



**Rhododendron  
Society  
of  
Canada**

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Canadienne  
du  
Rhododendron**

**Bulletin Fall 1987  
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# RHODODENDRON SOCIETY OF CANADA

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The rhodo featured on the cover of this issue is CHELSEA REACH.  
The photo was taken by Al Smith.

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## WHAT'S NEW IN RHODOS

### FLOWER SHOW, 1987

Congratulations to award winners at the R.S.C.'s annual Flower Show, held in conjunction with the Annual Meeting at Brock University, St. Catharines, Ontario, May 30-31, 1987.

JOHN E. BRENT AWARD, Best in Show: 'Herbert', entered by Wayne Funk.

E. FRANK PALMER AWARD, Best Canadian Produced Hardy Rhododendron: Seedling, Wayne Funk.

BEST SPECIES AWARD: *R. calendulacea*, Montreal Botanical Garden.

BLANCHE E. SNELL MEMORIAL AWARD, Best Smooth-leaved Rhododendron in Commerce: 'Arthur Bedford', Lyall Freitz.

W.E.P. DUNCAN MEMORIAL AWARD, Best Deciduous Hybrid Azalea in Commerce: 'Gallipoli', Richard Birkett.

THOMAS HOUSTON WILSON AWARD, Best 'Ironclad' Elepidote in Commerce, Exhibited in Home Gardeners' Class: Not awarded.

M. LESLIE HANCOCK AWARD, Best Lepidote Rhododendron: *R. carolinianum*, Montreal Botanical Garden.

ROBIN DUNCAN MEMORIAL AWARD, Best Deciduous Azalea Species: *R. calendulacea*, Montreal Botanical Garden.

A.H. SMITH MEMORIAL AWARD, Best New Elepidote Hybrid, First Time Entry: Seedling, Wayne Funk.

ARTHUR OSLACH AWARD, Best New Deciduous Azalea Hybrid: Seedling, David Hinton.

SONJA OSLACH AWARD, Best Floral Arrangement: Emmi Nilson.

KINTYRE AWARD, Best Balled and Burlapped Elepidote Rhododendron: Not awarded.

### SEED DISTRIBUTION

Please send your contributions for the 1987 R.S.C. Seed Exchange to:

Paul Wendt  
Ellershouse, Nova Scotia  
B0N 1L0

All shipments should reach Paul by December 1, 1987. Seeds should be fresh, cleaned and properly labelled. Please give as much information as you can as to location, parent plants and if other than a commonly-known variety, the expected hardiness. Do not forget to indicate whether open, hand or self-pollinated. Seed of new crosses and of companion plants is always in demand.

## SOME QUERIES AND RECOMMENDATIONS AS TO THE FUTURE OF OUR SOCIETY

R.M. Steele - Rose Bay, Nova Scotia

One of the things that I would ask that perhaps all of the Regions would consider, is whether we should expand and promote the growing of rhododendrons in areas of the country where they are either not grown at the present time or are grown with some considerable difficulty. There are many aspects to this that you could think about over the next couple of years. I think that it is important that we either persuade - or I hate to use the word 'pressure' - our government research institutions and our universities to probe into extending the hardiness of rhododendrons. Perhaps they might consider using what is generally referred to as genetic engineering, or what I would prefer to called 'genetic manipulation'. I think it is necessary, if we want to expand our Society to other areas of Canada, that we increase the hardiness of our rhododendrons. If I were personally involved, I would request that the Research Station at Kentville, because of the great base it has of rhododendron material, consider conducting the sort of hardiness tests that have been going on at the University of Minnesota in cooperation with the Mezitt family, who run Weston Nurseries just outside Boston. The Mezitts have been taking material from their plants, rushing it to the airport and flying it out to Minnesota, and there they have been testing the temperature at which that material was killed. I think that there must be other considerations when testing hardiness, but this is a magnificent way to start to look at it a little bit more objectively.

I also think that because we have a wide group of rhododendrons that are variable in many respects, we should start to look at the ways we can use our rhododendrons more flexibly, in order to enjoy them more. I was thinking particularly that we might grow rhododendrons containerized, and use them outside on patios and balconies. We could enjoy them during their bloom period and then return them to some other area of the property.

I think it would be desirable to look at the use of some of the semi-tropical plants, which are epiphytic and normally grow up in the crotches of trees in some of the rain forests of the world, to see if we could use them to bring a little more beauty and enjoyment into our homes during the winter months. I have experimented with this and have found that they react very well, and will grow and do well without much attention in a number of types of containers. I have tried clay containers, to which they respond well, and wooden containers, and they have worked well in these, providing the drainage has been good. I have also used fibre pots, which are remarkably more durable than you would expect. They breathe like clay pots do and are quite successful in that regard. So there is an area in which I think we might look with some expectation of success for more use of our rhododendrons. I think that perhaps one of the Regions might take this on as a project with some members that might be interested, and look at various types of low-cost and easy-to-generate containers in which you could grow your plants, seeking perhaps some degree of endurance in the container itself, so that you could use it over quite a long period to grow an increasing number of plants; that is, grow one plant in it until it was a little too large and then start another plant in the same

way. I refer sometimes to these semi-tropicals as 'those heavenly-scented rhododendrons', because I find some of them have a magnificent scent to them.

Another thing that I would like to talk about is our rhododendron truss shows. We normally hold our shows at the same time of year, year after year, and this means that we have a very narrow window on the bloom period of the rhododendron. We see the same plants over and over and we fail to see some of those that bloom earlier or later, so that we are restricted in our outlook on rhododendrons. Another aspect to it which worries me a bit is that we see the rhododendron itself as simply the truss, and our attention is focussed only on the truss; we don't consider the remainder of the plant, we don't know how well that plant grows, and we don't know what it looks like in our gardens over the other eleven and a half months of the year. Could we establish some system of limited exhibitions or 'show-and-tell' projects, where we would bring our early-blooming rhododendrons to show other members earlier in the spring? Perhaps we might in the late winter have a showing that doesn't take too much trouble to engender at which we might show any of the semi-tropicals when they are at their peak.

In order to do well, both our 'normal' rhododendrons and the semi-tropicals require a certain cooling period. I think that some study might be done on how ordinary rhododendrons could be grown in containers, left outside and perhaps heavily mulched with material such as shavings from which it is easy to extract them during the winter months and bloom them indoors, after they have had their cold period. Most rhododendrons will eventually bloom if they do not get a cold period, but they bloom sporadically, here and there. You get a bloom and another bloom and they bloom for a long period of time, but if you want them to bloom all at one time they need that cold treatment. Some experimentation might go on in the various Regions on the length of cold period they need and the best way to use the rhododendron so that it will get that cold period.

Something that I have been concerned with for quite a while is the effect that weather has on our rhododendrons. We think of weather as affecting the hardness of the rhododendron - that is, the coldness of the winter - but I think there are other aspects of it too. I know that last year on our rhodos we had less than 30% of our normal bloom. They didn't set their buds, and the reason is that during the bud-set period they were in severe drought, all through that period and to much later in the year. So those that are interested might do some sort of study on this and find out exactly what type of drought or what type of weather would affect the blooming of your plants.

Another thing that I think it might be worthwhile to consider is, should we establish in various Regions Classification Groups, that is, groups of people would not suddenly make their decisions in one year, but over a period of time would look objectively at their plants and classify them as to how they perform at that locality and who might be able to tell people about problems to expect and how they might deal with them. I refrain from suggesting that they classify plants as to 'the most magnificent rhododendron you've ever seen', or something that does well at shows. I am thinking of overall performance of the plant, so that people who want to grow rhododendrons and have limited space can pick plants that will satisfy their needs best.

The other thing that I would like to push very hard, because I think in this time when all across the world we have barbarism and brutality and lack of regard for others as a growing horror in our society, that the effects that gardens and green areas and places where you can go to find some sort of quiet and tension-relaxing factors are very important to us, so I would like to encourage everybody to do their very best to organize types of gardens where the public can go, and also to develop private gardens that will do the same for the general population as for yourselves. I'm talking about both private and public display gardens; anything that we can do along this line, I think, will help to generate a little better world. I am not completely naive in speaking of this. I think that people will slowly realize that this is one of the most important aspects of getting people back to civilization again.

*A talk, somewhat abridged, given by Captain Steele to the Toronto and Niagara Regions in January, 1987.*

## **LIME IN RHODODENDRON CULTURE?**

Otto Burchards, Oldenburg (Oldb.) Germany\*

In the literature about Rhododendron and broad leaved evergreens, one always find the admonishment (Hinweis) "Rhododendrons do not like and cannot bear lime. For fertilizing one must use only lime-free fertilizer materials, so that only physiologically acid reacting fertilizers must be used." In watering the plants, a lime-free water (rainwater is best) should be used."

Aren't these statements too commonly observed when conclusions should be ruled by locales and areas where lime is present in the soil or may reach the plants through ground or sprinkle water?

But in areas where there is very little lime in the earth or none at all, lime has significance in the culture of these plants. Here one must consider the propagation of rhododendrons on rooting mediums and in containers, as is frequently done nowadays.

In order to discuss the problem of lime supply for rhododendron culture and plant propagation, the first thing to be considered is the significance of calcium in the plant's nutrition and the importance of lime in soil reaction.

The second thing to be considered is the question of the pH value, that is the soil condition of the natural environment of rhododendrons.

Also the manner of mixing the medium or soil in which the plants grow is important in breeding and propagation.

Sprinkler water has more than a little value in its quality and calcium content in the goal of producing good young plants.

In the enumeration of these factors one may find an indicated answer. This plant culture needs lime and it is indeed necessary here as much as it is for the other plant growth. In each individual case it is necessary to determine if the plant has this element in its habitat, either in the ground or in the water, and in what quantity in order to determine if supplementing by the cultivator is necessary.

