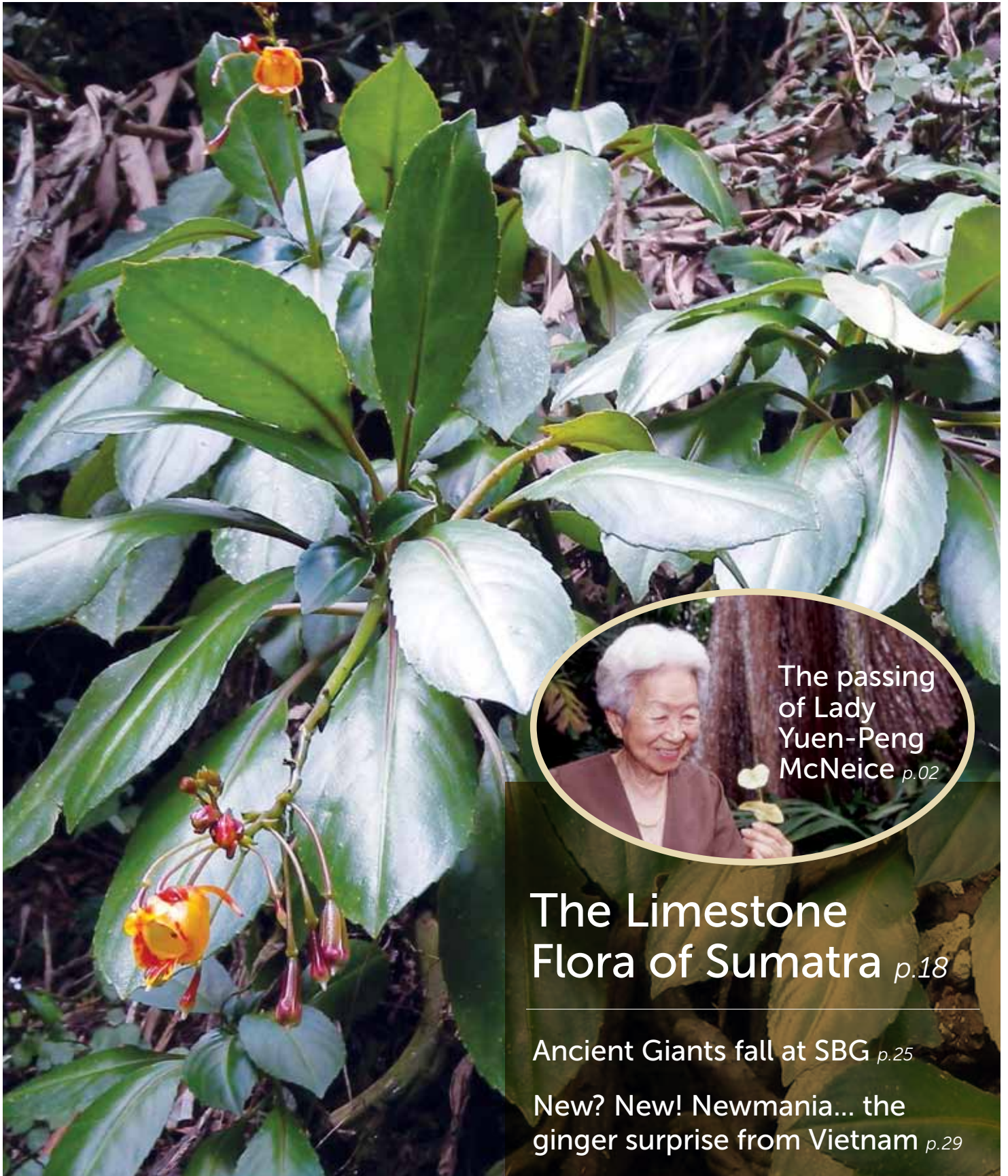


GARDENWISE



THE MAGAZINE OF THE SINGAPORE BOTANIC GARDENS VOLUME 39, JULY 2012 ISSN 0129-1688



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Photo by Mark Hughes

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► We begin this issue of *Gardenwise* on a solemn note, because it is with much sadness that we mark the passing of one of Singapore Botanic Gardens' greatest supporters, Lady Yuen-Peng McNeice. Her many contributions are detailed in the biographical note of appreciation by Nura Abdul Karim (p. 02), but for even the casual visitor to the Gardens her name and generosity can be noticed in many places, whether it be the Heritage Tree dedicated in her honour, the bromeliad collection in the National Orchid Garden or beneath the distinctive clock tower she commissioned for the Nassim Gate Visitor Centre. Less obvious to most are the benefits her personal charity gave to many individuals in the development of their careers, as well as her early service to the National Parks Board as one of its Trustees. She will be missed by many long-serving staff at SBG and NParks and it is my regret that latterly, due to her failing health, I was denied an opportunity of meeting her. Another loss to SBG's extended family is Haji Sidek Bin Kiah (1932–2012) who, like a number of current staff, was born and raised in the Gardens in those days when accommodation for workers was the norm and offspring regularly followed in their fathers' footsteps as SBG employees. So it was with Sidek, whose enthusiasm as a plant collector is recorded in these pages by Wong Khoon Meng.

On a happier note, and capping off the world record of 4.13 million visits in the year ending March 2012, in early April SBG received the exciting news of its award as "2012 Garden of the Year", made by International Garden Tourism (Canada). This entailed your Director travelling to Vancouver to receive the award and explain to the assembled representatives of other gardens "how we do it". "Doing it", so to speak, requires a great deal of effort on the part of the many horticulturists, visitor services, science and education staff SBG employs and so it would be remiss of me if I did not also draw attention to the

enthusiastic band of Volunteers that SBG has increasingly come to rely upon in recent years. Thus, in late March we enjoyed the SBG Volunteers Appreciation Tea together in the Function Room, which included competitions, presentations on our plans for 2012 and votes of thanks from senior management for the many contributions by volunteers in 2011/12.

A new initiative reported on elsewhere in this issue concerns a collaborative effort between SE Asian botanic gardens agreed upon at a meeting of directors held at Xishuangbanna Tropical Botanic Garden, Yunnan Province, China in November last year, for a programme of staff exchanges and training. SBG was proud to be the first to kick off the programme when it received the Director, Rik Gadella, and 4 staff from Pha Tad Ke botanic gardens, Laos, for 2 weeks in February. Funds given to SBG by Botanic Gardens Conservation International (BGCI) for plant conservation supported the stay of the 4 staff and will enable a reciprocal visit of an orchid specialist and scientists from SBG to Laos later this year. Such training opportunities, which include internships for any foreign horticultural and education staff, are additional to the botanical scholarships already offered by our Research & Conservation Branch, and are an important measure of SBG's contribution to capacity building and technology transfer under the terms of the UN Convention on Biological Diversity (CBD) and in support of its Global Strategy for Plant Conservation (GSPC).

At the time of writing a majority of SBG staff is preoccupied with mounting the fourth Singapore Garden Festival at Suntec Convention Centre, while in SBG itself the new Fragrant and Foliage Gardens are taking shape and should be ready by the end of the year. These new attractions will be welcome enhancements to the northern half of the Gardens and will emphasize the diversity of floral scents and showcase the colours and textures of tropical leaf form. Both

new garden features will complement the Healing Garden opened in October last and already popular with visitors for its array of flowering plants and wealth of information on their medicinal and cultural uses. Unseen by most visitors is an important change we are making to SBG's Rainforest reserve in the interests of promoting the maintenance of biodiversity: the historic Liane Road, which runs through the Rainforest, is being replaced with a raised board walk to match those seen elsewhere in this precious habitat. This improvement, to be opened before the close of the year, will allow tree roots, their fungal associates (mycorrhizae) and the innumerable tiny creatures that form part of the forest's ecology to communicate more freely across the line of the path. Although this one-time motor road and its inorganic foundations will be expunged for good, the historic route it followed will be maintained as a key piece of SBG's heritage. Liane Gate is now closed and will not be re-opened in order to reduce disturbance, especially at night, to the Rainforest's wildlife.

Another drive for 2012 is to review our management of the growing number of visitors to ensure enjoyment for all and to discourage "anti-social" behaviour on the part of albeit a very small minority. Soon, regular visitors will become aware of notices requesting Gardens users to think of others and not monopolise shelters and covered areas for picnics and other group activities, as has tended to happen in recent months. Exercise groups and trainers, of which there are many, will be reminded that the playing of music at a volume that disturbs others is not permitted and we will also be taking action against a few persistent offenders who ignore the rule that dogs must be kept on a leash at all times and away from botanical plantings. We hope our many supporters will help us in this endeavour and understand why it is necessary. As Director I am keen to receive feedback from those that read the pages of *Gardenwise* and will gladly respond to anyone who contacts me by email: – Nigel_Paul_Taylor@nparks.gov.sg

Nigel P. Taylor

THE PASSING OF LADY YUEN-PENG MCNEICE



► Lady Yuen Peng McNeice smiling joyously as she held the fruits of the *Terminalia subspatulata* that was dedicated to her. During that occasion, she was reported to have said "It's better than receiving a gold medal."

