttings and Andy Duvall from grafts. They all did a great job. We had such a good time I have been asked to make this an annual event. Thank you to Bob & Brigitta Stewart for your help to make this meeting such a success and for donating the scions for our grafts. Also thank you to Gary Gee from Gee Farms for donating the understock for our grafts. Please show your support to these nurseries – they have always given to our group when we asked. We did over 120 grafts which you all got to take home. For most of us this was our first attempt at grafting and so far I've heard many of the grafts are doing very well. Below is a short reminder of after care for your grafts. For next year, if you plan to bring cuttings you want to graft, contact me ASAP with a list of those plants. I will attempt (but no guarantee) to have understock for you.

Looking forward to seeing you at the plant sale. Bring lots of plants.

John Serowicz

Reminder of Continued Care For Your Grafts

Immediately after grafting the grafts were tented holding the humidity high. You can now start to harden your grafts off by gradually opening your tents a little over a period of 10 days or so. Once they are fully exposed keep them out of direct sunlight until you see bud growth on your scions. When you transplant your grafts, put the understock root ball with scion in a gallon pot with new good potting mix, not garden soil. Slowly over the next year or so start trimming the understock, less than 50 % at a time, and cutting new growth off first. Fertilize only with diluted liquid or a slow release fertilizer.

The Genus Primula & Alpine Flowers of Southeastern Tibet by Pam Eveleigh

Meeting Notes by Laura Serowicz

The October 17, 2009 meeting featured two talks by Pam Eveleigh as part of the NARGS Speaker's Tour. Pam lives in Calgary, Alberta Canada and has traveled extensively looking at primulas and other interesting alpines. She is lucky living in Calgary because they have cool summer nights which are very good for growing alpines, especially primulas. Her first talk was "The Genus Primula" and then after a catered lunch she gave a talk on "Alpines in SE Tibet".

***THE GENUS PRIMULA*:** Pam started her website 10 years ago as a "little project" (www.primulaworld.com) to put one picture of every species of Primula on her website, little realizing that the list of Primula species is ever-changing and some species have only been seen once, so they may only exist as a herbarium sample somewhere. In order to figure out if an image was correctly identified she had to learn about the characteristics that defined that particular species and what separated it from other species that were closely related, where that species grew in the wild and what the variation of it was in the wild. That led her into learning the taxonomy of Primula, and her talk "The Genus Primula" took us through the taxonomic definition of Primula in a very organized and understandable way, with gorgeous photos.

Primulas have been growing in gardens since the 1500's when they were grown for their medicinal value. Pam grows 40 species of Primula, less than 10% of the 430 or so species that there are in the world. Of those 430+ species, about 80% grow in the greater Sino-Himalayan region. There are also 36 species in Europe, 20 species in North America and 1 species in South America.

Primulas are known as early bloomers and *P. vulgaris* is the species recognized by many Europeans as one of the first signs of spring. It is found growing in the greater Mediterranean region, through and up the coastal areas north to Norway, growing mostly in open woodland situations. The purple form, ssp. *sibthorpii*, is one of the first ones to bloom in Pam's garden. Another sign of spring primrose in the UK, is the Cowslip, *P. veris*. It grows throughout most of Europe and well into central Asia in grasslands. Very early blooming, it may droop during a cold snap but will snap back up when the weather turns warmer. In North America we don't consider any native Primula to be our sign of spring. A rock garden Primula that Pam would consider a sign of spring would be *P. auricula*, it is actually the most commonly known alpine Primula and has been mentioned in texts as early as 50 AD. Its common name is the Bears-Ear because of the shape of its leaves and its yellow flowers are actually unusual for European Primulas, which are mostly pink. In the 1600's Auriculas became quite fashionable subject to intense breeding and exhibiting. Some cultivars included ones with 7 petals and doubled petals. Gold Laced Primula, not an Auricula, also came from this period.

If you read the definition of *Primula* from the Flora of China, you won't really know any more about what a primula is, but there are words like "rarely" and "sometime" that are important when trying to identify a primula grown from wild collected seed. You want to look for rare characteristics on your plant to narrow down the number (from 430+) to identify your plant. The 430+ species are split into many sections, which can help because the species are grouped by common characteristics and relatedness in the DNA, and often are growing in similar conditions. So if you can grow a species from a particular section and you want to grow more species, look to that same section.