## THE pH VALUE OF THE SOIL IN THE NATIVE HABITAT OF RHODODENDRONS

Information about the necessity of lime fertilizer requires a laborious investigation of the pH value in relation to the calcium requirements. The pH value is determined by the quantity of H ions in the soil, the various acid groups, by the quantity of the plant roots and the activity of the soil microorganisms. The determination is by a potassium chloride solution (KCL). According to their reaction the soils are arranged:

pH 4	very strongly acid
pH 4-5	strongly acid
pH 5-6	moderately acid
pH 6-7	weakly acid
pH 7-8	weakly alkaline
pH 8-	moderately to strongly alkaline

For example, all heath and peat soils are very strongly acid. Here pH values can go as low as 2.8. The North German Peat soils generally have a pH value between 2.8 and 3.2. Investigation of other peat soils could give other values but would probably be higher.

For rhododendrons and most woody evergreens a pH value of 4.5 to 5.5 is indicated in the area of moderately acid. A decisive factor in the question of the pH value of a soil is its texture and its aeration, especially in humus rich soils. If the aeration is good then the pH value can also be lower. Repeated and massive use of peat, or the utilization of pure peat with rhododendrons in certain cases in which a natural lime availability cannot be attained can result in a stunting of the plants. The pH value of the site of rhododendrons in their habitats gives us a disclosure about the optimal range that these plants require.

SPECIES	HABITAT	pH (KCl)
Rhododendron calendulaceum	N. America	4.8-5.7
R. catawbiense	N. America	4.6-5.7
R. ferrugineum	Alps	3.8-5.3
R. lapponicum	Scandinavia	6.0-8.0
R. maximum	N. America	4.6-5.7
R. viscosum and canadense	N. America	4.5-5.0
R. arborescens	N. America	5.5-6.0
R. roseum	N. America	over 6.0

### LIME IN PLANT PROPAGATION

Peat is being used increasingly in propagation at nurseries. Compressed peat or peat moss are used according to the conditions of the business. Lately in the propagation of rhododendron cuttings and cuttings of other evergreen woods there is more use of peat moss and less of peat. The reason may be that in the drying process of peat, certain substances may be developed by oxidation. In peat moss there is little or no drying out and no residues to cause plant damage.

However, high temperatures in the propagation beds and high humidity, especially in the moist installations, favor the impact of peat moss substances unfavorable to the rooting process.

In the cutting beds the process is approximately as follows:

About 6 to 7 weeks after the peat has been put in the propagation bed, the cuttings form roots. A light yellow or brown coloration of the roots develops. Later the roots die off and on as yet unrooted cuttings a root develops on the lower end. The symptoms show that unfavorable factors in the propagation medium are the cause.

In other aspects of plant propagation, peat is limited before use as a growth or propagation medium. Now the question is whether liming the cutting medium would be helpful since the pH value was around 3.0.

The first tests were made with Rhododendron 'Cunninghams White' and showed that the cuttings in limed peat yielded a higher percentage of rooting and the quality of roots and root balls was much better. The roots were white and of good appearance.

In a second investigation, various quantities of calcium carbonate were added to the peat in order to determine the optimum quantity of liming. It was observed that the addition of 0.5 grams of lime per liter of peat raised the pH about 0.5 points but that the rooting medium must have a pH value of between 4 and 4.5 in order to keep the harmful substances and acid bound to the peat.

This investigation was made with cuttings of a *Rhododendron repens* hybrid and *Prunus laurocerasus* 'Schipkaensis Macrophylla'. The investigation were carried out in a mist system.

### ROOTING OF CUTTINGS OF A *Rhododendron repens* Hybrid.

Gram-Lime per Liter	Well rooted	Percentage, heavily well rooted	Not rooted
0	34	18	48
0.5	45	20	35
1.5	53	18	29
2.5	54	25	21

### CONCLUSION:

The cuttings of the research lot without lime formed only two to three roots, which branched and formed the root ball. The roots are easily broken off and formed mostly on the lateral cut surfaces. The lower portions of the cut surfaces were mostly brown from rotting. In the research lot with 0.5 grams of lime to each liter of peat the cut surfaces were mostly brown. The root and root ball formation was moderate. The research lot with 2.5 grams lime to each liter of peat yielded the highest percentage of rooting. The root balls were consistently somewhat smaller but the number of small fine roots was considerably greater.

\* From Rhododendron und immergrüne Laubholze, Jahrbuch 1971. (Article translated from German by Dr. Herbert Heckenbleikner, Quarterly Bulletin Contributing Editor.)

## THE 'NORTHERN LIGHTS' AZALEAS: AN UPDATE

*Reprinted from the Newsletter of the Massachusetts Chapter, American Rhododendron Society*

Our main speaker, Dr. Howard Pellett of the University of Minnesota Landscape Arboretum, then examined why low temperatures are tolerated by some plants but not others. In this regard he mentioned two different mechanisms – one a freeze-avoidance mechanism that permits supercooling of cell fluids without freezing and the other, not yet entirely understood, that lets some plants freeze and endure very low temperatures. Dr Pellett pointed out that root tissues are much less capable of tolerating frost than stem tissues, a circumstance that create difficulty for container growers. He also stressed the importance of day-length and acclimation to progressively lower temperatures, processes that make plants less susceptible to late-season cold than to early-season cold.

Dr. Pellett said that little research has been done on how fast plants can deacclimate and how fast they can reacclimate, factors that affect survival in late winter warming spells and freezes. However, after two or three days at room temperatures a typical plant is rendered vulnerable to low temperatures.

Dr. Pellett, who has been involved in breeding cold-hardy plants for northern climates, recommends breeding plants to suit specific situations. For the northern U.S. he suggests using seed populations from similar latitudes in, say, northern China and Manchuria, rather than using stock from the far north. Also, it has been found that an occasional  $F_2$  seedling will be harder than either parent, suggesting that interbreeding and selection for cold hardness can extend the range of many landscape plants.

Dr. Pellett also described the "Northern Lights" deciduous azaleas produced by a breeding program with which he was involved. The original Northern Lights hybrids, hardy up to  $-45^{\circ}\text{F}$  in midwinter, mostly developed from crosses between Mollis hybrids and *R. prinophyllum*, include 'Pink Lights', 'Rosy Lights' (a darker pink), and 'White Lights' (probably *R. prinophyllum* x 'Oxydoli'). The latter is not quite as hardy as the others, nor is it a pure white; but it is very floriferous, shows good fall color, and has a compact growth habit. More recent additions include 'Spicy Lights' (*R. prinophyllum* x an Exbury seedling) which is yellowish in color; 'Orchid Lights' (*R. canadense* x a Mollis hybrid) which is pink-magenta with smaller flowers and a relatively compact growth habit; and 'Golden Lights' (an *atlanticum* hybrid from Scotland x an Exbury seedling) which is a handsome white with a yellow blotch that is mildew-resistant and hardier than either parent.

While hardiness was the primary concern of the breeding program, the participating hybridizers are now more concerned with improving other characteristics – looking for nice yellows and bicolors, bronze foliage, semi-dwarfness, later bloom, and mildew resistance. They have been using Choptank River Hybrids (*R. atlanticum* x *R. nudiflorum*) to produce good blue-grey foliage and a *viscosum* hybrid to obtain glossy dark green foliage, because in July and August the poor 'Northern Lights' foliage is not much of an asset in the landscape. (A good source for plants free of leaf spot and mildew are hybrids from the high elevations in North Carolina.)

Dr. Pellett has also been involved in the development of the other cold-hardy plants. Among them: 'Northern Sun', a forsythia hardy to  $-30^{\circ}\text{F}$ ; a red osier dogwood selected for redder twigs; a buckeye, 'Autumn Splendor', with red fall foliage; and an elegant double-flowered white plum. Right now some tests are being conducted to select viburnums that are hardy and that have a compact plant habit, good fruit color, and glossy green leaves. Some inter-generic crosses employing mountain ash, hawthorns, *Amelanchier*, *Aronia*, and *Chaenomeles* are also being explored. Altogether, Dr. Pellett's presentation provided a view of the exciting plants obtained from the University of Minnesota Landscape Arboretum breeding program to date, as well as a look at more good plants on the way.

## THE PLANT COLLECTORS

### FRANK KINGDON WARD (1885-1958)

Tony Schilling – Wakehurst Place, England

A fortunate few dedicated men have left an indelible mark on the map of East Himalayan botanical exploration in that remote corner of Asia, where the wilderness of south east Tibet, south west China, north east India and Burma merges in an exciting confusion of river, gorge and mountain.

Some, like Bailey and Morshead, were military men who merely brushed against botany whilst engaged in geographical surveys, but others were intrepid plant collectors who totally committed themselves to the task of seeking new species for our gardens.

One such man was Frank Kingdon Ward who, in view of the diversity of his achievement, is considered by many to be the doyen of more recent plant hunters. His passion for exploration (both botanical and geographical), knew no bounds and this, coupled with his patience, determination and stamina, his keen and perceptive eye, his modesty and his talent for romantic, but scientifically exact, writings made him the envy of his contemporaries and a hero of many who follow after him.

He was born in Manchester on 6 November, 1885, son of Harry Marshall Ward, a brilliant botanist who was later appointed Professor of Botany at Cambridge where he founded the University's modern Botany School. After general education at St. Paul's School, Hammersmith, Frank Kingdon Ward entered Christ's College, Cambridge in 1904 and achieved his degree in Natural Sciences Tripos. In 1907 he departed for China to take up a post as school teacher at the Shanghai Public School.