Oh heart, if one should say to you that the soul perishes like the body, answer that the flower withers, but the seed remains...

Kahlil Gibran (1883–1931)

► On 3 June 2012, the Singapore Botanic Gardens mourned the loss of her most staunch supporter and benefactor, Lady Yuen-Peng McNeice.

At the age of 94, Lady McNeice, affectionately known as 'Peng' to her closest friends, passed away peacefully at home. The wife of the late Sir Percy McNeice, Singapore's first president of the City Council, and sister of the late Loke Wan Tho, founder of Cathay Organisation, she was renowned in her own right for her work as a conservationist, environmentalist, photographer and philanthropist. She is survived by her two children and four grandchildren. Those who have known her remember her fondly as a soft spoken, elegant, unassuming, astute, independent, kind, caring and generous lady.

Born in Kuala Lumpur to Mr. Loke Yew and Mrs. Loke Cheng Kim, she was the youngest of three children. Her father, Loke Yew, was a prominent businessman who

was regarded as the richest Malaysian of his time, and her mother, Cheng Kim, was the eldest daughter of tin mine owners in Selangor. After her marriage to Sir Percy at the end of World War II, the couple made Singapore their home. Her beloved husband was to precede her in death in 1998.

So, how does one begin to put into words the countless contributions of Lady McNeice to the causes that were so dear to her heart?

Both her parents were outstanding citizens and ardent philanthropists of their time, and not surprisingly, she followed in their footsteps. Locally and abroad, Lady McNeice was a respected champion of causes for nature, environment and the arts.

As the long-serving Chairman of the Board of the Loke Cheng-Kim Foundation, she was instrumental in deciding that the

Foundation apply its scholarship beyond mainstream subjects and particularly towards the natural sciences, horticulture, environmental fields, humanities and the performing arts, areas believed to be under-represented in other scholarship awards but increasingly relevant to Singapore's modern day society. Through this foundation, she has made it possible for innumerable aspiring talents to pursue their studies. I am personally one of countless people who have benefited from her generous sponsorship. I still recall my scholarship interview, during which Lady McNeice showed to me a list of the Foundation's recipients, her eyes lighting up with pride as she recalled and shared their successes in their various fields. She also wisely expounded the importance of learning through books as well as life experiences, of utilising fully all opportunities presented, and of giving back to society selflessly.

She was a firm believer in investing in young talent. In NParks alone she sponsored over seven people to pursue their degrees overseas. And since 2001, she was also the benefactor of the Lady Yuen-Peng McNeice Gold Medal that is awarded to the top diploma student of Ngee Ann Polytechnic's Horticulture and Landscape Management course.



► The 47 m tall heritage tree, *Terminalia subspatulata* (Jelawi), that was dedicated to Lady McNeice during the inaugural Heritage Tree Awards ceremony.



► The delightful sculptures that were generously donated by Lady McNeice complement the lush greeneries of the Botanic Gardens.

“Lady McNeice’s love of nature and photography is renowned. She was a longstanding patron of the Singapore Botanic Gardens and served as a board member of the National Parks Board during its early years (1990–1993).”

Lady McNeice’s love of nature and photography is renowned. She was a longstanding patron of the Singapore Botanic Gardens and served as a board member of the National Parks Board during its early years (1990–1993). She was also an associate of the Royal Photographic Society of Great Britain and honorary patron of the Photographic Society of Singapore.

Her connection with and love for nature, as well as her strong interest in conservation, may have been born from her formative years living in Kuala Lumpur, during her family sojourns to Fraser’s Hill, and through her studies in Switzerland. She loved flowers and plants and was very knowledgeable about horticulture. She was a keen gardener, and when she was in good health did her own gardening and collected

many unusual plants, some of which she gave to the Botanic Gardens.

One of the unusual plant groups that caught her interest was the bromeliads. Impressed by their hardiness, shapes and colours, she purchased an entire collection from the Sheldance Nursery in the USA, which she donated to the Botanic Gardens in 1994. The collection still thrives and is admired by visitors to the Yuen-Peng McNeice Bromeliad House located inside the National Orchid Garden.

The Botanic Gardens remained the fortunate recipient of Lady McNeice’s generosity throughout much of her life. In addition to plant contributions, she generously donated several delightful sculptures to the Gardens. Most of these

sculptures can be viewed amongst the flora found in the National Orchid Garden, where they enhance the visitors’ experience. In 1998, to commemorate the opening of the Garden’s Visitor Centre, she commissioned a majestic 3.5 metre tall clock tower which was inspired by the sealing wax palm, the logo of the Botanic Gardens. In 2009, when the Botanic Gardens marked another illustrious milestone, Lady McNeice sponsored the publication of the Gardens’ 150th anniversary commemorative book. She had previously sponsored a book on the Gardens’ attractions in 1989.

Being a firm believer of the importance of conserving our natural heritage, in April 1992, she generously donated \$0.5 million towards the first comprehensive survey to be carried out on plant and animal life



► The entire Sheldance Nursery's bromeliad collection, purchased from the United States and gifted to the Botanic Gardens, is located at the Lady McNeice Bromeliad House.

Her tremendous service to Singapore through her work for the environment, conservation and society culminated in Lady McNeice being awarded the Pingat Bakti Masyarakat (Public Service Medal) in 2005.

in Singapore's nature reserves, undertaken by the National Parks Board. This fund was matched by the Government. The results of this survey remained a very important baseline towards further studies of our flora and fauna and in the conservation management measures that later ensued.

Her tremendous service to Singapore through her work for the environment, conservation and society culminated in Lady McNeice being awarded the Pingat Bakti Masyarakat (Public Service Medal) in 2005. In recognition of, and in gratitude for, her invaluable contributions over the years to the Gardens, and her efforts toward greening the Nation through the Garden City Fund, in 2004, the National Parks Board aptly dedicated a heritage tree, *Terminalia subspatulata*, in her honour. This imposing tree that stands grandly at the corner of Liane Road and Maranta Avenue will now serve as a fond reminder of the Gardens' most ardent benefactor who will be dearly missed. The legacies of Lady McNeice will forever be visible amongst the lush flora of the Gardens she so loved.

Nura Abdul Karim
Plant Records

All photos from SBG Library Archives

HAJI SIDEK BIN KIAH (1932–2012)



► Born 14 June 1932 while his family lived in the staff quarters of the Singapore Botanic Gardens, Sidek was the son of Kiah Bin Haji Mohammad Salleh (1902–1982), who served the Gardens as a Plant Collector with the Herbarium for nearly 38 years until 1957. (Kiah was himself a well-known botanical collector who had accompanied Malayan botanists such as Furtado, Symington, Moysey, Sinclair and Chew on fieldwork.) Although Sidek's school education terminated at Primary 3 due to the onset of World War II, he was fluent in English in addition to his native Malay, and had also learnt some Japanese.

He joined the Botanic Gardens as his first job, and then was also Plant Collector, thus following in his father's footsteps, and stayed on with the Gardens until retirement. His job, which he greatly enjoyed, was to make botanical collections for the Gardens' Herbarium (a scientific repository of preserved dried plant specimens specially organised as a reference facility for plant identification, and for assisting the inventory of the plant resources of particular areas) and assist in its curation. For this, he followed many plant-collecting trips in Malaya (now Peninsular Malaysia) and surrounding areas, including Sabah. He also actively collected the Singapore

flora. His contemporaries that are still in the service of the Herbarium include Samsuri Bin Ahmad and Mohd Noor Bin Jumaat. Sidek's collections spanned his service with the Herbarium and after his retirement from the Gardens, and were mostly made under the numbering of his co-collectors, numbering more than 1700. His family recalls that he was especially proud of being involved in plant identification, having to learn unusual plant characters and botanical plant names. He was an active person generally and the family recalls him having cycled to work and elsewhere in his youth.

Sidek married Bedah Binte Abdul Rahman, from a family in Johor, Malaysia, on 13 January 1963. They have a daughter and three grandchildren. He and his wife performed the haj in 1989. Following retirement from the Botanic Gardens at 55, Haji Sidek joined the Centre for Natural Product Research, Institute of Molecular and Cell Biology (under the Agency for Science, Technology and Research in Singapore) on 1 June 1994 as a Laboratory Technologist, with responsibilities for plant collection and specimen identification. He transferred to MerLion Pharmaceuticals Pte Ltd in May 2002 and retired a year later. During this period, he continued

"His family recalls that he was especially proud of being involved in plant identification, having to learn unusual plant characters and botanical plant names."

his interest in plants, often in contact with Eugene Tang, with whom he had developed an aptitude for learning about plant biochemical properties and their usefulness.