The definition of Primula in the Flora of China is:

Herbs perennial, rarely annual, glabrous or pubescent, often farinose. Leaves simple, forming a rosette. Flowers usually heterostylous with pin (with longer styles) and thrum (with shorter styles) flowers, sometimes homostylous, in umbellate, racemose, subcapitate, or spicate inflorescences on scapes, with bracts, rarely solitary, scapes undeveloped. Calyx campanulate or cylindric, sometimes leaflike, 5-toothed. Corolla tube cylindric, not constricted at throat, limb 5-lobed, spreading or campanulate, lobes 2-cleft, margin entire. Stamens inserted on corolla tube, filaments very short, anthers obtuse. Ovary superior. Capsule globose, ovoid, or cylindric, dehiscing by valves, rarely with an operculum or crumbling, seeds numerous.

To make this definition more understandable for us Pam went through it pulling out key parts to show sections and species exhibiting the features.

"rarely annual" -We started by looking at section Monocarpicae, because it has the rare feature of being **annual** (monocarpic), whereas most Primulas are perennial. In this section, *P. malacoides* (the Fairy Primrose) is grown as a bedding plant at Sea World in California and Pam has found it in the houseplant section of Wal-Mart in Calgary.

"glabrous or pubescent, often farinose"- Glabrous means smooth and the leaves in section Amerina are smooth, shiny and almost fleshy. Members of this section are circumpolar found growing in North America, China, and Siberia. In this group *P. fasciculata* is very closely related to its look-alike *P. tibetica* and is a nice little plant that should grow for us, but it likes very wet soil. Pam grows it outside in a bog but if grown in a pot the pot must be in standing water. The popular *P. involucrata*, usually white or pale pink, is widespread in the wild from Pakistan through the Himalayas to Sichuan in China and is also hardy for Pam. There is a purple form of it, ssp. *yargongensis* (sometimes called *P. yargongensis*). **Pubescent** means with short and soft hairs. In the section Soldanelloides *P. buryana* is an extreme example with its long white hairs on the leaves and stems, *P. reidii* has more typical hairs. Although very beautiful, members of this section are extremely difficult to grow. They are high alpine species that need to be dry in winter. **Farinose** means covered with farina, which is a waxy substance exuded by the glands on new growth of the plant, the flower, leaves and stems looking like a powder that is easily washed off, and is sometimes referred to as "meal". Farina enhances the beauty of Primulas such as on the deep red flowers of *P. calderiana*. Many of the cultivated show Auriculas have a ring of meal on the face of the flower referred to as the paste. For exhibition grow the plants in a greenhouse to prevent the farina/meal from washing off in the garden, and it is only produced by the new growth. *P. albenensis*, also in section Auricula, was just discovered in 1993, a surprising discovery from Mount Alben in northern Italy; you would think that all the species in Europe had long since been discovered A gorgeous plant, not yet widely in the trade, is nice because, similar to *P. marginata,* it's got a lot of different leaf shapes and leaf forms and edges and there is some variety in the color of the flowers so it will be an exciting plant to grow, but it is slow to increase. *Primula calderiana* is a member of section Petiolares. Forms of the species include ones that are velvety deep red with a yellow eye, and forms that have a dark eye or that are completely yellow. It is hardy in Calgary so she suggests we give it a try. Farina can be white, yellow or cream. *P. aureata*, also in section Petiolares, is the first in that section that Pam totally fell in love with, although she has difficulty growing it, and has tried it repeatedly. Once it comes into growth it doesn't like a cold snap, so if you can keep it frozen until all the late cold snaps are over then maybe you will have some luck.

For Pam a critical definition has not been included in keys. This is **leaf vernation**, the way that the leaf is folded as it emerges from the rosette. The majority of Primulas have **revolute vernation** which is when the edges of the leaf roll back under as it emerges. In rare cases it has **involute vernation** where the edges are rolled inward like it is hugging itself, it is found in just a few sections. Section Auricula has involute vernation and has some of the most familiar and classic alpine primulas like, *P. auricula, P. marginata, P. minima, P. hirsuta,* and *P. allionii. P. deorum*, which is the largest member of that section, is an easy one to grow in a bog. It comes from the Rila mountains in Bulgaria and is an evergreen species. Another example of involute vernation is in section Parryi, this is a North American section of about 5 or so species. *P. rusbyi* is the example that Pam showed and there is a subspecies, *P. rusbyi* ssp. *ellisiae.* Pam finds *P. rusbyi* to be very forgiving in the garden, she can grow it in a bog, the scree or in ordinary garden soil, so it is certainly worth trying in our gardens. According to John Richards' book "Primula", a third example of involute vernation is in section Amethystina, but when Pam went to China in 2007 the species she saw in that section had revolute vernation. It is important to go out into the wild and check the plants yourself. *P. amethystina*, with purple-blue flowers, is often seen on botanical tours to China, it grows through Yunnan up to Nepal and into northern Burma. *P. faberi* which Pam finally saw last spring on her trip to Yunnan is gorgeous and very similar to *P. amethystina* but is yellow-flowered. Both are difficult plants, Pam has been able to germinate seed of *P. amethystina* but she hasn't been able to get it past seedling stage. An even rarer type of leaf vernation is called **conduplicate vernation**, where the leaf edges meet together like a clam shell. This is only found in section Sphondylia, *P. boveana* is an example of the section. *P. x kewensis* is a cross within this section. Members of this section have a unique distribution, they are found in southeast Turkey, Mt. Sinai Egypt, Ethiopia and northern India, all really hot places where you would not expect Primula, but they are growing in wet seeps and cooler spots within those regions. This section is very closely linked to *Dionysia*.