From an early age he had been fired with a burning urge for botanical exploration. Before he went to University he had already read Schlimper's *Plant Geography* and, having been intrigued by pictures of tropical forest, this naturally led him to read other classics of biological exploration. Therefore, whilst *en route* to Shanghai he impulsively went ashore in Singapore, fled the city, and obtained his first personal experience of tropical forest. To use his own words – 'That was my night out: fireflys and bullfrogs ... I just wanted to sleep myself in an atmosphere, to revel in the scents, and to see with my own eyes all the exuberance of life that the warmth, humidity and equinoctial time-sequence of the tropics produces...'

By his own admission, the teaching job which he took in Shanghai was merely a means to an end, thus he found his work uncongenial and disillusioning. Being already set on becoming a plant collector but having little or no experience, he needed fortune to smile upon his enthusiasm, and in 1909 thanks to an appropriate introduction he joined an American zoological expedition to western China. His degree in natural sciences and family connections helped him to achieve this initial experience and, although it was in no way a botanical expedition, he managed to make a small collection of herbarium specimens which he gave to the Botany School at Cambridge. For a time it was thought that three of these were new to science, but the laws of priority soon sank the trio into the disappointing depths of synonymy.

Meanwhile he returned to his teaching job in Shanghai and then, out of the blue in 1911, Arthur K. Bulley, a rich Liverpool cotton broker and founder of the nursery firm Messrs Bees Ltd, asked him to collect plants in the Yunnan province of south west China, his previous collector George Forrest having moved to the employ of J.C. Williams of Caerhays Castle in Cornwall. This expedition proved to be the key which opened the door to the career which he had long felt he had been born to follow. In all, Kingdon Ward made 22 expeditions for various sponsors spanning 45 years, and it is small wonder that he has left such a clear mark on history.

During 1913 he explored and collected in Yunnan and Tibet (described in *The Mystery Rivers of Tibet* (1923)) while in the following year he made the first of his many visits to north Burma (recorded in *In Furthest Burma* (1921)).

During the First World War he served in the Indian Army and attained the rank of captain, but the year after Armistice he was back in north Burma on the alpine slopes of Imaw Bum. In 1921 he returned once more to China (Yunnan and Sichuan) and in 1922 he travelled in these two provinces yet again before moving on through southeast Tibet to north Burma.

Then, in the period spanning 1924-25 he made what was probably his most famous and successful expedition, in the company of Lord Cawdor, to Bhutan and southeast Tibet. It was during this long and arduous experience that he solved 'the riddle of the Tsangpo gorge', and exhibited to the scientific world his powers, not only as a first class field botanist, but as a geographical explorer also.

The Tsangpo is that great river of Tibet which is the upper section of the Brahmaputra and, until Kingdon Ward's survey, a great mystery hung over the geographical character of the mountain section of this precipitous gorge. Close to Lhasa the river lies at an altitude of 12,000 feet (3,650m) but, where it emerges from the Himalayas and escapes southwards into the Assam Valley, it is a mere 1,000 feet (305m) above sea level. The actual unsolved riddle of the Tsangpo gorge was the presence or otherwise of the much-rumoured Falls of Brahmaputra, a story which over the years, had become known as 'the great romance of geography'. Bailey and Morshead's journey of 1913 had settled the last doubts regarding the actual course and identity of the river, but the gorge itself remained unexplored as neither they, nor the Sikkimese pundit Kintshup (who travelled there almost 35 years earlier at the request of the Survey of India), managed to penetrate its mysterious depths.

In the winter of 1924, Kingdon Ward and Cawdor followed the river gorge down from Tibet past the great guardian peaks of Namche Barwa and Gyala Peri. Near to the base of these two mountains (breasts of the goddess Dorje Phangmo), lie the settlements of Gyala and Pemakochung both of which gave their names to two of Kingdon Ward's discoveries and introductions – *Berberis gyalaca* (K W 5962) and *Rhododendron pemakoense* (K W 6301). Beyond the adjacent pass named Nyima La in the Rong Chu valley he discovered and collected one of the best of all primulas for woodlands and bog gardens; *Primula florindae* (K W 5781). Further west on what he described as 'the wooded hills east of sacred Lhasa' he first collected the plant which probably brought him most fame the much acclaimed 'Blue poppy' *Mecoprosis betonicifolia* (K W 5784).

This epic expedition down the major part of the difficult gorge finally succeeded in dispelling the myth of rainbow-ringed waterfalls 150 feet high (45m), but Kingdon Ward found compensatory romance in the form of many more plant species new to science including *Berberis tsangpoensis* (K W 6326), *Rhododendron leucaspis* (K W 6273), *R. auritum* (K W 6278), *R. venator* (K W 6285), *R. montroseanum* (K W 6261) and *R. scopulorum* (K W 6354).

The Tsangpo still guards some of its deepest secrets and, until such time as someone completes an unbroken survey along the entire length of the Tsangpo-Brahmaputra river from Assam to Tibet, the remaining mysteries will persist.

From 1926 until 1956 almost all Kingdon Ward's collecting efforts were focused on the mountains and gorges of Burma and Assam, an area which over the years was to become considered as 'his country'. He was in Burma early in the second World War when the Japanese invaded the country but, thanks to his intimate knowledge of the area, he had little trouble in escaping into India. There he instructed the armed forces in jungle survival techniques, and after the war was over he became employed by the United States government to search for wrecked planes and the graves of lost aircrew. To assist them in these field operations the Americans could not have wished for a more experienced guide and adviser.

It was during one of these searches that he found *Lilium mackliniae* on Mount Sirhoi in Manipur. He returned there again in 1948 with his wife Jean (for whom the lily is named) with the sole purpose of seeing the plants in flower. Its colour in cultivation was said to be a muddy white and he simply could not accept the fact that what he considered to be one of his 'botanical swans', had actually been dubbed 'an ugly duckling'! The story of that energetic pilgrimage back to Mount Sirhoi makes compelling reading in his book *Pilgrimage for Plants*, for he relocated the lily in large numbers and laughed with delight when he discovered it to be '...a delicate shell-pink outside like dawn in June, with the sheen of watered silk; inside it was like faintly flushed alabaster.'

Two years later, whilst on expedition in Lohit valley on the borders of Assam and Tibet, he and his wife were lucky to escape with their lives when on 15 August 1950, they were caught at the epicentre of what proved to be one of the most severe earthquakes ever recorded.

The story of that epic adventure was modestly documented by Kingdon Ward in *Nature* and also in the *RHS Journal* (June 1952). His wife gave the story graphic and compelling coverage in her book *My Hill So Strong* (1952); a book which also gives an insight into her husband's unique style of existence in the wilderness he constantly sought after. It reveals much of interest, not least his quiet bravery as he fought daily against his great fear of heights. What misery he must have experienced at times during his long years of endeavour as he trod carefully, and white-faced with tension, across unstable mountainsides and over ill-constructed bridges in quest of his goals. He also suffered recurring bouts of malarial fever, contracted in the harsh climate of north Burma, a region which had claimed the life of Reginald Farner in 1920 when only 40 years old.

Kingdon Ward was a man of great patience, immense energy, resolution and endurance, and with a sharp and critical eye for detail. This keen power of observation backed by his scientific training put him in a class of his own; he was in every sense of the word the complete natural scientist with a wide and catholic interest in all aspects of his hunting ground.

No one has travelled more widely in the eastern Himalayas nor written in such detail about it; no one has collected more selectively and with such individualism, nor summarised his observations so clearly. Not only was he a brilliant field botanist, he also involved himself in the natural distribution of plants and their ecology, as well as the various factors which interrelate with them such as climate, aspect, even zoology and ethnology. In consequence one is just as likely to find his writings in the *Geographic Magazine*, *Nature* or *Blackwood's Magazine* as in *The Gardeners Chronicle* or the *RHS Journal*.

On top of all this talent he was a man of great modesty and with a quiet yet sharp sense of humour and a concern for animals. When in Monyul in 1938 he impulsively purchased 'a black long-haired dish-faced bow-legged Bhutanese dog with large appealing eyes and well covered in fleas'. It cost him one rupee, he called it Beetle, and from that date on they travelled the Himalayas together.

His earlier travels were often his loneliest, but following his second marriage in 1947 his wife Jean constantly accompanied him and helped him immensely with his work. Their only other companions were their porters and guides, often cheerful and friendly but sometimes sullen and hostile. Those eastern gorges of the Himalayas harbour many little-known tribes of variable temperament, the Naga, Abor and Mishmi, being but a few of those he spent so many of his years with.

Kingdon Ward's success realised him many honours. In 1932 the Royal Horticultural Society awarded him the Victoria Medal of Honour and in 1934 the Veitch Memorial Medal. In 1930 the Royal Geographical Society awarded him their highest honour, The Founders Medal. The Massachusetts Horticultural Society awarded him the George Robert White medal in 1934, and in 1936 he was given the Livingstone medal by the Royal Scottish Geographical Society. In 1952 he received the OBE for his services to horticulture, and in 1957 he was installed as an Honorary Freeman of the Worshipful Company of Gardeners.

Kingdon Ward died suddenly in London on 8 April 1958. Scarcely a week

before he had been discussing possibilities for his twenty third expedition to north Iran or perhaps the Caucasus. He also had his shrewd green eyes set on a trip to Vietnam.

In all he wrote some 25 books and an amazing number of articles for a large number of journals. It could be said that he wrote out of necessity in order to fund his next expedition, but he also wrote because he felt compelled to share his love of nature and his zest for the unknown.

He was by his own confession an unashamed romantic, a fact which showed in the very titles of his books – *The Land of the Blue Poppy*, *Planting Hunting on the Edge of the World* and *Plant Hunter's Paradise* being but three of the many examples. It could be argued that his writings are as much his memorial as his plant introductions and his geographical observations were.

So superbly did he write that the 'armchair explorer' can almost feel the breeze upon the cheek, almost smell the blossoms, see the distant blue hills, or hear the pounding of the mighty rivers. What one really does sense is the great spirit of adventure which he enjoyed so deeply, and it is easy to feel that one has actually shared his experiences, trod the same paths and observed that same beauty.