After his career, Haji Sidek enjoyed gardening. Much later in retirement, he joined the *Anjung Budiman*, a Senior Citizens' organisation at Clementi Community Club, and in 2007 (at 75), he helped organise a Flora and Fauna Fantasy activity (outdoor experiential learning) at the Botanic Gardens to reach out to a group of "at-risk" youths, who were amazed with his expertise and vast knowledge of plants and seeds at the Botanic Gardens. The organisers decided to make this a regular activity with Haji Sidek as their volunteer consultant. He was often about accompanied by his granddaughter Khairunisa Bte Jailani (born 1993), with whom he last visited the Singapore Herbarium at the present Botany Centre on 5 July 2010. Later he was diagnosed with a condition related to a blood clot that required an operation in 2012. But just some seven months following the onset of the condition, he passed away on 30 March 2012, at the age of 80. Haji Sidek's many friends and associates remember him as a botanically inclined person, friendly and dedicated, who never shed his pride in having come into his career with plants and a life-long appreciation for the role of the Botanic Gardens, Singapore.

K.M. Wong
Herbarium

UNCOVERING THE HISTORY OF THE BANDSTAND...



► Photograph from the Library's archives labelled as "The Bandstand Hill, Singapore Botanic Gardens around 1877".



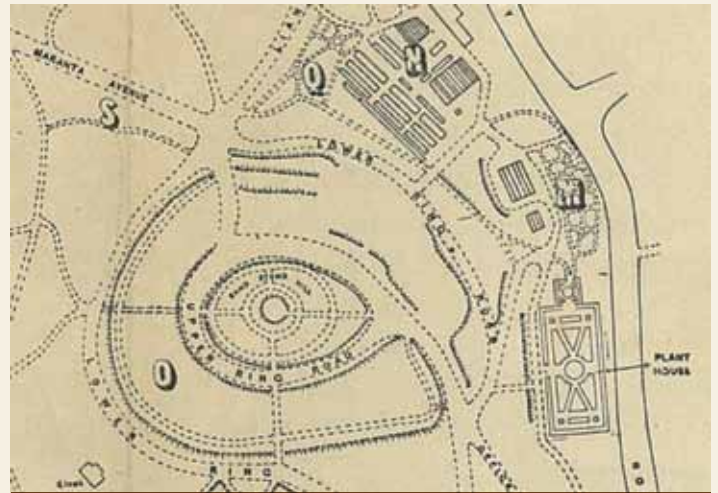
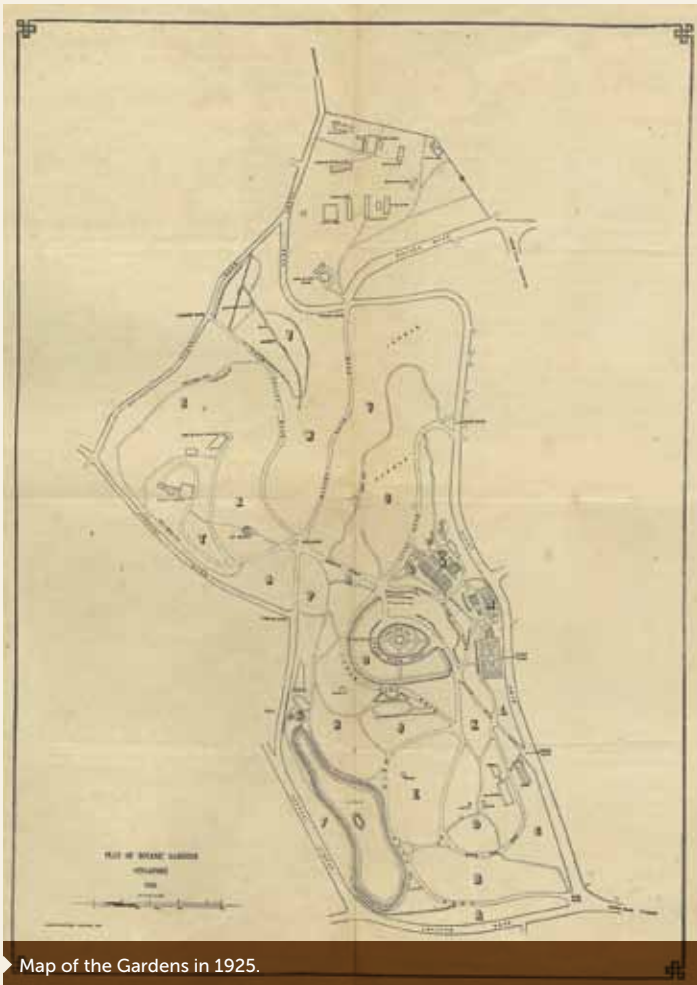
► The Bandstand today surrounded by a row of Yellow Raintree.

► The octagonal white pavilion that is known today as "the Bandstand" is undoubtedly one of the most iconic and well-loved features of the Singapore Botanic Gardens. It is also commonly thought to be one of our oldest structures, dating back to the Gardens' early years. But how much of this belief is founded in fact?

Luckily, SBG's history has been very well documented through a series of detailed annual reports. The earliest report in our archival collection was written in 1866 by Lawrence Niven, the first Superintendent of the Gardens who is also lauded as the man who designed much of Tanglin Core. While our records on the Gardens' initial years under the Agri-Horticultural Society (the group which started the SBG at its Tanglin site) are patchy, our records from 1875, the year the British colonial government took over, are wonderfully comprehensive. With the exception of the war years (1941–1947), we have all of the annual reports that the Directors diligently wrote until the 1970s, when the Gardens was amalgamated with the Public Works Department. These reports chart the Gardens' development and work in extraordinary detail, and together with old photographs and maps, are invaluable assets in our archives.

What our records confirm is that the bandstand area was indeed a key feature in Lawrence Niven's original design of the Gardens. It was a place for military bands to perform and these evening performances were very popular with the crowds.

"These reports chart the Gardens' development and work in extraordinary detail, and together with old photographs and maps, are invaluable assets in our archives."



Close-up of the Bandstand hill area from the 1925 map of the Gardens. At the centre is a circular area that is demarcated by the symbols for slope.

However, upon closer inspection of the records, there appears to be a glaring absence of any mention of a wooden structure in the centre of the bandstand. This seems odd, as the Directors were continually reporting on the need to repair and replace all the other wooden structures in the Gardens, such as the offices and the Plant House. Further evidence to suggest that there was no wooden structure at the bandstand comes from an early photograph, recorded as "the bandstand in the 1870s", which documents the lack of this feature. The structure is also missing from the 1925 map of the Gardens. Interestingly, these two documents reinforce the idea that the earliest bandstand was merely a raised area in the centre of a series of circular terraced lawns.

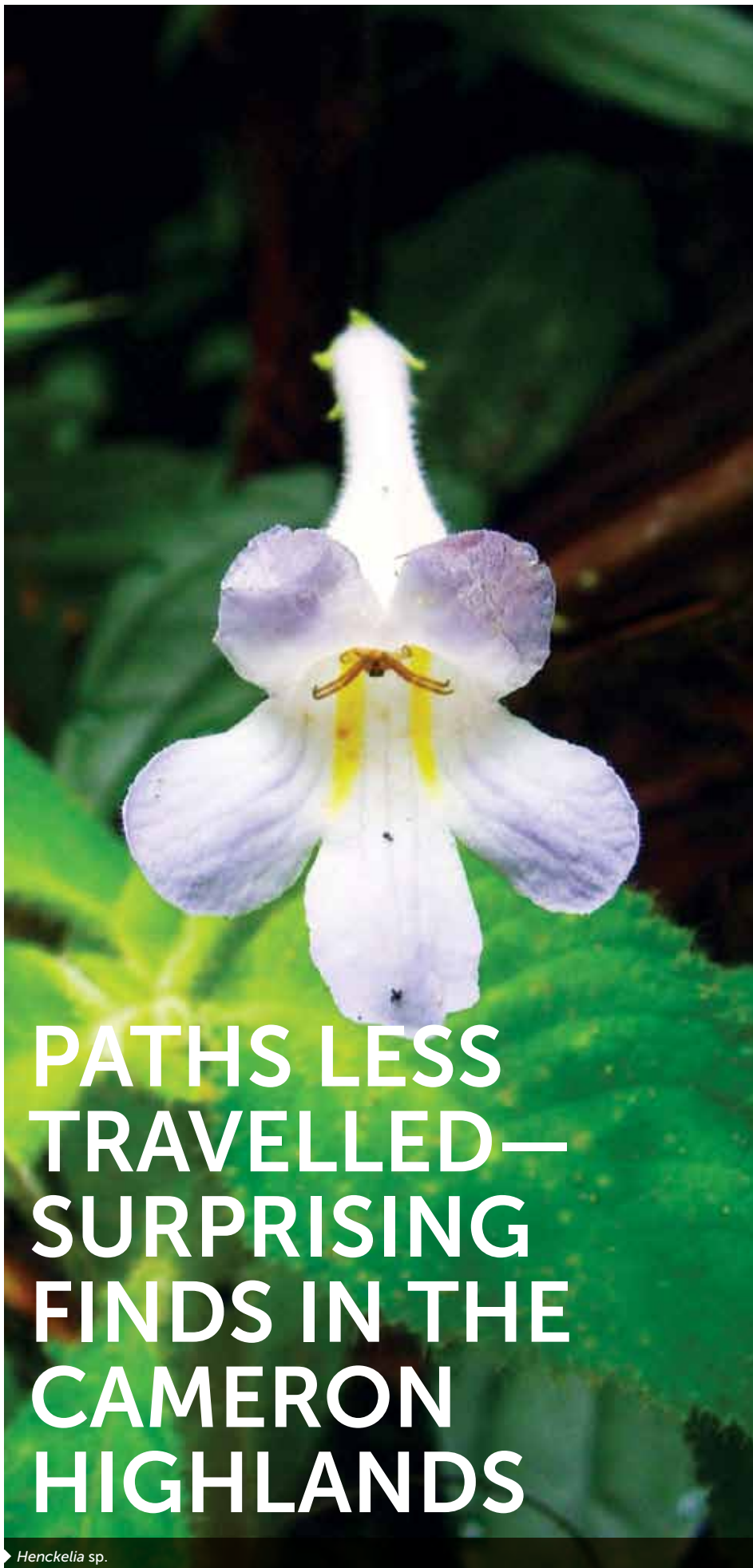
The first mention of any wooden structure at the bandstand was in the 1930 annual report. Here it mentioned that a new bandstand was erected toward the end of the year by the Public Works Department. Subsequent records mention the need for repairs of this feature alongside the other wooden structures in the Gardens.