"Flowers usually heterostylous with pin (longer styles) and thrum (shorter styles) flowers,"- a large part of the definition of Primula deals with the flowers. The unique thing about Primula is that they have two different kinds of flowers (heterostylous), you won't find the two different kinds (pin or thrum) on one plant, you will find them on separate plants. In the pin form the stigma [on a longer style] is above the anthers enabling cross-pollination with just the single pin-head of the stigma showing in the center of the flower. In the thrum form the center of the flower looks "busy" with all the anthers showing, the stigma [on a shorter style] is below the anthers forcing self-pollination.

Primulas are early bloomers and where Pam gardens in Calgary they get late cold snaps which kill off the early pollinators, so if Pam wants to get seed from her Primulas she usually has to hand-pollinate them. Pam had a sequence of photos [from her website] showing how to hand-pollinate Primulas: take a thrum form flower, split the petals apart until you can isolate one anther with ripe, dust-like pollen that easily comes off the anther, then find a pin form flower with a glistening stigma and dab the pollen onto the stigma to pollinate.

"sometimes homostylous" This is the rare condition for Primula flowers where the anther and stigma are the same height e.g., *Primula cuneifolia* ssp. *saxifragifolia*, from section Cuneafolia. Members of this section are from the perimeter of the north Pacific, the subspecies Pam showed is from the North American side, in Alaska.

"in umbellate, racemose, subcapitate, or spicate inflorescences on scapes, with bracts, rarely solitary, scapes undeveloped"- This part of the definition describes the arrangements of the flowers, or its inflorescence. **Umbellate** is when there is a central point on the flower stalk and the flowers come out from that central point. Species in section Carolinella e.g., *P. wangii*, show this. This is a very rare section with not much known about it, the species come from south-east Yunnan and range down into Vietnam and Thailand. **Racemose** means that the flowers come out from the main axis of the stalk, with oldest flowers at the base and

youngest flowers at the top. Pam showed *P. blattariformis* which she saw last spring in lower elevation dry forests in Yunnan, but she doesn't think it would be hardy for us. Very pretty and fairly rare, it belongs to section Malvacea. **Subcapitate** means more-or-less shaped like a cap a somewhat dense cluster of flowers, e.g., *P. capitata*, section Capitatae. This species is quite variable, with 6 subspecies, most common in cultivation is ssp. *Mooreana*, a wonderful deep violet color and is unusual by blooming in the fall. It has a central ring of infertile flower buds that never open. Since it flowers so late in the fall it is hard to get seed of it and it is often not very long-lived, so treat it more like an annual. **Spicate** means a spike and *P. viallii* is a classic spike inflorescence with bright red buds (the calyxes being red) above violet flowers [like a red-hot poker]. It is easy from seed and if Pam sows it in her basement under lights in January or February then plants it out in the spring, she can have it blooming in her garden in August. Not really a long-lived plant with about half of the seedlings planted out overwintering and gradually more die every year. It is really pretty and worth continuing to grow from seed. It is part of section Muscarioides which is very similar to section Soldanelloides but these have more flowers in the inflorescence. Another part of Primula inflorescence that is not mentioned in the definition is the concept of **whorls**, with a ring of flowers around the stalk and each ring is usually separated by a bit of flower stalk. From section Proliferae (Pam calls them "prolific" because these ones interbreed very readily) *Primula wilsonii* and *P. aurantiaca* illustrate this. If you receive seeds from this section in the seed exchanges be prepared to see a lot of hybrids - often you won't get anything that is the true species. These are also called the Candelabra Primulas, they are quite easy to grow and they like it very wet. *P. japonica* is also a member of this section and should do well for us. Another example of flowers with whorls is a species that at first was thought to be *P. hongshanensis*, a new species just described within the last 10 years, but after looking at the plants during her trip last spring it turns out that it isn't a new species, but rather an old species, *P. boreiocalliantha*, section Crystallophlomis, so again it shows the importance of getting to see the plants in the wild. **Bracts** are leaf-like structures associated with the flower, that can be inconspicuous or diagnostic. *P. involucrata* is an example in section Armerina with a pouched bract. *Primula integrifolia* in section Auricula has leaf-like bracts, and does well tucked beside a rock in the scree. Re: flowers **rarely solitary**, solitary flowers are shown in *P. juliae*, a creeper that is propagated by divisions so you don't often see seed of it in the seed exchanges. It comes from the section Primula as do *P. vulgaris* and *P. veris* (each with multiple flowers) growing in the area around the Caucasus mountains.