There has never been, nor is there likely to be, another man quite like him. Botanists, gardeners, geographers, lovers of literature and others besides, owe him more than can be easily measured. His was the country of river gorges, ours are the treasures which outlived him.

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## RHODOS FOR YOUR GARDEN

### THE KNAP HILL AZALEAS

G. Donald Waterer – Somerset, England

In 1809 Michael Waterer the elder of Knap Hill (1745-1827) took his eldest son, Michael Waterer junior (1770-1842) formally into partnership. The son, it was declared, had "for some time past" conducted and managed the trade or business at Knap Hill of his father, gardener and nurseryman. Three years earlier it had been noted that the younger Michael had constructed a road from the highway to the "Fuel Barn" which became the nucleus of the budding nursery of fourteen acres which was soon to expand in all directions.

In 1829 the eagle-eyed J.C. Loudon visited the nursery of Mr. Waterton (sic) at Knap Hill and wrote an account of it for *The Garden* magazine. He had observed there "one of the most splendid displays of Azaleas ever seen in England in the first week of June last". Mr. Waterton had raised many hundreds of hybrid seedlings and had, besides, all the best old varieties and many of the new sort raised by others. Always ready to give credit and to offer constructive criticism, he wrote of a nursery which was evidently well established. How old, one wonders, was an old variety of azalea in the year 1829?

It is likely that the younger Michael had started hybridizing azaleas at Knap Hill before 1810, the year in which Napoleon reached the zenith of his power. The seedlings did not differ greatly from those which were being raised at more or less the same time in Belgium, on the Earl of Carnarvon's estate at Highclere and in the nurseries of Loddiges, Lee and Kennedy, and Osborne of Fulham.

By 1829 some of the low-lying ground at Knap Hill had been pipe-drained to a depth of up to four feet. Soil fertility, deep digging and perfect drainage made possible the formation during the summer of 1828 of growths five feet long on *Azalea aurantiaca*, to the astonishment of Loudon who knew it as a slow grower.

The younger Michael, who died in 1842 left his Knap Hill Nursery to his youngest brother, Hosea Waterer, whose Christian name had descended to him from a haberdasher who worked in the City of London at the time of the Great Fire. In the same year *Azalea viscossepala* was noted at Knap Hill, the result of *Azalea sinensis* crossed with *Azalea viscosa*. The original plant, still flourishing in the 1950s, filled the air surrounding it on calm evenings in June with delicious scent.

Hosea Waterer died in 1853, an enthusiast for rhododendrons rather than azaleas. To two of his nephews who had been working in the nursery for some years he bequeathed his property in equal partnership. One was the first Anthony Waterer, son of his brother James Waterer of Chertsey (1790-1869). The other was Robert Godfrey, son of his sister Elizabeth. At about this time azalea 'Nancy Waterer' was named in the nursery for Anthony's elder daughter, a hybrid, it is thought, between *Azalea sinensis* and an azalea of the Ghent type.

Anthony Waterer and Robert Godfrey, passionately devoted to the breeding of azaleas, lost no time in putting their ideas into action. In 1861 *The*

*Gardeners' Chronicle* reported: "Some fine seedlings have been obtained with blooms of large size and possessing great richness and variety of colour. They have also the good property of being late bloomers....". There was a reference to crosses made between older azaleas and "the best orange-yellow Chinese sort" (*Azalea sinensis* = *Rhododendron molle*).

In 1867 Robert Godfrey, suffering from ill health, withdrew from the partnership. Although Anthony Waterer could afford the large sum involved in buying his cousin's share of the business, the year 1867 marked the zenith of many years of development.

The Knap Hill Azaleas, by which name they were already known, were a mixture of nine deciduous species, six of which came from North America. There were at Knap Hill fine forms of the American *Azalea calendulacea* with flowers of medium size, funnel-shaped, red, orange or yellow, flowering in late May or early June. Having no scent, these brought colour and vigour to the Knap Hill strain. *Azalea occidentalis* brought fragrance and some beautiful whites and pale pinks. A rather poor form of this species which came to this country in the 1850s was superseded by a finer form which the elder Anthony brought to Knap Hill in the 1870s and for which he obtained a Botanical Certificate in 1886.

Anthony had a particular liking for the double-flowered seedlings which appeared from time to time, but it has been said that having seen a seedling once in flower, he had no wish to see it again. Any seedling to be used for breeding he kept for that purpose only. Strictly, that was not quite true. *Azalea* 'Nancy Waterer' has already been mentioned. He named also a beautiful white for his wife, Mrs. Anthony Waterer. This plant, derived from *Azalea arborescens*, was awarded a F.C.C. in 1892. *The Florist and Pomologist* for 1883, p. 177, featured a coloured illustration of three named azaleas raised at Knap Hill: 'C.S. Sargent', 'Henrietta Sargent' and 'Rubra Plena'.

The elder Anthony was catholic in his taste. There is no evidence to suggest that he had a predominant interest in one type of hybrid azalea rather than another. He died in 1896 and left his nursery to his bachelor son, Anthony junior, who guarded his Knap Hill azaleas jealously until the end of the first World War by which time the nursery had virtually become a wilderness. Two azaleas were named by him. One, a scented white with an orange blotch, was named for Lady Derby about the year 1910. Forty years later I was happy to assure Lady Derby that her azalea was still grown. The second azalea named was 'George Reynolds' (A.M. 1936) and was one of many of his azaleas which he sold to Lionel de Rothschild at Exbury. Others were supplied to P.D. Williams and his cousin J.C. Williams in Cornwall.

The younger Anthony died in 1924. He bequeathed the Knap Hill Nursery to his younger brother, the second Hosea Waterer, an American citizen who had founded a seed store in Philadelphia. Perhaps in order to acquaint his family with their inheritance, Hosea decided to end his days at Knap Hill. In 1925 he named several azaleas and showed most of them at Westminster in the following year. Among them were:

'Coquette'	'Knap Hill Pink'
'Homebush'	'Knap Hill White'
'Lady Rosebery'	'Marion Merriman'
	'Mary Waterer'

To five of the above the R.H.S. gave Awards of Merit.

In 1926 the firm of W.C. Slocock & Sons of Woking acquired from Hosea 'Homebush', a remarkable double azalea which Hosea had named a year earlier. They acquired also a number of azaleas which they named and put on the market after World War II. These were:

'Devon'  
'Fireglow'  
'Gog'  
'Harvest Moon'  
'H.H. Hunnewell'  
'Persil'  
'Pink Delight'  
'Satan'  
'Sevill'

Towards the end of 1926 Hosea Waterer died. He left the nursery to his two sons, Anthony III and Harry, both of Philadelphia who, in 1931, sold it to a new company known as the Knap Hill Nursery Ltd, of which F. Gomer Waterer and R.C.H. Jenkinson were directors. In the same year Frank P. Knight was appointed nursery manager. The considerable stock of Knap Hill azaleas which still remained in the nursery was critically examined and a selection was made for naming. Among those named before the outbreak of the second World War were:

'Barbara Jenkinson'  
'Firecrest'  
'Goldcrest'  
'Golden Oriole'  
'Goldfinch'  
'Hoopoe'  
'Lapwing'  
'Merlin'  
'Penguin'  
'Robin'  
'Ruddy Duck'  
'Toucan'  
'Whitethroat'

It was decided to resume the hybridisation and selection of the Knap Hill azaleas, but in 1935 a devastating frost on 17 May destroyed the flowers of every azalea in the open ground. With his unusual generosity Lionel de Rothschild invited the Knap Hill Nursery to make crosses at Exbury using azaleas which he had acquired from the second Anthony Waterer, Exbury having suffered no harm from the frost. These crosses were made at Exbury by Frank Knight. Further crosses were made at Knap Hill before the outbreak of war in 1939.

Distressed by the possibility that the nursery might not survive another war, I decided to buy fifty seedlings to be returned to the nursery if and when circumstances improved. Having joined the R.A.F. in 1939, I was serving at Marham in Norfolk in May, 1940, when Holland was invaded. The weather was idyllic. Coffee was still served after dinner on the lawn of the Mess, while aircraft engines roared and nightingales sang in the thickets nearby. After a gruelling spell of night flying I was unexpectedly granted 72 hours' leave. Leaping into my ancient Ford, I drove through the night without headlights and arrived safely at Knap Hill. The azaleas were flowering splendidly and I was able to mark fifty of the seedlings which I thought most worthy of retention. My father, Gomer Waterer, took charge of them in the autumn and I sent a cheque for £25 to the nursery. They grew well during the war years.

Bobbie Jenkinson resumed service in the Army and in 1941 Frank Knight left to take up war work. In 1943 Henry Goude was appointed Managing

Director and Gomer Waterer died in March, 1945. I was among the last prisoners of war to be liberated on 8 May near Lubeck.

I was invited to rejoin the staff of the Knap Hill Nursery, an invitation which I accepted with pleasure. I resumed work towards the end of the summer and was instructed by Henry Goude to make an inventory of all the Knap Hill azaleas which were scattered in various parts of "Lowlands", an area which was devoted almost entirely to rhododendrons and azaleas. Some were barely visible beneath a tangle of brambles. At the same time I was instructed to prepare an area of ground to be used exclusively for the layering of any Knap Hill azaleas named or unnamed, which I considered to be worthy of propagation.

To facilitate the making of an inventory I devised a code system for each seedling selected based on three letters and a number.

The three letters identified the area in which the seedlings had been marked. Thus:

Dri 40 The fortieth seedling marked in the Main Drive Border  
Nys 10 The tenth seedling marked near the *Myssa sylvatica*  
Nan 20 The twentieth seedling marked in the bed near the big azalea Nancy Waterer (probably the original plant) and so on.