So is the Bandstand really as old as the Gardens? Well, that depends on how you look at it.

Thereis Choo

Education, Development & Administration Support

The structure is also missing from the 1925 map of the Gardens. Interestingly, these two documents reinforce the idea that the earliest bandstand was merely a raised area in the centre of a series of circular terraced lawns.



► Situated on the Banjaran Titiwangsa (or Main Range), Cameron Highlands is the oldest hill station in Malaysia. A popular tourist destination, it is easy to associate the highlands with sprawling tea plantations, vegetable farms and cut flower exports. However, despite the recent rapid development and deforestation to make way for agriculture and tourist facilities, the hill station remains an important biodiversity hotspot, housing many endemic plant species and a number of globally threatened mammals.

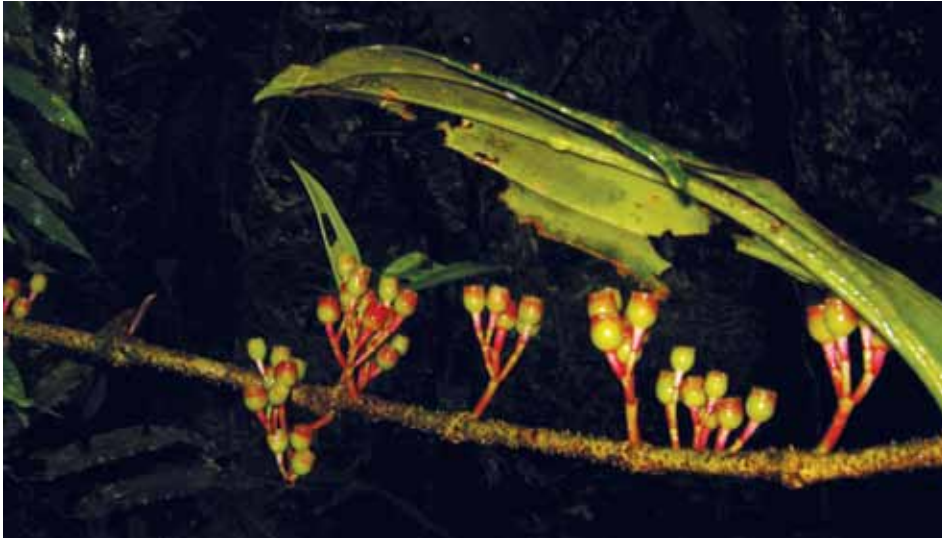
During a short getaway last December, we chose to explore the paths less travelled, opting for service tracks and trails that veered away from the main paths. That did the trick, and we were rewarded by some rather surprising finds amidst the more locally abundant herbaceous genera, such as Phyllagathis, Globba and Henckelia.

Situated on a natural plateau, the hill station is surrounded by several mountain peaks, namely Gunung Perdah (1,576 m), Gunung Jasar (1,696 m), Gunung Beremban (1,841 m), and Gunung Brinchang (2,032 m). For nature lovers and students of botany, there is perhaps no better place than Cameron Highlands to get acquainted with, and excited about, the montane flora of Peninsular Malaysia, as the trails that lead to many interesting discoveries are just a stone's throw away from the nearest lodge.

During a short getaway last December, we chose to explore the paths less travelled, opting for service tracks and trails that veered away from the main paths. That did the trick, and we were rewarded by some rather surprising finds amidst the more locally abundant herbaceous genera, such as *Phyllagathis*, *Globba* and *Henckelia*.

PATHS LESS TRAVELLED—SURPRISING FINDS IN THE CAMERON HIGHLANDS

► *Henckelia* sp.



► *Phyllagathis* sp.



► A small colony of *Balanophora papuana* just about to emerge from the steep earth bank.



► *Arisaema* sp. inflorescences.



► The male inflorescence of this parasite bore a superficial resemblance to *Balanophora fungosa*.

Given the sheer size of the tuber and the colour of the inflorescence, which the nursery helper described as *bunga putih* (or white-flowered), we knew it had to be *Amorphophallus prainii*. If the account of the nursery stall owner was true, it will be a surprising find as *A. prainii* is thought to be a lowland species.



▶ *Arisaema filiforme*.



▶ *Aeschynanthus rhododendron* individual flower.



▶ *Aeschynanthus rhododendron*.



▶ *Arisaema* sp. fruits.

Root parasites galore

While exploring one of the service tracks, we chanced upon a colony of a root parasite, *Balanophora papuana*. In the peninsula, this species, which flowers throughout the year, is usually found in montane forests between 1,000–2,000 m, and has been recorded from various montane localities in Malaysia. Elsewhere, this species can be found in Borneo, the Philippines, Sulawesi and New Guinea. A few days later, when we were scouring the undergrowth in the mossy forest for terrestrial helmet orchids (*Corybas* spp.), we were rewarded with the sight of a huge colony of a *Balanophora* species that superficially resembled *B. fungosa*. The size of the clump was truly a sight to behold, and it helped to soothe the disappointment of not having been able to photograph the tiny helmet orchids.

Aroid-ers paradise

One of the 'must-do' things we checked off was to photograph the curious inflorescences of *Amorphophallus* and *Arisaema* species in Cameron Highlands. At a local nursery stall, we came across a huge *Amorphophallus* tuber that weighed almost 4 kg and was supposedly harvested by the locals from the montane forest at about 1,500 m. Although other *Amorphophallus* species have been recorded from the highlands, none of them are thought to be more than 1.5 m tall. Given the sheer size of the tuber and the colour of the inflorescence, which the nursery helper described as *bunga putih* (or white-flowered), we knew it had to be *Amorphophallus prainii*. If the account of the nursery stall owner was true, it will be a surprising find as *A. prainii* is thought to be a lowland species. Once we got over

the excitement of our 'humongous' find, smaller and more exquisite species greeted us in the forest understorey as we trekked along the streams to find cobra lilies (*Arisaema* spp.) that were flowering and fruiting.

Cold feet, hot lips and unexpected finds

While we did prepare for the cool weather, we found out the hard way that we also had to prepare to avoid getting cold feet. We had completely forgotten that during the rainy season, the usually dry and "springy" peat substrate in the upper montane forests can become a watery peat bed! Cold feet were the order of the day as we were either too engrossed in looking out for epiphytes amongst the moss covered branches, or attempting to hop from root to root to avoid sinking into the almost knee-deep pools of peat that we encountered in



▶ *Crawfurdia trinervis*.



▶ *Crawfurdia trinervis* fruit, long sectioned.



▶ *Begonia lowiana*.



▶ *Crawfurdia trinervis* flowers.



▶ *Didymocarpus sulphureus*.

Some of the highlights include *Begonia lowiana* (Hugh Low's begonia) with densely hairy leaves, *Didymocarpus sulphureus*, aptly named for the bright yellow flowers that swayed with the breeze, and *Crawfurdia trinervis*, a small understorey climber with fruits that are almost indigo in colour.



► Waxy blooms of *Agapetes scortechinii*, an Ericaceaceous shrub found in upper montane forest.



► *Duliticola* sp., also known as "trilobite larva".



► *Impatiens oncidioides*, also known as yellow mountain balsam.



► *Nepenthes macfarlanei*.



► Where blooms were absent in the gloomy undergrowth of the forest, the vibrant colours of the Malay red harlequin, *Paralaxita damajanti damajanti* made up for it.

some areas. But it was all worth it when we caught a glimpse of some of the loveliest montane species in the area. Some of the highlights include *Begonia lowiana* (Hugh Low's *begonia*) with densely hairy leaves, *Didymocarpus sulphureus*, aptly named for the bright yellow flowers that swayed with the breeze, and *Crawfordia trinervis*, a small understory climber with fruits that are almost indigo in colour. As we trudged through some of the more overgrown parts of the mossy forests, we found the fallen blooms of an *Aeschynanthus* species with flowers that were 10–12 cm in length—we nicknamed this large sprawling climber species "hot lips" as we were totally bowled over by the size of its fiery red flowers. It seemed to be floriferous too, bearing up to 5–6 flowers on a single branch.