"Calyx campanulate or cylindric, sometimes leaflike, 5-toothed"- The **calyx**, is a combination of sepals, the sepals in most flowers being green, and lying under the more conspicuous petals, and most often in Primulas is a cup-like structure. The calyx comes in different shapes, it can be campanulate [bell-shaped], cylindric, or elsewise. You have to look at the backside of the flowers to see them. From section Oreophlomis *P. rosea* and *P. warshenewskiana* should be easy to grow. *P. warshenewskiana* grows in very wet locations in Turkey through to northwest India and into Central Asia. They look the same when they come out in the spring with the flowers looking very similar, but *P. rosea* gets bigger leaves and *P. warshenewskiana* has little red dots that sparkle on the calyx. *P. sikkimensis* in section Sikkimensis is deciduous and it completely disappears underground in the winter. Pam always thinks she's lost it in the spring because it comes late, and then every single plant, no matter where it is located in her garden, comes up on the same day. It is certainly very hardy, Pam has never lost a plant of it, so she suggested we should give it a try. The **leaf-like** calyx is found in *P. obconica* in the section Obconicolisteri, which is often sold as a houseplant in a range of flower colors. However, it has chemicals in its leaves and flowers that may cause an allergic reaction (*P. sinensis* even more so) and in section Auricula some people can develop a reaction if in contact with the farina over time.

"Corolla tube cylindric, not constricted at throat, limb 5-lobed, spreading or campanulate, lobes 2-cleft, margin entire" - Another section of the definition that has to do with the flowers, this basically says that Primulas have 5 petals that have a notch at the end. *P. mistassinica*, is very variable in the wild, which is one reason she grows it from seed to see the variation, and you are not just propagating one clone. It grows on peaty hummocks, like a block of peat that is immersed in spring water, to get consistent moisture. It is part of section Aleuritia, which also includes *P. scotica* and P. *laurentiana*, all little plants but if you have a nice clump of them growing they are showy.

Another flower characteristic not part of the definition is the concept of **annulate vs. exannulate**. Exannulate flowers are funnel-shaped the tube going straight down, annulate flowers have a ring-like constriction at the mouth of the tube. *Primula longipes* in section Crystallophlomis has an annulate flower. Section Crystallophlomis is so large it is broken down into 4 subsections. All are found from Turkey to Burma to Alaska but most are found within Sichuan, Yunnan and Tibet border regions. They like it wet and cool in summer and consistent snow cover in winter so they may be a little tricky for us. A few of them from this section, particularly *P. chionantha*, *P. chionantha* ssp. *sinopurpurea*, and *P. longipes* are in the nursery trade. *Primula florida* in section Yunnanensis is the example of an exannulate flower. In Yunnan it grows on grassy ledges and is in cultivation, but she doesn't think it will be long-lived or easy to grow.

"Capsule globose, ovoid, or cylindric, dehiscing by valves, rarely with an operculum or crumbling" – Collecting and growing from seed is important to get genetic diversity, and to select for hardiness in the garden. Primula seed is usually spilled from capsules that open by valves at the top of the capsules. Sometimes the capsules only have a hole in the top or the capsules crumble to disperse the seed. The unusual crumbling form is part of section Petiolares, which includes *Primula calderiana, P. sonchifolia, P. moupinensis, P. hofmanniana* and *P. pulchra* which bloom very early in the spring, the capsule membrane dries up and the seeds fall out when they are still green and fleshy-looking. In their native habitat seeds germinate right away when the monsoon season arrives so those seedlings are warm and wet from day one. Seeds from this section need to be sown fresh or green and it is hard to get viable seeds of them in the exchanges. This section is full of really beautiful species and some of the bluest ones in the genus. All are difficult except for the lilac-flowered *P. hofmanniana* which forms strawberry-like runners, allowing vegetative reproduction.

At this point in the talk Pam congratulated us on making it through the definition of Primula. Pam gets many images for her website, www.primulaworld.com, from people who have taken pictures of Primulas in the wild from all over the world. To identify species in the photos people send, she looks for the characteristics in the definition. To do this she needs pictures

of the front of the flower, the calyx, the leaf, and the plant in its habitat. Think of her when taking pictures of Primula species in the wild, even our native species, and send them for her website.