With the help of three German prisoners of war\*, an area of about 4,000 square yards was double trenched in the traditional style – top spit on top, each trench well forked. Before the war the nursery had collected spent hops from Simmonds' Brewery at Reading. It happened that one of their directors, Richard Quarry, was an old friend and I lost no time in asking him if the hops contract might be renewed. Although he was still abroad he took the trouble to ensure that my request was granted.

With the parsimony which at the time he was obliged to bring to his business dealings, Henry Goude could at first tolerate no more than one shovel-full of hops for each stool plant. Further applications had to be made furtively in the dead of night. In time he relented when it became obvious that the strength of the stools and of the root formation of the layers was commensurate with the amount of hops applied. Apart from an occasional mulch of chopped bracken, no other form of humus was used during the 25 years of the stool ground's existence. Virtually no applications were made either of organic manure or of artificial fertilizers.

For more than twenty years I staged groups of rhododendrons and azaleas for the nursery both at Chelsea and at the Rhododendron Shows at Vincent Square. It was soon apparent that retail orders of modest size were not readily given for mixed seedlings. If one individual plant was admitted it was necessary to provide an identical clone propagated from it. For this reason azaleas selected for layering were necessarily strong growers with pliable growths from which layers could be obtained in commercial quantities and in the shortest possible time. Grafting on seedlings of *Azalea pontica* was initiated but speedily abandoned.

In 1946 I thought the time was right to offer to sell back to the nursery the seedlings I had bought in 1940. Henry Goude accepted my offer and, with frosty good humour, handed me a cheque for £27-10s-0d, which was

\*Karl Schaal from Wurtemberg, August Humm from the Ruhr and Joseph Voelkl from Bavaria

the price I had suggested. Most of these azaleas were planted immediately on the stool ground with the code letters "Don". Among those which before long were named were 'Mephistopheles', 'Golden Eagle', 'Rumba', 'Eva Goude', 'Ambush', 'Sahara' and 'Rosella'.

Goude was content to leave the selection of names to me, provided that I bore in mind my father's preference for bird names. I think it was about the year 1952 when Mr and Mrs Darnton came to see the azaleas in flower. They were neighbours of Collingwood Ingram in Kent, ardent photographers of wild life in distant jungles, lively and humorous. When they learned that we were running short of appropriate bird names, they offered to supply a list of attractive names of foreign birds. But the nursery would have to pay special attention to the order they were placing, otherwise they would supply the names of flea beetles, some of them beautiful names, and we would never know. Memorable days on the stool ground were usually accompanied by laughter.

At about this time Oliver Slocock gave us a set of six of the Knap Hill azaleas which his family firm had acquired in 1926. They were grafted plants and included 'Satan' and 'Fireglow', two splendid varieties, which unfortunately were unsuitable for layering on account of their dense and compact growth.

We inaugurated a modest but by no means insignificant export trade to the United States and Canada. Small plants were supplied bereft of every vestige of soil and minutely inspected in order to meet an exacting standard of hygiene.

Seed was collected from selected clones, sometimes hand-pollinated. Having been dried and shaken from the open capsules through sieves of the correct gauge, the seed was sold in packets of 250 seeds. Goude spent an afternoon counting out 250 units with the aid of a magnifying glass and a pen with a relief nib. These, with extra for good measure, I placed in a slender glass phial which I marked to register the required amount.

I was privileged to carry on the work of hybridization which the company had resumed in 1931. Seed from azalea 'Whitethroat' which had been hand pollinated produced several attractive double varieties, mostly fragrant and vigorous. Some had copper-tinted foliage which was at its best in full light. The copper colour did not appear in partial shade and was ruined by forcing. Whenever possible it was necessary to remove specimens straight from the open ground for transportation to Chelsea.

The R.H.S. acknowledged the existence of these and earlier double azaleas by sanctioning the group title of "Double Knap Hill Azaleas". Sir Eric Savill, attracted by the pure white double azalea 'Whitethroat', planted a group of it near a bridge in the Savill Gardens. During the 1950s he took great interest in the various doubles we had raised from it, some of which went directly from the R.H.S. Hall or Chelsea to the Savill Gardens.

A large pale carmine azalea attracted attention at the Shows in spite of a rather forbidding code number. We chose the name 'Sylphides' for it. Alexander Kellier, pointing to it in a Chelsea group, murmured in my ear, "Mme Karshavina approves". Encouraged, we gave the name Petrouchka to something more flamboyant.

It is perhaps worth noting that by far the best money-spinner for the

nursery was azalea 'Golden Oriole'. It has all the qualities which are likely to endear any plant to the average gardener - vigour and hardiness, robust growth, brilliant colour and pervading fragrance. Moreover, 'Golden Oriole' always headed the stock list of numbers of azaleas available for sale at any given time. It received no award.

As we learned the technique of raising our azaleas from cuttings, the stool ground gradually ceased to be used for layering and became instead a spectacular show ground and at times a landmark for passing aircraft. In the days of the two Anthony Waterers there had been an "open Sunday" at the beginning of June for the benefit of any local inhabitants who might care to enjoy the flowers. For a wider public we resumed this custom during the 1960s. Collections were made for charity. On one occasion there were 4,000 visitors.

The wholesale nursery of K. Wezelenburg & Sons of Hazerswoude in Holland bought a number of our azaleas and have been propagating them ever since. There is a steady demand for them in Germany and Italy where, it is said, they grow well and the flowers suffer little damage in bad weather.

Shortly before Martin Slocock took over the nursery in 1976 I assembled a collection of azaleas near the big fern-leaf beech which I thought might be worthy of preservation. Unfortunately, the intense drought of that year killed some and damaged many others.

During the late 1960s the Crown Estate was offering to the trade unnamed seedlings, both selected and unselected, of their strain of azaleas which was, I believe, a further development of the Knap Hill strain. These azaleas were raised under the guidance of Sir Eric Savill with the assistance of Hope Findlay and John Bond.

The selected seedlings which I saw in flower at that time were of exceedingly high quality. The flowers, of moderate rather than excessive size, were held in well-shaped trusses and at that time it occurred to me that they embodied all those qualities which the elder Anthony had striven to bring to his strain of azaleas more than a century earlier.

#### THE KNAP HILL AZALEAS

This list, to the best of my knowledge, represents all varieties which were raised and named at the Knap Hill Nursery.

E = early  
M = mid-season  
L = late

Albacore	Pure white, an upright grower, E.
Ambush	Strong rich yellow, M.
Ann Callingham	Crimson fading to deep pink, L.
Arabesque	Pink, frilled, M.L.
Avocet	White tinted pink; scented, M.
Barbara Jenkinson	Rich orange apricot, M.
Betty Kelly	Brilliant mandarin red, flowers rather small, of good shape, M.L.
Bullfinch	Deep rosy red, broadly funnel-shaped, M.L.
Buzzard	Pale straw yellow and pink; scented, M.

Calico Double lemon, scented, M.  
 Chameleon Pale yellow becoming pale pink when finally open, scented, L.  
 Chaffinch Salmon pink, often semi-double, growth rather erect, E.  
 Chelsea Reach Double creamy white flushed pale mauve lilac, M.  
 Chenille Double rich cherry pink, fragrant, M.  
 Chocolate Ice Double white, pink bud, bronze foliage, scented, M.  
 Chorister Double pale cream, very fragrant, bronze-tinted foliage, M, L.  
 Cockatoo Large flame apricot, derived mainly from *R. japonicum*, E.  
 Colin Kenrick Double pale flesh pink, scented, M.  
 Contralto Rich pink, M.  
 Coquette Bright pink.  
 Crepello Bright true red, green foliage, M.  
 Devon Rose pink.  
 Diabolo Salmon orange, vigorous, the foliage tends to persist until mid-winter, L.  
 Donald Waterer Saffron yellow, red tube, M, L.  
 Dorothy Corston Deep red, bronze-tinted foliage, compact, M, L.  
 Double Damask Double cream fading white, E.  
 Eva Goude Sulphur yellow, fragrant, foliage slightly bronzed, M.  
 Firecrest Brilliant orange scarlet, E.  
 Fireglow Orange vermilion, L.  
 Flaming June Deep red, compact, mid-June, L.  
 Flarepath Deep red, scented, mid-June, tall, green foliage, L.  
 Florence Pilkington Large cream, base of flower tube tinged red, M.  
 Frances Jenkinson Large orange apricot, flowers flat, L.  
 George Reynolds Large yellow, thick texture, poor grower, M.  
 Glockenspiel Double salmon pink, M.  
 Gog Orange red, M.  
 Goldcrest Bright rich yellow, vigorous, compact, E.  
 Golden Eagle Bright orange, dense growth, M.  
 Goldeneye Deep vermilion, bold suffused golden blotch, L.  
 Golden Oriole Bright yellow, very free-flowering and vigorous, compact, E.  
 Goldfinch Bright orange yellow, low and compact, E.  
 Gwenda Kitcat Pink and white, scented, M.  
 Harvest Moon Pale sulphur yellow, a weak grower, M, L.  
 Harwell Rich pink, tall-growing, L.  
 Heron Deep red, white stamens, bronze foliage, L.  
 Hiawatha Bright orange red, attractive foliage, E.  
 Homebush Flowers double, deep carmine, in dense rounded trusses, vigorous, M.  
 Hoopoe Near scarlet, white markings, slight orange blotch.  
 Imago Double, deep yellow tinged red-lilac, M.  
 Impala Satan x Knap Hill Red. Very deep red, L.