While we were still stubbornly searching the undergrowth for our photographic quarry, the *Corybas*, we found a millipede-like creature that was about 4 cm in length. A closer look revealed that it was a female of a species of net-winged beetle, *Duliticola*, which is commonly referred to as "Trilobite larva" as it bears a superficial resemblance to the prehistoric sea creatures. The males look like ordinary beetles, but females do not complete their entire metamorphosis; they remain larva-like, although they are able to reproduce. Little else is known about the ecology of these shy and uncommon creatures, apart from the fact that the neotenous females live in rotting wood, where it is believed that they feed on the microorganisms present there. But our surprise did not end there. While we prepared for our departure, we found a beautiful specimen from the ginger family with dark purplish-red capsules. On close examination, we realized that we had stumbled upon what appeared to be *Geostachys megaphylla*, which is known only from the type locality, which happened to be exactly where we stood! It was indeed an incredible moment for both of us, to say the least, and a fantastic way to wrap up our short but exciting and memorable trip to one of our favourite mountains!

Keith Lin

Horticulture, Exhibitions & Events

Lily Chen

*Horticulture & Community
Gardening Division*

PLANT (AND ANIMAL) HUNTING AT A WATERSHED AREA IN EAST KALIMANTAN

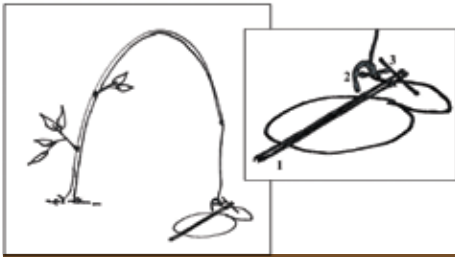


► Bulbul's nest.

► In the heart of a vast plantation landscape in East Kalimantan, pockets of forests are still holding out, and within those, a remarkable array of species exists both in flora and fauna. We had the opportunity to botanise some of this forested area in August 2011, when the oil-palm company PT. Kutai Mitra Sejahtera (PT. KMS) invited us to provide a botanical inventory of its forests for the purpose of delineating permanent conservation reserves within its property boundaries. Amongst these forested habitats, we surveyed a watershed area dissected by many streams. We were told that several months earlier, most of the area was flooded with water drained from the Senyur River. Likely the result of widespread land clearing and a persistent drought, the undulating terrain was generally dry except for its small valleys, the floors of which had been transformed into squishy mud. Gingers thrive in such habitats, and we encountered five species, two of which, *Hornstedtia minor* and *Etlingera inundata*, we had not previously found within the boundaries of PT. KMS property.

*Gingers thrive in such habitats, and we encountered five species, two of which, *Hornstedtia minor* and *Etlingera inundata*, we had not previously found within the boundaries of PT. KMS property.*

The watershed vegetation of the upper Senyur River is mostly disturbed, with small remnants of former, older forests that are characterised by the presence of *Eusideroxylon zwageri* (Lauraceae) and *Dryobalanops* spp. (Dipterocarpaceae). At one point, we chanced upon the remains of a fallen giant, a *Dryobalanops aromatica* tree with a trunk diameter of more than a metre. It had been "devoured" by human machinery; its trunk was accompanied by piles of sawdust and neat stacks of freshly sawn planks. This grand old tree, known locally as Kapur, and in English as the Borneo Camphor, is highly sought after for its high quality hardwood. For centuries, this tree has been harvested by the local people of East Kalimantan for the construction of houses and jetties, as well as for finer work such as *parang* (machete) scabbards.

Local hunter's *modus operandi*.

Five species of fig trees were scattered through the habitat, some were "stranglers", while others had less gruesome, free-living lifestyles. Amongst the latter group was a magnificent species festooned with cauliflorous (growing directly on the trunk) collections of fig fruits, more than 50 figs per bunch on average, with individual figs measuring about two cm in diameter. As we were collecting specimens from the tree, a bizarre creature scuttled out and leapt to the ground. We staggered backwards, fearing that it might be one of the huge local (and very venomous!) centipedes. On closer examination, we were greatly relieved to find that it was a harmless polydesmid millipede that was not only inoffensive, but also typically blind. Its wing-like "armoured" projections give the species an almost military appearance that also allows it to blend cryptically into the trunk of the tree that it makes its home.

One palm regularly encountered in this forest is *Borassodendron borneense*, or as it is known locally, the *bendang*. Like many palms, the endosperm of the immature fruit is commonly eaten (similar to the "meat" of the coconut), and it also has an edible "heart" (the unfurled apical shoot, or spear). The hardened endosperm could also be used for vegetable "ivory". This species provides food for orang-utans that depend on the heart as emergency nutrition during times of drought or other lean seasons. We found and examined other palms, including *Licuala* and *Livistonia*, and also rattans, one of which, *Korthalsia rigida*, was fruiting at the time of our expedition. Other species that we encountered in our survey included trees in the genera *Saurauia* (Actinidiaceae), *Diospyros* (Ebenaceae), *Baccaurea* (Euphorbiaceae), *Sterculia* and *Pterospermum* (Malvaceae). The under surface of the leaves of the *Pterospermum* species that we encountered is a radiant golden brown, and certainly gives it horticultural potential. Beautiful shrubs and small trees that we found included two members of the Rubiaceae, a *Psychotria* with white flowers, and a *Urophyllum* with pale green flowers. A *Glochidion* species (Phyllanthaceae) also advertised itself to us



The 'fearsome' invertebrate.

with a striking array of pendant, pinkish-purple, furry fruits.

As we were collecting specimens from the tree, a bizarre creature scuttled out and leapt to the ground. We staggered backwards, fearing that it might be one of the huge local (and very venomous!) centipedes.

One particularly swampy site that we explored was dominated by a great variety of herbaceous plants and shrubs, including *Selaginella* sp. (a spikemoss), *Eulophia spectabilis* (a terrestrial orchid), and the clumpy shrub *Chloranthus*. A nearby deep valley was ubiquitously covered with *Phrynium laxum* of the family Maranthaceae. The forests of the site were festooned with climbers and lianas, including *Spatholobus* (Leguminosae), *Connarus* (Connaraceae), *Embelia* (Myrsinaceae), *Maesa* (Maesaceae) and a *Tetrastigma* vine (Vitaceae), which in related submontane species could be the host for the famous giant *Rafflesia* flower. We collected specimens from five species in each of the Zingiberaceae (gingers), Moraceae (figs) and Myrsinaceae families,



Antler marking of the Sambar deer.

A hollow-out tree stump, made by a sun bear (*Ursus malayanus*) while extracting its bounty of honey.

totalling 112 specimens in all. A set of plant specimens that we collected has been deposited in the Singapore Herbarium.

Several tree trunks that we passed during the survey were engraved with odd patterns of scars. Our local field crew told us these were made by male Sambar deer (*Rusa unicorn*) during the mating season. The scars are produced when a male (buck) uses its antlers to strip the bark off of small diameter trees, marking its territory and polishing its antlers. In fact, we actually chanced upon a group of local hunters who asked if we had seen a deer run in our direction. Though the animals remained unseen by us, we often noticed deer sign and observed their trails that crisscrossed the area.



▶ 01



▶ 02



▶ 03



▶ 04

01. *Glochidion* species with furry pinkish-purple fruits. 02. *Dryobalanops aromatica*, or *Kapur* tree, felled for timber. 03. *Psychotria* species, a small tree with a bunch of tubular white flowers. 04. Our would-be hero Daud Lenjau. 05. Tunnel passage of the thick-spined porcupine (*Hystrix crassispinis*). 06. Sun bear scat with seeds that it had consumed.