Cortusa are very closely related to *Primulas*, and one day they may be renamed to the genus *Primula.* Often when you get seed *P. jesoana* or *P. heucherifolia* you end up with a *Cortusa* instead. So she thought she should show the differences so that you will know what you have. *Cortusa* has anthers that are fused into a thick ring at the base of the flower and in *Primula* the anthers are attached to long filaments (stalks) that go down to the base of the flower. The flowers of *Cortusa* are usually bell-shaped and hanging.

Dodecatheon has recently been moved into *Primula* as section Dodecatheon, an article in a recent issue of the NARGS bulletin *Rock Garden Quarterly* explains why the move was made. Most *Dodecatheon* species were able to retain their species names (with a minor change in the word ending) but several have had to take new species names because the equivalent *Primula* name was already in use

Most Primulas grow in meadows, Pam showed a photo with 3 species growing together in Yunnan, yellow-bell flowers of *P. sikkimensis*, purple-bell *P. secundiflora* and purple flat-faced flowers of *P. involucrata* ssp. *yargonensis*. When they are blooming they were in full sun with no trees anywhere for shade, but the soil was kept moist beneath stones. Later other meadow plants grow up around the primulas and shade the rosettes, but the seed capsules are held high so that the seed can ripen in the sun. Some meadow primulas, like *P. veris* or *P. denticulata*, can be grown in ordinary garden soil, but remember to give them moisture and sun in the spring when they are blooming. A lot of the meadow species really like it wet, for example *P. nivalis* and *P. vialii*, and would do well in a bog garden. To make her bog gardens Pam lines a dug-out area with a thick plastic, punches a couple holes in it, and fills it up with 50% sand-50% peat. Bog gardens are key to grow these Primulas, to retain moisture and as the bog evaporates it provides cool and humid conditions on the surface Another way to grow moisture-loving Primulas, especially for section Petiolares, is to use fishbox troughs made from styrofoam to keep the soil moister. John Richards, author of the book '*Primula*' uses fishbox troughs for his petiolarid Primulas which he takes to exhibitions and locates them under tall Rhododendrons in his garden to keep them in the shade.

Primula geraniifolia, section Cortusoides, grows in forest habitat in areas of high rainfall. A more typical forest habitat for Primulas is where there are not a lot of other plants on the forest floor. *Primula allionii*, section Auricula, can grow in extreme habitats, they are chasmophytes [cliff-dwellers] which grow in cracks and crevices in low humidity on tufa-like rocks, the conditions reducing rot and botrytis. There is a webpage at www.auricula.org.uk listing known forms of P. allionii, Pam suggests that if you want to try some of these that you start with some of the hybrids first as they might be easier. *Primula angustifolia*, section Parryi, grows in Colorado, where it is hot and dry above but there is moisture at the roots, the moisture held by the many stones in the meadow, the plants growing in crevices. Among the ones Pam grows in her crevices are *P. rusbyi*, *P. auricula* types and hybrids, *P. allionii*, and *P. cusickiana*.

To finish up her talk Pam showed a few plants that are up-and-coming, the locations in the wild are known and she is hoping that we will see seed of them soon. *P. bracteata*, section Bullatae, is normally pink or white, but they found a stunning yellow form. It is a cliff-dweller, so people who have grown this species do it like they do Dionysia, in hot and dry conditions. There have been several attempts to get the yellow form but no one has gotten seed of it yet. *P. serratifolia*, section Proliferae, is a beautiful delicate yellow with white edges, and a bit of seed has come out recently so Pam is hoping that it will show up in the seed exchanges soon. *P. euprepes*, section Crystallophlomis, known as the black Primula, is now in cultivation and is being micro-propagated in Scotland so we should be seeing plants of it soon. The deep red bell-shaped flowers of *P. kingii*, section Amethystina, is probably the choicest Primula, it used to be in cultivation about 50 years ago but was lost. There have been expeditions to this area hoping to reestablish it in cultivation, it is related to purple *P. amethystina* and yellow *P. faberi*.

For more information about Primulas see John Richard's book "*Primula*" (Revised Edition) from Timber Press and the Flora of China website at http://www.efloras.org for the descriptions of individual species of Primula

For more photos of Primulas see Pam's website www.primulaworld.com

***ALPINES IN SE TIBET*:** The second talk covered Pam's trip to Tibet June 21-July 11, 2007 to look for high-altitude alpine cushion plants, but Pam was looking for primulas and found 50 species of *Primula*. Pam had to narrow down from several thousand photos to just a few. She picked some that are interesting, some that are maybe growable and of course some Primulas. The trip was in the eastern end of the Himalayas from Zhongdian (aka Shangri La) in northwestern Yunnan to Lhasa in eastern Tibet. A map as well as some photos from her trip are viewable on her website. They covered almost 2000 kilometers on the trip, everyday travelling for several hours, starting relatively early, with stops along the way at the high points and ending up at another place almost every night. The phrase "the flora is rich" became clear to Pam when every time she looked down she saw many species and multiple specimens of each species, all garden worthy and choice.