Jock Coutts White tinged pink, flowers beautifully shaped, deep bronze foliage, M, L.  
 Kentucky Minstrel Large saffron yellow and orange, M, L.  
 Kestrel Orange, M.  
 Kilauea Vivid orange red, bold blotch, compact, L.  
 Knap Hill Apricot Yellow apricot, very vigorous and tall-growing, E.  
 Knap Hill Pink Rich carmine, M.  
 Knap Hill Red True red, rich bronze-tinted foliage, tall-growing, L.  
 Knap Hill White White shaded carmine rose, M.  
 Knap Hill Yellow Rich canary yellow, bronze-tinted foliage, M.  
 Krakatoa Fiery red, young foliage deep bronze, E.  
 Lady Derby Creamy yellow/trading white, golden blotch, M.  
 Lady Rosebery Rich crimson, compact, young foliage glaucous blue, L.  
 Lapwing Creamy yellow tinted pink, scented, a good grower, E.  
 Linnet Double mauve pink flushed pale yellow, M.  
 Lorelei Double pale lilac, M.  
 Marionette Pink, orange blotch, fragrant, M.  
 Marion Merriman Rich yellow boldly blotched, spreading habit, E.  
 Mary Waterer Bright pink, paler centre, buff spots.  
 Mauna Loa Red, suffused orange blotch, M, L.  
 Mazurka Coral apricot, scented, green foliage, M, L.  
 Mephistopheles Bright flame red, handsome foliage, M, L.  
 Merlin Salmon pink, orange blotch.  
 Mirikin Very small double lilac pink fading to white, M.  
 Moselle Deep cherry pink, E.  
 Motet Double white, scented, M.  
 Mrs Anthony Waterer Pale cream fading white, sweetly scented, L.  
 Mrs Gomer Waterer Cream and mauve pink, semi-double, E.  
 Nancy Waterer Golden yellow, L.  
 Oryx Creamy white, L.  
 Osprey Broad-petalled pure white, M, L.  
 Papoose Double pale carmine, M.  
 Paramount Double yellow, L.  
 Pavane Large peach pink, scented, young foliage bronze-tinted, M.  
 Penguin Very pale yellow suffused pink, top petal shrimp red, speckled orange blotch.  
 Peregrine Orange, M.  
 Persil Pure white, orange blotch, M.  
 Petrouchka Apricot and yellow bicolour, M.  
 Piccolo Very small double flowers, cream tinged pink, M.  
 Pink Delight Peach pink, yellow eye, M.  
 Placrum Pale peach pink, speckled orange blotch, L.  
 Polonaise Double apricot, scented, L.  
 Pompadour Carmine, striking orange blotch, scented, green foliage, M.  
 Redshank Orange red, conspicuous orange blotch, strong and tall grower, E.

Robin	Deep red, L.
Rosella	Pale pink, scented, vigorous, L.
Rozanne Waterer	Double white tinged carmine, deep pink tube, fragrant, bronze-tinged foliage, M.
Ruddy Duck	Salmon-red fading to salmon pink, deep bronze foliage, compact, L.
Rumba	Bright orange, flower tube tinged red, foliage bronze-tinted, M. L.
Ruth Davies	Orange, sturdy growth, M.
Sahara	Bright yellow, mid-June, L.
Saint Ruan	White, orange blotch, M.
Sarsen	Double cream, scented, M.
Saskia	Pink, pink bronze foliage, M. L.
Satan	Deep true red, green foliage, compact, L.
Scarlati	Deep true red, M.
Sceptre	Large creamy white tinged mauve, M.
Seville	Orange.
Shanty	Double pale pink cream, fragrant, M.
Sophie Hedges	Double deep pink, scented, bronze foliage, M.
Spoonbill	White tinged pink, M.
Stranraer	Vivid orange scarlet, E. M.
Stromboli	Red, M.
Sydney Firth	Filled pink, M.
Sylphides	Large pale carmine fading white, E.
Toucan	Pale cream fading white, scented vigorous, M.
Troupial	Orange, L.
Tunis	Red, orange eye, M.
Tyrol	Large cream fading to icy white, tall and vigorous, mid-to late-June, L.
Venetia	Intense mauve salmon, L.
Viscosepala	Small cream fading white, greyish foliage, intensely fragrant, L.
Vivienne Waterer	A striking yellow, M.
Waxwing	Pink, petals slightly recurved, M.
Whitethroat	Double white, compact, bright red autumn foliage, M.
Whyneck	Pale sulphur yellow slightly tinged pink, M. L.
Yoga	Orange flame, M. L.
Zanzibar	Deep yellow splashed shrimp red, L.

Reprinted from 'Rhododendrons, with Magnolias and Camellias Yearbook', 1985, with permission of the author and the Royal Horticultural Society.

## COMPANION PLANTS

### NOMOCHARIS

Margaret Cameron – Dunedin, New Zealand

*Nomocharis has been successfully grown in the Muskoka region of Ontario, and should certainly be possible in the Atlantic Region, as well as in British Columbia.*

The name *Nomocharis*, translated as "beauty of the pasture" or "grace of the pasture", aptly describes a small genus of plants closely related to *Lilium*. They originate in the pastures and forest glades of the high mountainous area where the borders of three countries meet – western China, north Burma and south-east Tibet; and where the great rivers Irrawaddy, Salween, Mekong and Yangtse have their source.

Reginald Farrer saw *Nomocharis farreii* in north Burma "on the high alpine grass-slopes of Hpimaw Pass nodding down ... with myriads of wide-open, dark-eyed faces, in every shade of pale rose and every degree of freckling". He described their "proud, meek port and delicacy of shell-pink colouring".

But I knew little of the admiration which these fascinating plants inspired when a happy chance led me to order seeds of *Nomocharis mairiei* which I saw on a seed distribution list in 1978. A tiny number of seeds arrived and were sown with no special treatment. A few germinated and were routinely transplanted into deeper, richer soil.

In June 1981 I was fortunate enough to visit Jack Drake's highland nursery at Inshriach in Scotland and there, in a garden full of treasures, I first saw *Nomocharis* in flower and was captivated by their beauty. In this garden *N. saluenensis* and *N. mairiei* were growing near *Mecopopsis grandis*, with which they associate in the wild. *N. saluenensis* is a favourite with Jack Drake because of the trusting way its rose-pink flowers look upward while all others hang their heads. Dwarfier than most of the species, its leaves are also broader, and it has a pronounced greenish area at the base of the petals.

Later that same month I was again to see *Nomocharis* flowering; this time well established clumps of *pardanthina*, one of the loveliest of the genus, in the quarry garden at Kildrummy Castle. Our party came upon the gardens after a heavy shower, and the large flowers were sparkling with raindrops. *N. pardanthina* was the first to be discovered, having been collected by Delavay in 1883. Its flowers may be pale pink or white, the flowers open almost flat, and the fringed inner petals are delicately spotted at the base.

As soon as I returned to Dunedin I transplanted my now precious and only surviving plant of *N. mairiei* into a barrel, and there, in 1982, it produced a flower head which was, frustratingly, snapped off on the eve of its opening, by an unusually strong wind. Finally, the following year, it flowered, and its single stem carried seven blooms. The flower of *mairiei* is flushed pale pink. The broader inner petals are deeply fringed and heavily spotted, while in this species alone the three outer petals are also fringed. The flowers are faintly fragrant, and the leaves are carried in whorls. *Nomocharis* hybridize very freely, and mine may not be a true species, but the hybrids are lovely too. The plant is at present putting up two more stems, and as *Nomocharis* are

long-lived I hope it will continue to increase. Alfred Evans in *The Peat Garden* mentions that a vigorous clump of *N. farreii* has, apart from one move, been continuously grown at the Royal Botanic Garden, Edinburgh, for forty years without ever relying on seed.

In their natural environment in the high mountain regions of the Himalaya, *Nomocharis* experience long winters when they remain protected by a thick covering of snow, followed by cool springs, and summers of high rainfall. Perhaps for this reason they have remained scarce in cultivation, although the first recorded flowering in cultivation was in 1914 at the R.B.G. Edinburgh, from seed of *N. mairiei* and *N. pardanthina* collected by Forrest. The most successful growers have been in central Scotland. Outstanding among these, Major and Mrs Knox Finlay of Keilour Castle, Methven, near Perth, have provided much practical information which is available in the Royal Horticultural Society *Lily Year Books*. Major Knox Finlay recommends for *Nomocharis* "an open situation with no ground cover; water in quantity at a favourable depth, a free root run, and quick drainage". The garden at Keilour Castle, on a peninsula between two fast flowing burns, had the advantage of frost drainage, a high water table, and a supply of very ancient and blackened sawdust.

*Nomocharis* resent root disturbance and at Keilour Castle the seed was broadcast in open frames and the plants were left undisturbed for several years until the bulbs reached flowering size. They were then planted out in beds dug to a depth of 45 cm and enriched with old compost, rotted sawdust, leaf-mould, sand and bone-meal. By this method it may take five or six years to produce flowering bulbs.

An earlier grower, also in Perthshire, Harley of Devon Hall, was able to bring plants to flowering in four years. He germinated the seed in slight heat in late winter; pricked out the seedlings into boxes of loam, leaf-mould and sand, and kept them in a heated vinery until autumn. The heat was cut off during the winter; the seedlings made small bulbs during the next summer, and in the winter of the third year they were replanted in boxes with fresh soil. They were planted out in the spring of the fourth year, and some flowered that season. Judging by my experience it seems likely that we in Dunedin could also have plants flowering in four years. Plants can also be increased by propagating from scales taken when the bulbs are dormant. *Nomocharis*, however, do not have many scales, and only one or two can be taken from each bulb.

In the Dunedin area we are fortunate to be able to provide conditions suited to *Nomocharis*, plants which have additional value for rhododendron growers in that they bloom after the main flowering season is over. Perhaps mention could be made here of the late Carl Teschner who grew and flowered *N. mairiei* twenty-five years ago. Of recent years, however, little interest has been shown in these lovely plants which Patrick Syngé describes as having "the grace and poise of the most delicate of lilies combined with the fascination and exotic form and markings of an orchid".