▶ 05



▶ 06



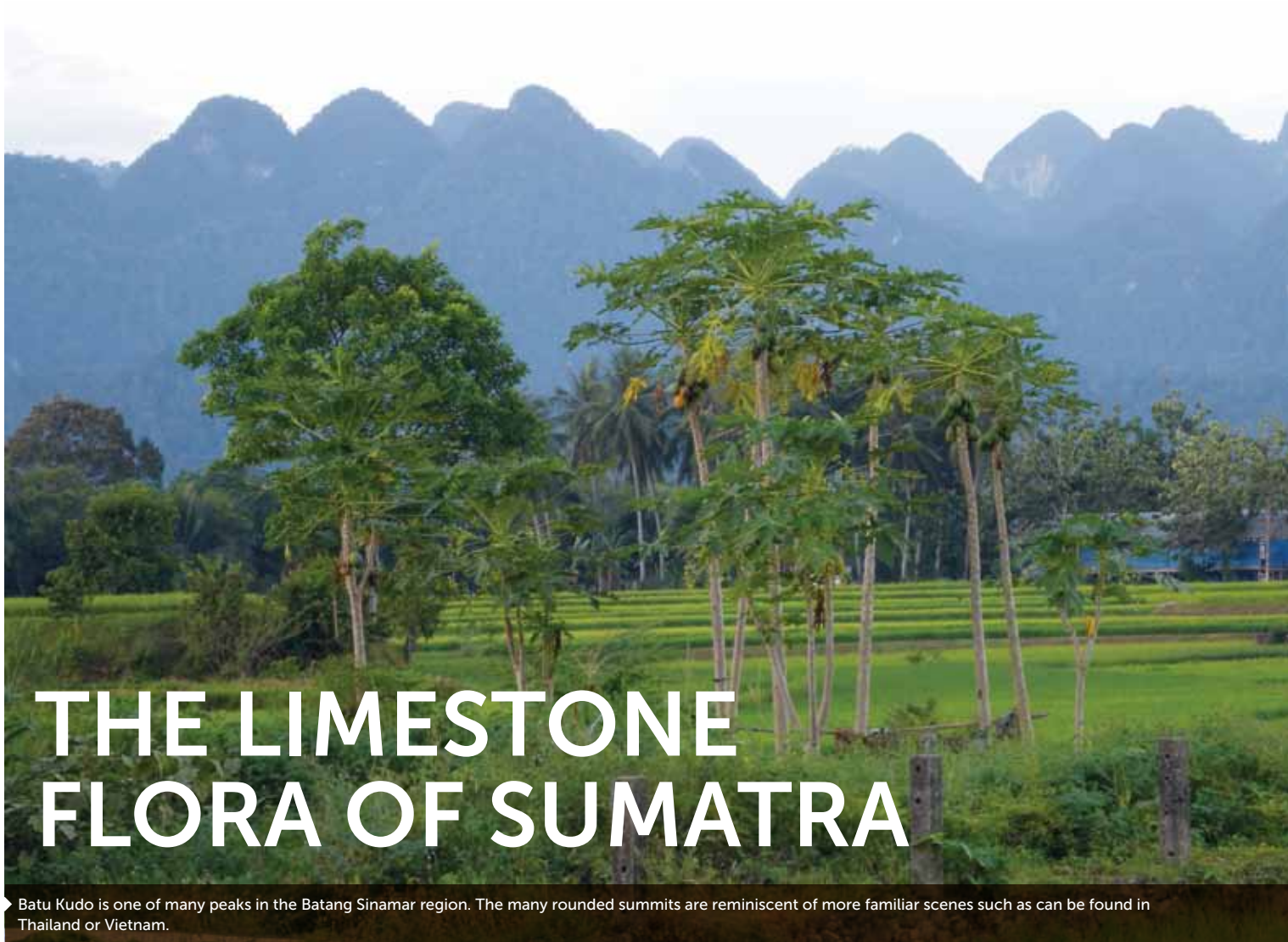
The fan palm, *Borassodendron borneense*. Note the white hardened endosperm of the seed which could be made into vegetable ivory carvings.



Ficus tree with huge bunches of cauliflorous figs.

At one time during our expedition, the benign calmness of the forest belied the presence of perhaps its most dangerous species, *Homo sapiens*, as our guide cum expert tree climber, Daud, pointed out to us (just in time) a snare trap disguised as an innocuous set of branches on the ground. He then provided a demonstration of how the trap would work if triggered. If stepped on, a stiff branch would suddenly whip up with sufficient force that it could easily put out an eye (oh, the perils of plant collection!). The trap was a simple "home-made" contraption (see accompanying diagram), with a small noose attached to the end of a supple, green sapling or branch bent over the ground. A twig (1) spreads the loop of the noose, which is held in place by a T-shaped twig (3), which is in turn held in place by a small hooked stick that is embedded into the ground (2). When a bird or other animal steps onto this unstable "platform" (1), (3) falls away and the bent sapling snaps erect, tightening the loop in the process, and leaving the hapless creature hanging upside-down by one (or two) leg(s). We found two trapped birds, one of which had fallen prey to a non-human predator (rather than ending up in a local person's cooking pot). The other bird, a lovely common Emerald Dove, we were able to save and release. All in a day's work!

Serena Lee
Paul K.F. Leong
Herbarium



THE LIMESTONE FLORA OF SUMATRA

▶ Batu Kudo is one of many peaks in the Batang Sinamar region. The many rounded summits are reminiscent of more familiar scenes such as can be found in Thailand or Vietnam.



▶ The soft character of limestone means it can be rapidly eroded, sometimes forming spectacular caves such as this one near Solok Ambah, West Sumatra.



▶ Limestone outcrops, shown here in red, are very scattered in Sumatra. Their archipelago-like distribution is no doubt important in permitting the evolution of many narrowly endemic plants on limestone.

Once a species becomes a limestone specialist and loses the ability to thrive on other types of base rock, the distribution of its populations becomes more restricted.



▶ A new species of *Begonia* discovered growing in cave entrances in Bukit Karang Putih a few kilometres away from Padang city.



▶ A striking new species of *Begonia* with very succulent leaves, found on the sheer limestone cliffs of Gunung Batu Kudo.



▶ A new species of *Begonia* found clinging to meagre and dusty soil on limestone rocks in Simolap, North Sumatra. This belongs in section *Reichenheimea*, and is allied to other species from Sumatra (such as *B. droopiae*) and from Peninsular Malaysia (such as *B. nurii* and *B. rajah*).

▶ Sumatra is one of the largest islands making up the archipelago nation of Indonesia. The combination of its equatorial position and mountainous backbone means it is home to some of the richest forests in Southeast Asia. Although much of its lowland forests have now been cleared (with the exception of the majestic Gunung Leuser National Park), its montane forests are in much better shape, and are ripe for botanical exploration. These forests are situated along the Barisan range of mountains which runs just behind the western coast of Sumatra. The mountains are the result of recent and rapid uplift caused by the subduction of the Indo-Australian tectonic plate, and their geological youth and activity are demonstrated by the 35 active volcanoes scattered throughout the range. The geological activity has also exposed many small blocks of limestone, which have an archipelago-like distribution within Sumatra. These limestone hills are incredibly rich in endemic plants and animals, and have been very accurately termed 'imperiled arks of biodiversity' due to their overexploitation by humans (Clements et al. 2006, *Bioscience* 56: 733–742). The reasons why we find such high numbers of endemics on limestone hills are not yet fully understood, but the fragmented nature of the habitat is likely to be one contributing factor. Once a species becomes a limestone specialist and loses the ability to thrive on other types of base rock, the distribution of its populations becomes more restricted. As seed and pollen dispersal is limited between isolated populations, there is a decrease in the influx of genes from populations that occur under slightly different conditions; as a result, individuals

adapt very tightly to highly localised conditions. Limestone hills also offer a variety of different niches, ranging from deeply shaded and sheltered to fully exposed and dry, as the rocks often become very dissected due to their highly erodible nature.

During the summer of 2011, the Royal Botanic Garden Edinburgh, Herbarium Bogoriense, and Kebun Raya Bogor carried out a joint six-week-long expedition to explore a number of limestone outcrops in Sumatra, with the expert support of colleagues from the University of Andalas in Padang. The main purpose of the expedition was to document and collect plants of special research interest for the participants, namely members of the Begoniaceae, Gesneriaceae and Zingiberaceae; collections of these and other families will be used to help in understanding the origins of the remarkable limestone flora of Sumatra.

The expedition began in Padang, initially exploring Bukit Karang Putih, an area located a few miles northeast of the city. This is a large expanse of limestone with sizeable hills, a large river, and several small caves. It is also home to the oldest cement plant in Indonesia, and much of the limestone hills are currently being quarried; this is the fate of many such areas throughout Southeast Asia, and is the main reason why limestone plants are of high conservation concern. At the mouth of a cave, we found our first new species of the trip, a *Begonia* with peltate leaves with a purplish centre. While the *Begonia* formed a dense colony of



The bright colours of this *Etilingera* inflorescence show up well even in the dim light of the forest understory. This is an as-yet unidentified and potentially new taxon from near Sijunjung.



This beautiful succulent *Impatiens* was found on a vertical rock face in a sheltered spot near Sijunjung. This is a potentially new taxon, and is currently being researched by botanists at Herbarium Bogoriense.



The pale lilac flowers of *Paraboea leuserensis*, an endemic to the Leuser region as its name suggests.



The steep sides of the impressive Gunung Batu Kudo.



► The team at the end of the expedition to Simolap in Gunung Leuser National Park, photographed in front of a hot spring. From left to right: Four guides from Simolap village, Wisnu Ardi Handoyo, Carmen Puglisi, Mark Hughes and Ricky 'Bangkey' Igi.



► Limestone habitats are free-draining and can periodically become very dry. This plant of *Paraboaea leuserensis* has rolled up its leaves in response to water stress.



► Caves and sheltered crevices are important habitats in limestone areas; here, Wisnu is collecting a new species of *Begonia* near Simolap, North Sumatra.

perhaps 50-100 individuals within the cave, none were found outside, likely due to higher sun exposure and greater competition from other plants.

During our tour of what seemed like the entirety of the road network of West Sumatra, we stopped our vehicle to scramble up anything that looked like limestone. At one such locale, a cliff formed the biodiverse backdrop of a building site where a hotel will soon stand; one wonders if the new residents will notice they are looking out on a new species of *Begonia* we found there, with its tiny leaves pressed against the rocks.