Pam and her husband arrived a day early and explored the hills around Zhongdian (10,000 feet elevation) by themselves. Yellow-flowered *Daphne calcicola* is one of the plants on the side of the hill outside Zhongdian, it was introduced by George Forrest in 1906. The Flora of China lists it as a synonym of *D. aurantiaca* but it is generally accepted to be distinct, and there are selections of this in cultivation ('Sichuan Gold' and 'Gang Ho Ba') but generally the selections aren't super hardy so they were looking for hardier selections. Behind the hill was a meadow full of *Euphorbia wallichii* and clumps of *Iris bulleyana*. The choice plant-find that day was *Androsace spinulifera*, with very large deep pink flowers and sculpted leaves. It is hardy in Calgary and Don LaFond said he grows it in Pinckney.

When the 3 other members of their party arrived needing time to acclimate to the high elevation they went up to Tianchi Lake, where the gorgeous *Nomocharis aperta* was growing among shrubs, every plant had different spots on it so it was exciting to look at all the variations, though limitedly offered in cultivation. Don LaFond had it but it was short-lived, so it is probably hardy but you have to work at keeping it alive. *Lilium souliei* was growing mixed in with a carpet of *Rhododendron russatum*, sometimes available in cultivation in the UK and flowers varied from dark red to almost black. The main Zhongdian valley is relatively dry but the side valley where Tianchi Lake is was noticeably cooler and moister and

the season was later. In a swampy area *Primula secundiflora* and *P. sikkimensis* were growing together as they often do in mixed meadows. Deep pink-flowered *P. secundiflora* is evergreen and needs winter protection because the leaves are winter-burned without cover and they eventually die. Yellow-flowered *P. sikkimensis* which gets 1 ½ to 2 feet tall, is deciduous and very hardy, it is one we should try growing in wet conditions.

Dieter and Rosi Zschummel from Germany and Jozef Lemmens from Belgium wereother members of their group Jozef Lemmens is an expert on the genus Androsace; his website is www.androsaceworld.com. Jozef was quite excited when he saw *Androsace bulleyana* on their first day out, its electric red flowers really stand out. It is hardy in Calgary but is biennial or monocarpic so you have to keep growing it from seed. Pam was also excited that day to spot *Primula zambalensis* growing in a clay bank that was wet with seepages, it is hardy in Calgary. This species is similar to *P. mistassinica* and grows in similar conditions as that group of primulas. It always has a blue flush to the petals and a dark orange-yellow eye, they found a lot of range in the flower color from light blue to almost pure white forms.

The second day of the trip they explored the pass at Beima Shan, one of the areas first explored by the AGS ACE expedition in 1994. *Solms-laubachia retropilosa* is a crucifer with huge pink flowers and is a really choice plant. Seed of it has been offered on several occasions, but Pam does not know of anyone succeeding with it [Harvey Wrightman has a couple plants in a trough, but no flowers]. *Androsace delavayi* was found throughout the whole trip, Pam has managed to grow and flower it in the open garden before it died. The Nepalese forms are white but all the ones in Tibet are pink-flowered. *Diapensia purpurea* is a small pink-flowered evergreen shrub, its seed is dust-like and Pam has only germinated it once.

As they were driving along they were always looking out for flashes of color, at one place she saw a flash of purple which turned out to be a columbine, but she was glad that they stopped there because they also found *Saxifraga lhasana* which is a very beautiful rosette species. Pam knows that it is in cultivation and she is hoping that we will see it in the seed exchanges soon. *Androsace mariae* is a non-stoloniferous cushion plant and it varies a lot in color, she photographed a very nice pink-flowered form on that stop.

On one day when they had bad weather they came across a moist meadow that was heavily grazed but it was obvious that the animals did not eat *Stellera chamaejasme* since the meadow was dotted with many plants. They saw this plant growing throughout the entire Tibetan area that they went through and even in much dryer areas. In the dryer areas the plants were smaller/stunted, so they may need more moisture. They also saw the yellow form, *Stellera chamaejasme f. chrysantha* as well and in the spring of 2009 they found a cream form that they think is distinct from the other forms, so they took herbarium samples and lots of photos

Tibet is known as the land of the blue poppy, but actually the first *Meconopsis* they saw was a yellow-flowered *M. integrifolia*, it was growing right in water which Pam found amazing. A sky blue-flowered *Corydalis melanochlora* was the first of a lot of different very choice blue species *Corydalis* that they saw on this trip, it is very hard to get a hold of this species in cultivation.