#### References:

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Syngé, Patrick M. (1980) *Lilies*: B. T. Batsford Ltd, London.

The Royal Horticultural Society (1970) *The Lily Year Book*. R.H.S., London.

NOTE: *Nomocharis mairiei* has been reclassified as identical with *N. pardanthina* (vide *Botanical Journal of the Linnean Society*, Vol. 87 Pt 4, 1983).

- Editor

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## HYBRIDIZER'S NOTES

### THIRTY YEARS OF HYBRIDIZING. PART 1: THE KENTVILLE HYBRIDS

R.M. Steele – Rose Bay, Nova Scotia

*From a talk given by Captain Steele at the Annual Meeting of the Toronto Region, R.S.C., in January 1987.*

I have been asked to speak on hybridizing as I have known it over the past thirty years, but I would also like to pump out some propaganda if I can ... I would like to suggest that in the Society we have round tables or workshops where we discuss the breeding of rhododendrons. I would emphasize that I'm not talking just about the hybridizers; I would like to talk to young people who might eventually breed rhododendrons. I would like to talk to those people who are only just interested and would like to learn more about rhododendrons. I think that if you could find a convenient way to get together and sit down in a relaxed atmosphere, you could look at the various methods whereby you might breed better and more interesting rhododendrons, more suited to the environment in which you live.

There is a plethora of rhododendron hybrids coming out; you see the literature and you see them in publications. How do we know which ones we should try? I suggest that basically you look at them from a very objective point of view and realize that the breeders in Europe are breeding for Europe, and the breeders in the United States are breeding for the various areas of the U.S.; that is, they are breeding for the environment in which they live and Canadians are breeding for their particular climate. Therefore, it is necessary for us to think seriously about breeding for plants that will do well for us. When looking at hybrids that are coming on the market or are being registered and named, examine their backgrounds first, see what their parentage is and ask yourself whether that parentage will produce a plant that will grow well in your environment. Don't be fascinated by the great big yellow truss that will only live south of Washington, D.C.

I would like to do anything I can to encourage younger people to breed rhododendrons and other plants. You might say, 'Well, why should we do this?' and I think that basically, it will provide us with a much wider range of plants that will perform well in our gardens in our particular areas and it will contribute a great deal to the beauty of the future and to the enjoyment of others. I think you might well ask, 'Why me?' The answer is, because it will eventually bring you substantial satisfaction in the long run and it will give members in our Society a greater understanding and knowledge of their rhododendrons. Discussion between people who are breeding plants leads to a greater knowledge amongst them.

I don't know how to go into the next aspect of breeding, and perhaps it would be better to say that I can tell you that it is very easy to breed. You can go out and take the pollen of one plant and put it on another plant and if it sets seed you can grow the seed, and you now have a hybrid. I think it would be better if you were going to become interested in breeding if you would be a little bit more objective than that. The best idea is to go and talk to another member of your Society who has had some experience and ask him how to go about it. When you know, it is worth trying almost any of the simple primary crosses. When you know a bit more about it, then start to do your breeding in the evenings or during the long winter months by prowling through the literature and seeing what has already been done; learn the characters of the plants and from that decide where you want to go.

The next thing that you probably should do when you've reached that stage is to go through the various records and see if the cross you have decided on has been made and named already, or if similar plants or one of the parents that you had intended to use have been utilized. If the cross has already been made, or crosses have been made that you think are worthwhile, then a plant has been selected. You can avoid or leapfrog the first generation by taking seed of that plant and selfing it or sibbing it, or making a cross with that and getting the same attributes that it might have taken you ten years to do.

*Captain Steel then went on to describe the Kentville hybrids, after discussing the reasons for the naming of the plants. Many were derived from the poem 'Evangeline' by Longfellow.*

**Acadia:** A very nice little rhododendron; however, the foliage on it can get very hungry if doesn't get enough nutrient. It originated from seed acquired from Schumacher in Sandwich near Cape Cod.

**Grandpé:** was bred from *R. catalabiense* 'Compactum' x *R. williamsianum* and grows into a plant about four feet high, very durable and very strong. It is not normally available in commerce because it takes quite a while to get up to a saleable size.

**Gabriel:** Gabriel was the sweetheart of Evangeline; the plant came from a cross of *R. smirnowii* x 'Dr. H.C. Dresselhuys'. It is very hardy and blooms well although it is not very extensively used in commerce.

**Bellefontaine:** Bellefontaine was Gabriel's last name; the plant was derived from a cross of *R. fortunei* x *R. smirnowii*. This cross blooms before 'Evangeline' and has somewhat better foliage.

**Evangeline:** Also achieved from a primary cross of *R. fortunei* with *R. smirnowii*.

*wii.* Both 'Bellefontaine' and 'Evangeline' have been very successful in the Halifax area, although they are sometimes damaged by hard winters. Synonym: 'Fundy'.

**Minas Maid:** 'Minas Maid' was derived from a cross of 'Nova Zembla' x *R. yakushimanum* and was selected after growing out in the open for several years. This plant is not to be confused with the lepidote rhododendron *mirus*.

**Minas Peace:** 'Minas Peace' took Best in Show in 1979 in Montreal and is a complex hybrid, to some degree, being a cross of ('Catalgia' x *R. degronia-num*), which is quite an early blooming plant, crossed onto *R. yakushimanum*. It is quite a delicate-looking hybrid, a very interesting, very lovely plant although it doesn't propagate very easily. Entirely a satisfactory plant.

**Minas Snow:** 'Minas Snow' is 'Cunningham's White' crossed with *R. yakushimanum* and is a very pure white with good foliage. I think it quite an excellent plant and quite hardy.

**Minas Rose:** 'Minas Rose' is ('Nova Zembla' x *R. yakushimanum*) crossed with ('Catalgia' x 'Elizabeth'). It is quite low and compact and a good all-round plant. Dr. Craig thinks it may be the one he likes the most and it may be the best one so far.

There have been many plants based on ('Catalgia' x *R. yakushimanum*) or vice versa and some of these have been very good, very interesting and very durable. There is quite a spread in them, quite a range in their performance and there are now quite a number: there is the 'Powell Glass' crossed with *R. yakushimanum*, and Gable has one called 'Double Dip'. When you get a good selection of it, it is a very good plant and also a good one from which to breed.

**X-Ray 6821 number 24.** This is a plant which has never been named. It doesn't mean that it was the 24th selection – it was number 24 in the row. The reason they have never given it a selection number is that although it is lovely when in bloom, it is a very straggly plant when it is not in bloom. They have used it in their breeding. (*Colour is red. Ed*)

**7504 is** ('Catalgia' x *R. yakushimanum*) crossed with 'Goldsworth Yellow'. They started using 'Goldsworth Yellow' in order to breed yellows and what they were going after was the hardest form they could find. 'Goldsworth Yellow' is (*R. caucasicum* x *R. campylocarpum*). The cross has given them some success but I don't think it is really exciting.

**7407 is** ('Goldsworth Yellow' x 'Catalgia') x 'Teresa' and 'Teresa' is one of the lovely reds crossed with 'Moser's Maroon'. As you can see this has no sign of red in it whatsoever. It does have some inclinations to yellow. (*Yellowish-white. Ed*)

Another is a cross which has been made several times in our area and it is *R. yakushimanum* x 'Purple Splendour'. We have noticed some variation with each cross which we have made. The only variant in the cross has been different Yaks, so that we get some sort of a different performance.

**7704 is** ('Catalgia' x *R. yakushimanum*) crossed with ('Catalgia' x 'Elizabeth') (Pink).

**7706 is** a very shrieking one, and a very attractive plant when it blooms, but it fades quite a bit. It is ('Nova Zembla' x *R. yakushimanum*) crossed with ('Catalgia' x 'Elizabeth') (Rosy red). ('Catalgia' x 'Elizabeth') is quite a good plant on its own and it has been quite a good parent.

## GROWER'S TIPS

### RHODOS LOVE GOOD SOIL!

Aubrey Edwards – Oakville, Ontario

Rhododendrons and azaleas will flourish and produce an abundance of blooms if care is taken in the selection of the site and in the preparation of the soil. Basically they require humid conditions, protection from drying winds and hot sun and a soil which is acidic, friable, largely organic, moist, cool and well-drained.

This short article is principally about soil but a few words must be said at the outset about the selection of the site for the plants, as this is perhaps equally as important as the soil, and can mean the difference between success and failure. They require:

- i) Some sun to encourage bud formation for part of the day. Dappled light for most of the day is ideal. Alternatively an easterly or northern aspect will be satisfactory.
- ii) Shade during the hottest part of the day in the summer and from full sun in the winter and early spring which can cause scorching or burning of the leaves.
- iii) Shelter from prevailing winds especially in the winter, which can result in desiccation of the foliage.
- iv) Avoidance of planting too close to shallow rooted trees such as maples, willows and poplars and to reflecting walls and overhanging eaves.

#### Preparation of Bed and Soil

Rhododendrons have a shallow root system with hair-like roots held in a compact clump just below the surface of the soil. Therefore a bed depth of 50 - 60 cm (18 - 24 inches) is usually more than sufficient. Good drainage is critical so locating the bed on a bank facing the north or the east is a preferred location. If the soil in the general area is friable, e.g., as with loam the drainage will normally be sufficient even if the site is flat. Where clay predominates it is recommended that the bed be established on top of the clay with an intervening layer of gravel to promote drainage. The critical objective is to prevent the plants from becoming water-logged as this will kill them. On the other hand, it is also necessary for the soil to be consistently moist and cool – a condition that promotes the well-being and health of the plant.