*We did, however, find a striking *Impatiens* with globose orange flowers, and a brightly coloured *Etilingera*; upon consulting experts in these groups, it seems they are both likely to be new species, and are now the subjects of further research.*

Some of the most impressive outcrops of the expedition were seen near the Batang Sinamar River, such as those found along the steep sides of Gunung Batu Kudo. At the shaded base of this otherwise hot and dry peak, we found yet another new species of *Begonia*, with thick and succulent peltate leaves. Not far away are the peaks of the Sijunjung Regency, some of which we explored near the village of Solok Ambah. There, we managed to find two *Begonia* that actually had names, even though both have only been described in the past couple of years: *Begonia puspitae* and *B. droopiae*. We did, however, find a striking *Impatiens* with globose orange flowers, and a brightly coloured *Etilingera*; upon consulting experts in these groups, it seems they are both likely to be new species, and are now the subjects of further research.

The final leg of the expedition took us to Simolap, in the southern end of Gunung Leuser National Park, where low- to mid-altitude forest still exists extensively. We followed our guides through the reserve's many shady trails, some of which cut through the caves in the area. Here we found *Paraboaea leuserensis*, which is endemic to the reserve. All *Paraboaea* species that occur in Sumatra and the rest of the Malesian region are restricted to limestone, and most are able to cope with the drier and more exposed areas near the summits or bare faces of karst limestone. They have a distinctive felty mat of hairs on the undersides of their leaves, which may help to reduce water loss during dry periods. In the shadier, damper areas we found several new *Begonia* species, including one with rounded, dark leaves that are somewhat reminiscent of the related *Begonia rajah* from Peninsular Malaysia.

The remarkable number of new species found during this expedition reflects both the very high plant diversity of the karst limestone habitat in Sumatra, and our lack of knowledge about the island's unique limestone flora. The collections we made will go a small way in addressing this gap. Much work is to be done before we can fully understand the botanical treasures of Indonesia, knowledge which will be needed by the country if it is to balance conservation against development.

Mark Hughes

Royal Botanic Garden Edinburgh, UK/
SBG Research Associate

Deden Girmansyah

Herbarium Bogoriense, Indonesia

Wisnu Ardi Handoyo

Kebun Raya Bogor, Indonesia

Carmen Puglisi

Royal Botanic Garden Edinburgh, UK

A BLOOM FOR THE SINGAPORE BOTANIC GARDENS

► In the spirit of highlighting the world's vibrant garden experiences and the potential of garden tourism, the Canadian Garden Tourism Council started the Gardens Tourism Awards in 2011. These awards are presented to organisations and individuals worldwide who have distinguished themselves in the development and promotion of the garden experience as a tourism attraction or product. Gardens that have previously won awards in the various categories include Butchart Gardens (British Columbia, Canada) and the RHS Garden Wisley (UK).

This year, we were delighted to learn that the Singapore Botanic Gardens clinched the 2012 "Garden of the Year" award, the first of its kind under the International Garden Tourism Award category! To top it off, the award comes after a year when our annual visitorship tipped the 4 million mark, something definitely worth celebrating!

Joanna Lim

Visitor Management



These awards are presented to organisations and individuals worldwide who have distinguished themselves in the development and promotion of the garden experience as a tourism attraction or product.

THE ELEPHANT PARADE

► After the incredible success of previous "Elephant Parades" organised in other parts of the world, a herd of over 100 brightly-painted life-sized elephants made their way to Asia for the first time and recently found themselves here in Singapore.

From 11 November 2011, locals and tourists alike were wowed by an army of baby art elephants that had taken to the streets of Singapore. This colourful outdoor exhibition then moved into the Bukit Timah Core of the Singapore Botanic Gardens on 8 January 2012, before being auctioned for charity. Although the elephants were only with us for four days, visitors from all walks of life flocked to the Gardens to enjoy and take photos of the 162 baby art elephants that had been hand-painted by celebrities and artists. *The Calligraphic Elephant* by Mr S.R. Nathan and *The Naughty and the Elephant* by Carrie Chau were two of the many outstanding works of art on display.

About the Elephant Parade

Elephant Parade is a charity that raises funds for various projects and organizations dedicated to the conservation of the Asian elephant. To date, this unique concept has contributed over 4 million Euros toward this goal. These funds have been used for projects varying from establishing elephant hospitals and corridors (stretches of land that connect elephant habitats), to lobbying governments and research. Singapore is the first Asian city to host the "Elephant Parade", and a total of S\$1,781,000 was raised from the elephants that were put up for sale. From these proceeds, more than S\$445,000 will go to the Asian Elephant Foundation and the Wildlife Reserves Singapore Conservation Fund.

Joanna Lim
Visitor Management



► Some of the sculptures on display.



► *The Calligraphic Elephant* by Mr S.R. Nathan (left) and *The Naughty and the Elephant* by Carrie Chau (right) were just two of many outstanding works of art.

SINGAPORE BOTANIC GARDENS VOLUNTEERS APPRECIATION TEA 2012



▶ Dr Leong Chee Chiew (DCEO NParks) kicked-off the event by thanking the volunteers.

▶ This year marks the 10th anniversary of the Singapore Botanic Gardens (SBG) Volunteer Programme. Since 2002, this programme has attracted over 140 volunteers who have donated over 2,000 hours of their time per year since its inception. These dedicated volunteers contribute in many different ways, such as giving guided tours on weekends, exercising their green fingers in the nursery, helping out with managing the Gardens' plant records and with our education outreach.

In recognition of their support and commitment, the volunteers were invited to the SBG Annual Volunteers Appreciation Tea on 31 March for a morning of fun and quality time together. After the welcome address by Dr Leong Chee Chiew (Deputy CEO of NParks), the volunteers were given an update by SBG's Director, Dr Nigel Taylor, on upcoming developments at SBG. The volunteers were also treated to a sneak preview of the Singapore Garden Festival 2012 and an informative talk on fruit trees.

One highlight of the event was the "Fruity Pursuit" trivia game involving interesting facts about some tropical fruits. Six lucky winners walked away with fruit baskets filled with an assortment of 'fruity-licious' tropical fruits!

Joanna Lim
Visitor Management



▶ The fruit table and beautiful decoration in the Function Room was possible thanks to the efforts of SBG's Horticulture, Exhibitions and Events teams.



▶ Mr Keith Hillier, one of our pioneering volunteers, receiving a fruit basket from Dr Nigel Taylor, Director of SBG.



▶ Fallen *Alstonia angustiloba* (Common pulai). (Photo credit: Elango Velautham)

▶ The early morning of 13th May 2012 was a sad one for the Singapore Botanic Gardens and its tree lovers. Two historic specimens succumbed to a rapid succession of storms ('Sumatra squalls') between 2 a.m. and 4 a.m., when other parts of the island experienced winds of as much as 90 mph. Luckily, at those hours no one was inside the Gardens, but the damage became clear as soon as dawn came, when the Gardens' arborists and contractors arrived at the scene.

The first great loss will be felt by many who know the Gardens' trees well. It was the common pulai (*Alstonia angustiloba*) between the Rainforest and the Bandstand. It was thought to be a remnant of the original rainforest that once clothed the island and certainly as old if not older than the Gardens' establishment in 1859. Many admirers of this tree have gazed up to its crown from its fluted and buttressed trunk. Its fall revealed how decrepit its root system had become. Indeed, its apparent health above ground belied a sorry state below. There were but a few adventitious roots keeping it going, whilst most of its original root system had long decayed. We might ask how it had survived for so long. Its crash was not alone, for it "took out" a number of other smaller trees and palms in its path, the upper part of the tree falling across Maranta Avenue and blocking it until the chain saws had done their work. An admirer of SBG's heritage trees, Tony O'Dempsey, sadly observed upon hearing the news: 'that tree was a point of

geographical reference in the Gardens... "upon leaving Maranta Ave, turn right at the *Terminalia* and go past the *Alstonia*... to reach the *Sterculia* nearby" '.

The first great loss will be felt by many who know the Gardens' trees well. It was the common pulai (Alstonia angustiloba) between the Rainforest and the Bandstand.

The second casualty was an ironwood, *Mesua ferrea*, of great age and also a native of the rainforest long before SBG acquired the land. Burkill provides a first historical account in *The establishment of the Botanic Gardens, Singapore*, published in 1918 in the *Gardens' Bulletin, Singapore*, in which he had this to say about the part of the gardens that this giant belonged to (a part that has since been added to its territory):

'...virgin forest certainly existed on the northern part, for that forest still persists—a most valuable asset to the gardens, and there is a little more of it just outside the Gardens on that part of the Kerr property... which, as said, on the making of Cluny



▶ *Alstonia angustiloba* (Common pulai)—its root plate revealing the lack of sound major roots. (Photo credit: Elango Velautham)



▶ *Mesua ferrea* – aftermath of storm at NParks Headquarters. (Photo credit: top, Lahiru Wijedasa; bottom, Elango Velautham)

Road was cut off from the rest. The trees growing on both bits of land attest to the forest being primitive: for there are among them such as do not return through blukar, into forest younger than a hundred years. The eye of Sir Stamford Raffles for instance, therefore, saw forest where we see it still.'