The next pass of interest that they came to was the Gama La. It featured a long scree area that was covered with lots of cushion *Androsace*. Probably the nicest cushion *Androsace* they saw was *A. tapete*, it was a very silvery one because of the long hairs on the rosettes. Like all *Androsace*, the eye turns red when the flower is pollinated, and that is particularly lovely on the cushion forms. Another prominent *Androsace* they saw there was *A. yargonensis* which forms much looser cushions and the leaves had a bronzy color. Pam often sees bronzing on the leaves of plants in her garden due to the cold conditions, and she suspects that is what happened there. *Caragana jubata* was also found here, Pam grows it in Calgary. There are different forms of it, including ones from Siberia as well. It is a beautiful pea shrub, with long spines on the branches so it is even interesting when it is out of flower. Deep blue-purple flowered *Saussurea aster* was only about 3-4 inches high, these woolly species are reputed to be a little more difficult than the non-woolly *Saussurea*. In Tibet a lot of the *Saussurea* are collected as medicinal plants so they are sometimes rare in areas that are easily accessible. One of the gems of the area is *Paraquilegia anemonoides*, the color forms in Tibet were always really good, nothing wishy-washy. They even saw a pure white form. There is some confusion if they are all one species or if some should be called *P. microphylla*, whatever the case, you can't go wrong with any of the species from this part of the Himalayas.

On a side trip toward the Burma border near Zayul they explored a huge valley and in the scree they found an unknown *Rhodiola* species with really nice rounded leaves that looked like it would be great in the garden. *Phyllophyton complanatum* [aka *Marmoritis complanatum*] is one of those weird looking Himalayan plants, which is related to the mint family, seed of it has been offered before. *Corydalis jigmei* was another blue-flowered C*orydalis* that they saw, it is a seldom seen species with really broad flowers, some forms were not as short and cushiony as the one Pam showed. A couple plants found in the turf rather than the scree were pink-flowered *Incarvillea himalayensis*. Various *Incarvillea* species are firmly in cultivation, although they are apparently not long-lived in our area.

On another side trip, they went to the head of a valley that went all the way down to Arunachal Pradesh in India, they spied a pass on their map called Galung La and convinced their drivers to take them there. It was moister and cooler there, and as well as having really great plants there was also a monastery and an amazing tumbling glacier. There they saw a a primula relative, *Omphalogramma tibeticum* has huge purplish flowers about 2 inches across, unfortunately Pam has not had much success with *Omphalogramma*.

In the forest on the way up to Galung La they saw some unusual woodland plants. *Allium kingdonii* had large nodding deep pink flowers, it is endemic to southeast Tibet and not in cultivation yet. They did not think much about the *Streptopus simplex* until they looked underneath to see the spotting inside the flowers, it has a large range, throughout that area all the way down to Japan. They spotted an unknown plant with flowers of a deep blue, later they were able to identify it as *Neopicrorhiza scrophulariiflora.* The rhizomes of this plant have been collected for medicinal purposes to the point that it has been over collected and now warrants CITES protection.

Rhododendron forrestii qualifies as the most gorgeous Rhododendron that Pam has ever seen. The plants are just inches tall but the huge red waxy trumpet flowers are 3-4 inches and it is in cultivation. The avalanche slopes were chockfull of really good plants. Pam was blown away by the *Primula tanneri* ssp. *tsariensis* var. *porrecta* which is a Primula with a long taxonomic history. It used to be confused with *P. calderiana* which we saw in the Genus *Primula* talk that was all covered in farina, but this species has no farina

and in the Flora of China they are now listing the subspecies as its own species, *P. tsariensis*. The *Meconopsis speciosa* they saw was always a stunning light blue flower with lots of spines sort of like a *M. horridula* but with dissected leaves.

At the top of the pass, looking down the valley that goes all the way into India, they spied more great plants in the meadow amongst the red flowers of the *Rhododendron forresti*i. Dotting the meadow were deep pink-flowered *Caltha sinogracilis* which has dark blue stamens, it is a small plant, only a couple inches high but has large flowers. Pam is hoping that someone will be able to get plants of this stunning species into cultivation [as were many in the audience]. Pam saw resting buds of a *Primula* that were like big eggs sitting on top of the soil and knew that meant something special. It turned out to be pink-flowered *P. agleniana*, which is a plant that was only known from herbarium specimens until an expedition by the Royal Botanic Garden of Edinburgh to the Burma border in 2006. That expedition found the white form, so for Pam to find the pink form was extra special. They actually found 15 species of *Primula* that day alone, and most of them were really choice.