The soil should be friable; i.e., loose and crumbly, with a high percentage of humus. A garden loam on top soil would be a preferred medium for bedding rhododendrons. A minimum of 50% peat should be added along with other organic material such as composted oak leaves and shedded pine bark, etc. Alternatively, approximately 20% cow or sheep manure could be added in the spring, with good results.

Acidity is another important aspect of the soil. Ideally the pH of the soil should be between 4.5 and 5.5. If it is much higher the plants may not or may only sparsely bud. If the pH is below 4, the plant may suffer from acid burn.

('Goldsworth Yellow' x *R. yakushimanum*) was crossed onto ('Catalgia' x *R. wardii*), and a selected form of that was 'Moonshot', done by Gable. (*Pink*).

This is (*R. fortunei* x *R. smirnowii*) crossed with *R. yakushimanum* and then they put 'Goldsworth Yellow' on it; although I don't know why they made this cross, as it destroys my whole theory of having looked at their plants and saying that you couldn't get anything out of 'Goldsworth Yellow', but then they got this out with that peculiar parentage. (*Ivory*).

The next slide is much the same thing except it hasn't got the Yak in it; it is 'Bellevontaine' crossed with 'Goldsworth Yellow' and you can see what it did to that. (*Pinkish-lavender*). Here are several slides of ('Bellevontaine' x 'Goldsworth Yellow') and it just shows the range which they got out of that particular cross. (*Pink, white*).

The next slide is a complicated hybrid and it is *R. yakushimanum* (Mist Maiden) times (*R. smirnowii* x 'Dr. H.C. Dresselhuys') (which is 'Gabriel') crossed with 'Catalgia'. The thing that fascinates me is why they think that is such a great thing. Perhaps as it gets older it gets better. (*Pink, frilled*). The next one is 'Goldsworth Yellow' crossed with ('Catalgia' x 'Teresa') and remember ('Catalgia' x 'Teresa') has all this red blood in it. It is then crossed with [( 'Catalgia' x *R. yakushimanum*) x 'Goldsworth Yellow'] and although it has a lot of yellow and red in it you get almost a clean white.

This is a [( 'Catalgia' x *R. yakushimanum*) x 'Goldsworth Yellow'] and is probably the yellowest plant they have had. This plant has also had ('Catalgia' x 'Elizabeth') put on it.

The next one is 'Mist Maiden' crossed with X-Ray 6821 #24 and when you look at it closely you can see that it is not all that red, but it has all sorts of interesting colour in it.

They have also selected two forms of azaleas. This one is called 'Minas Gold'. I have forgotten which of the yellows they used, but they used *R. luteum* in it so it is probably heavily scented. The other one, 'Minas Flame', is a 'Gibraltar' hybrid. It might be a second generation 'Gibraltar' hybrid – I'm not sure of it. There is one other which I have put in because of its background and this is ('Red Head' x *R. yakushimanum*); 'Red Head' is ('Atrosanguineum' x *R. griersonianum*). Then it was crossed again with a Glass x 'Elizabeth' hybrid, and these might eventually prove to be something.

That is the range of material that has been bred at Kentville over the years. There is an awful lot of it that still hasn't been selected or doesn't have selection numbers on it but that has interesting parentage.



Due to the critical nature of soil acidity it is recommended that it be measured from time to time. The best time is in the spring as soon as the soil is thawed out and starts to warm up. Unfortunately there is no cheap and reliable instrument available for accomplishing this. pH paper and soil testing kits such as the one made by Sudbury, provide useful information. The very cheap pH meters available in some gardening supply stores do not appear to be reliable. The best approach is to have a soil test made by a reputable testing agency. This will be discussed in more detail later.

Southern Ontario soil is basically alkaline because of the underlying limestone. This causes the soil to have a pH in the range of 7 which, as discussed, is unsuitable for rhododendrons. To lower the pH by ½ to 1 unit it is recommended that micro-scopically wettable sulphur be applied on the surface of the soil over the area covered by the foliage of the plant at the rate of .025 kg/sq. m. (½ lb. per 100 sq. ft.) and then lightly watered to wash off any sulphur on the trunk and leaves of the plant.

Agricultural sulphur can also be used but it tends to be lumpy and doesn't disperse as readily as the micro-scopically wettable material. Ferrous Sulphate will also acidify soils and will reduce the pH by ½ to 1 unit if applied at the rate of .015 kg/sq. m. (3 lb. per 100 sq. ft.). Since it reacts quickly it does not have to be applied far in advance of planting but it has the disadvantage of draining quickly and therefore must be replaced every two or three years. After a couple of years or so sulphur appears to stabilize the acidity of the soil. Aluminum Sulphate is toxic to rhododendrons and therefore is not recommended. If the acidity is too high, i.e., has a low pH, an application of powdered limestone at the rate of about .25 kg/sq. m. (5 lb. per 100 sq. ft.) will raise the pH by about 1 unit.

The rhododendron bed should be mulched with some 8 cm. (3 inches) of pine needles to prevent evaporation and moisture loss and to permit air to reach and interact with the soil. Also the mulch will keep the soil cool even in the hottest weather, a condition in which rhododendrons appear to thrive. In hot weather, the bed should be thoroughly watered at least once a week. Incidentally, the author has not found pine needles, contrary to current opinion, to be acidic. At best they only have a very minor effect on the acidity of the soil. Mulched oak leaves are tough and do not readily break down. Also they tend to mat and prevent air from reaching the root system which is considered to be an undesirable condition and should be avoided. In damp conditions also, the compressed oak leaves appear to promote fungi. Peat is not suitable for mulching as it dries out and forms a hard crust which prevents rain and air from penetrating to the root system.

The fertilizing programme recommended by Wray Bowden<sup>2</sup> utilizes liquid fertilizers and is practical for the rhododendron enthusiasts with average sized plantings. It has consistently provided very good results and has the advantage of supplying the nutrients in reasonably controlled small dosages for producing healthy plants and excellent blooms. With granular products which are applied by hand, it is relatively easy to over-fertilize and cause distress for the plant. The Bowden programme is as follows:

1. April 15: Stern's Miracid\* (30-10-10). 1 tablespoon per one gallon of water
2. May 1: Stern's Miracid. 1 tablespoon per gallon of water

3. May 7: Epsom salts<sup>□</sup> (hydrated magnesium sulphate). 1 tablespoon per gallon of water

4. May 15: Stern's Miracid. 1 tablespoon per gallon of water
5. June 1: Stern's Miracid. 1 tablespoon per gallon of water
6. June 7: Epsom salts. 1 tablespoon per gallon of water
7. July 1: Sturdy ♦ (0-15-14). 1 tablespoon per two gallons of water
8. July 8: Epsom salts. 1 tablespoon per gallon of water
9. Aug. 1: Sturdy (0-15-14). 1 tablespoon per two gallons of water
10. Sept.: Sturdy (0-15-14). 1 tablespoon per two gallons of water

\* Plant-Acid Fertilizer by Plant Products and RX 30 by Garden Research are suitable alternatives.

♦ Peter's 10-30-20 could be used as an alternative with a concentration of 1 tablespoon per four gallons of water

□ Now not considered essential but is easily applied.

Before preparing a site for rhododendrons it is recommended that a test be made of the soil conditions in the general area selected, to determine the existing pH level and the magnesium, phosphate and potassium concentrations. This should be repeated after the bed has been established for a number of months. A soil sample of about 250 cu. cms. (15 cu. ins.) should be forwarded to an authorized testing agency<sup>1</sup> indicating the purpose for the test. The sample should be comprised of three or four sub-samples from the soil around the plant. Since the plant root system is close to the surface and is rather frail, the samples should be taken from near the surface after any mulch has been cleared away, so as to not damage the roots.

#### Soil Nutrient Levels

For those wishing to assess their soil test figures the following is a tentative guide for the range of soil nutrient concentrations considered to be suitable for gardens including rhododendrons:

Nutrient	Concentration – parts per million
Phosphate	20 - 60
Potassium	100 - 210
Magnesium	20 - 100 +

The higher values for phosphate and potassium should not be exceeded. The maximum level for magnesium is not critical as it is not toxic to most plants and because it is normally in abundance in Ontario soils. Nitrogen is difficult to measure so a figure is not provided but some should be applied each year.

#### Acidity Testing

Some preliminary tests indicate that it appears feasible to use narrow range pH paper for measuring the pH values of soils within sufficiently practical limits. For this method the soil must be moist. If the soil has been watered

or there has been a heavy rainfall, a two-day interval should be allowed before testing to permit the soil/root system to stabilize. Using a clean dry stainless steel spoon collect and mix three samples of soil from around a plant just below the surface after mulch etc. has been cleared away. Then press the soil sample against a short length of the pH paper using a clean dry plate as backing. Within a 30 second or so period the pH paper will have absorbed sufficient moisture to change colour for comparison with the colour standards provided with the paper. If it is a good test the accuracy of the result should be within about 0.3 pH. Two narrow range pH papers covering say 3.9 to 5.4 and 5.3 to 7 will be required to cover the range of interest to rhododendron enthusiasts. The paper costs about \$1.50 for a 4.6 m roll and is normally available from scientific and educational supply houses. The method discussed is not considered a replacement for a test by a recognized pH meter. The author would be glad to hear from members about their experiences using the proposed method.

#### References

- 1 The authorized testing agency in Ontario is:  
Agri-Food Laboratories  
Unit #1  
503 Imperial Road  
Guelph, Ontario  
N1H 6T9  
Phone: 519-837-1600

(Note: A test for pH, magnesium, phosphate and potassium levels costs \$ 7.00 which must be included with the sample).

- 2 Bowden, Wray M.: A Soil Fertilization and Mulch Programme for Rhododendrons and Azaleas. Rhododendron Society of Canada Bulletin, Vol. 6, No. 2 (1977)

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