Continuing down the highway they were rewarded with a stunning meadow that they had to stop and walk through. It was full of *Iris bulleyana* and white-flowered *Primula alpicola* var. *luna*, which is a creamy white form of the normal purple species. To see a whole field of just the white-flowered form makes Pam suspect it may be a subspecies rather than just a variety, it is hardy in Calgary. They were zipping along a smooth stretch of road and looking for color on the cliffs beside the road when they spotted a flash of blue and had to stop so they could go back and see what it was. It turned out to be *Primula cawdoriana*, which Pam had really wanted to see. She was very interested in how it was growing just in moss on top of rock with no soil.

The highest pass they went over was the Mi La at 15,500 feet on their way to Lhasa and there they saw *Potentilla eriocarpa* var. *tsarongensis*, with very hard tight cushions and yellow flowers. They also found *Thylacospermum caespitosum* which grows across the Himalayas from Pakistan through Tibet. It usually grows as a hard hummock on a scree or amongst rocks where it fills in all the crevices, it has tiny white flowers that are not very showy. They went to a couple lakes in the Mi La area, where they found a beautiful red-flowered *Rhodiola* species. Even more exciting was the discovery of other interesting plants including an unknown *Meconopsis* species that they have not been able to get identified. It had gorgeous spiny leaves that were quite thick and fleshy and black glands on the spines of the buds and the flowers were all a purply color. They also found a mauve-flowered *Corydalis milarepa* which was first discovered in 2005 by the AGS-Tibet expedition. But what really excited Pam was *Primula littledalei*, this was growing under a very large boulder. It is related to *P. caveana*, they grow in similar conditions, in small caves and under boulders. It had never before been photographed in the wild. The soil under the boulders was a coarse quartz sand, no dirt or humus and they are well protected from the elements; it is not in cultivation yet. One of the cushion plants they were particularly looking for was *Androsace bisulca* var. *bramaputrae*, *A. bisulca* normally comes in a white form, there is also a yellow form, this variety is pink-flowered. Normally *Androsace* like a fair bit of moisture, these plants were growing in sandy soil and in very well-drained, hotter and drier conditions, so if you try to grow *A. bisulca* keep it a little drier.

When they arrived in Lhasa area they wanted to go to the Potrang La where only one other expedition had gone before, the maps showed the road going in another direction but when the guide talked to the local people it turned out that they were on the Potrang La. They saw an amazing dwarf *Rheum moorcroftianum*, only about 1-2 foot across with dark red leaves and white-pink bottlebrush flower stems coming from the base. *Onosma hookeri* was a surprise as the flowers were such a dark blue they almost looked black, they were growing in very hot dry conditions. The gesneriad *Corallodiscus kingianus* was also in very hot dry conditions, always growing on vertical faces. Most of the plants they saw were quite desiccated with the outer leaves all dry but the inner leaves were green and they did find some in bloom.

What really stole the show on the Potrang La was the *Saxifraga*, yellow-flowered *S. umbellulata* is related to *S. lhasana* that we saw earlier in the talk and white-flowered *Micranthes melanocentra* [aka *Saxifraga melanocentra*]. *S. umbellulata* and *lhasana* are endemic to Tibet. The *Micranthes* they saw was just about the best form you could find with large white flowers and great yellow spotting and large dark ovary. The best *Saxifraga* they saw was *S. bergenioides*, it was covered with rust-colored hairs on the leaves, all the way up the stems and on the calyx with large purple flowers, it is endemic to this area of Tibet and hopefully will get into cultivation.

Nearing the end of their trip they were in a much drier area of the Tibetan plateau, with isolated mountain ranges rather than a continuous chain. On the Yarto Drak La they found *Saxifraga lychnites*, it is usually very small, about 1 inch tall in flower. It is widespread throughout Kashmir to Sichuan and always growing in wet, mossy, boggy conditions. They saw a lot of species of *Leontopodium*, but *L. monocephalum* was probably the choicest, besides being the littlest one they saw, seed of it has been wild collected so it should be available. *Clematis tibetana* ssp. *vernayi* had dark brown-purple almost black flowers, they did also see a lot of more normal dark orange-yellow colors, ranging to an almost burnt brown color, but the black color is really nice.

At the beginning of the talk Pam had said that the goal of the trip was to look for high-altitude alpine cushion plants and *Chionocharis hookeri* is probably the best one. It's basically an alpine cushion forget-me-not of the Himalayas and it was really gorgeous so she finished off her talk with a photo of that.

Note: We'll have the program notes from Nick Turland's wonderful talk on Greek Plants at our winter potluck meeting in the fall newsletter.

Please send address changes to our Treasurer, and include your up-to-date email:

Andrea Urda-Thompson
7760 Crane
Ypsilanti, Michigan 48197
(734) 434-7654
aandjthompson@aol.com

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GREAT LAKES CHAPTER
North American Rock Garden Society
Newsletter Editor, Tony Reznicek
890 Wickfield Court
Ann Arbor, Michigan 48105-1227

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