In that passage, the Kerr property referred to was William Graham Kerr's land which had formed a part of the Botanic Gardens. The "blukar" mentioned (nowadays more commonly spelt *belukar*) is a Malay term for any species-poor secondary forest community that develops on sites cleared



Myristica lowiana, prior to removal. (Photo credit: Lahiru Wijedasa)

of primary vegetation in Singapore and throughout the SE Asian region.

The wood of *Mesua ferrea* is so hard that it was probably spared from the axe in the past, because of the difficulty of felling it. It was growing near the entrance to the underground car park at Nassim Gate, behind National Parks Headquarters. It was known to have problems of rot on one side, but was judged that if it failed it would fall away from the building and do little damage, which proved to be the case. It will be succeeded by three younger specimens of the same species growing nearby, but these no longer have their great relative to look up to. Two nests of stingless bees also lost their home, reminding us that old trees are sometimes mini ecosystems supporting a diversity of other organisms.

The storm also damaged a number of other unusual trees, including a *Myristica lowiana*, which has since been removed for safety reasons. This old tree is part of one of the oldest taxonomic collections in the gardens, the Myristicaceae plot. While the exact date when this plot was established is not known, specimens were collected in this area as far back as 1924, and the great size and rarity of the plants found in the plot attest to its considerable age. Sinclair used this plot in his landmark study of the family, as described in *A Revision of the Malayan Myristicaceae*, published in the *Gardens' Bulletin, Singapore* (1958), and this tree has contributed to our understanding of its taxonomy and biology.



Myristica lowiana trunk showing cracks. (Photo credit: Lahiru Wijedasa)

Myristica lowiana is a species found predominantly in peat and freshwater forests, most of which have vanished from the Singapore landscape and are vanishing at a great pace in Southeast Asia (Posa et al., 2011); this species is classified as Critically Endangered in the 2008 *Singapore Red Data Book*. It is clear that as climate change causes more violent weather events, we will need to be ever more vigilant in how we manage our trees to ensure their resilience to such storms. It is fortunate that SBG has other examples of the specimens recently lost and, indeed, many other heritage trees to delight the visitor when the weather allows. This sad event reminds us that for our safety and enjoyment, we should avoid the Gardens or other parks when there is violent weather.

Nigel P. Taylor
Director SBG

Lahiru Wijedasa
Horticulture, Exhibitions and Events

NEW IN THE LIBRARY SHOP



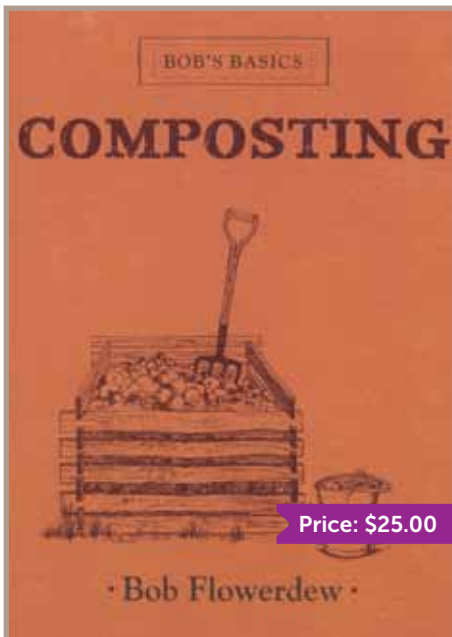
Brighten up your life with Bougainvillea
by Eric Simon

Bougainvilleas are known to be hardy, showy and floriferous plants. We've seen them everywhere, including overhead bridges, flyovers and road dividers. They can be grown in pots or in the ground, are useful as climbers on trellises, and can be presented artistically as bonsai or topiaries. Yet, given their immense versatility in beautifying our surroundings, they seem to be underrated plants.

This book is not much on the science or taxonomy of these plants; rather, it is dedicated to keen tropical growers or bougainvillea lovers who are interested in getting the best results from their plants. It contains useful and practical information on plant selection, planting, propagation and necessary maintenance to ensure optimal growth. For the grower's reference, the book covers the common varieties as well as the not-so-common ones.

With many brightly coloured photographs and easy to read step-by-step instructions, the author hopes to change people's perspectives on the humble yet magnificent bougainvillea, and also to get these plants more exposure in the landscape. If you're already a bougainvillea lover, get ready to fall in love again!

Year Published: 2005
ISBN: 978-983418-830-6



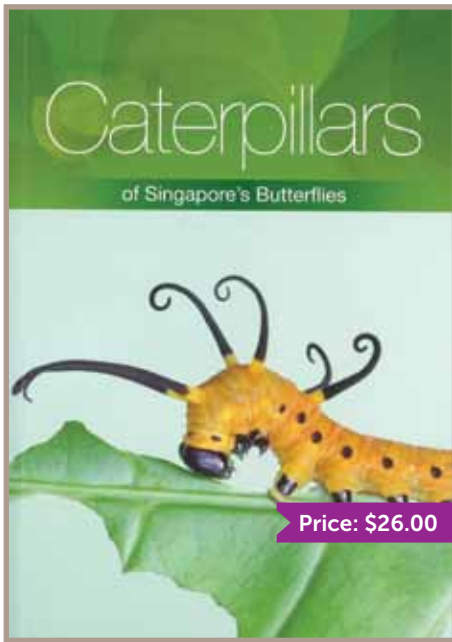
Composting
by Bob Flowerdew

People often think compost and fertiliser are the same. "What's the difference?" you may ask. There is a big difference! As one lecturer often reminded me back in my school days, fertilisers are like the shampoo for your hair and compost is like the conditioner; both go deep into the roots (no pun intended!).

In this book, renowned organic gardener Bob Flowerdew shows us how the most mundane materials can be turned into composting treasures. From uncommon objects, such as the hair found in your vacuum bag, lint, or even an old silk scarf, to everyday trash such as eggshells, newspapers and vegetable waste, the author advises how to make effective compost easily, and how to use it to help your garden flourish.

Even as a non-active gardener, I was deeply intrigued and fascinated by the author's humorous and witty, yet practical style of discussing the making of compost from recycled materials. With lots of interesting visuals to guide the reader along, this is an engaging book for anyone wanting to try their hand at making compost!

Year Published: 2010
ISBN: 978-185626-930-8



Caterpillars of Singapore's Butterflies
an NParks' Publication

At first glance, most caterpillars may look like alien props straight out of a movie set. But look beyond their creepiness, and you'll find that it is a unique form of beauty that you behold.

This new NParks publication details and helps to identify the various stages of caterpillars' lives before they morph into the beautiful butterflies that we see flitting around. Most of the featured caterpillars are commonly found in our nature reserves, parks and gardens. The book aims to help butterfly breeders, nature lovers and students of biology to recognise common caterpillars as the butterfly species into which they morph.

With amazing photographs and detailed descriptions of caterpillars, including information on their classification, growth, and the host plants on which they can commonly be found, this is a very informative and well-documented local wildlife book that you won't want to miss out on!

Year published: 2012
ISBN: 978-981-07-1557-1



Our Fragile Rainforest
an NParks' Publication

For the uninitiated, rainforests might seem boring, but look closely and one can see that they host a biodiversity rich in flora and fauna, which can be found high up in the trees and also under the canopy.

Our Fragile Rainforest is a joint collaboration between NParks and HSBC that took three years in the making. This collaborative survey of our Central Nature Reserve helps us to better understand the plants and animals present in the rainforest and also to gauge the size of their populations.

This book is well documented, with many beautiful and close-up shots of the flora and fauna found in the Central Nature Reserve. From the snakes, bats, and monkeys to the elusive colugo and pangolin, as well as the myriad of insects included, this publication is truly an eye opener for anyone not familiar with the rainforest. The book also provides maps of the Reserve, with trail connections all the way to the MacRitchie Nature Trail. So if you're an adventurous hiker, bring the book along to use as a reference guide and see the pictures come alive, right before your eyes!

Published: 2011
ISBN: 978-981-08-5324-2

Soh Qiu Xian
Library

NEW? NEW! NEWMANIA... THE GINGER SURPRISE FROM VIETNAM



Left: *Newmania orthostachys*, right: *Newmania serpens*

A "double novelty" has recently been discovered in central Vietnam, two new ginger species that form a new genus. The story of this special discovery shares the exciting part of a botanist's job.

► New species are considered great botanical finds, heralding the recognition of new biological entities in the biodiversity around us. Species are indeed the building blocks of biodiversity, with groups of sufficiently distinctive species placed into a genus. While new plant species are still being discovered fairly often, the recognition of a new plant genus is much less common. Some studies have estimated that for every thousand species newly identified, only one new genus is discovered. However, in some plant groups, like the gingers, several new genera (plural of genus) have cropped up in recent years. A "double novelty" has recently been discovered in central Vietnam, two new ginger species that form a new genus. The story of this special discovery shares the exciting part of a botanist's job.

A few years ago, Ngọc-Sâm Lý, my colleague from the Institute of Tropical Biology in Ho Chi Minh City, showed me pictures of a slender, pretty ginger he found during his explorations of central Vietnam. It had inflorescences creeping on the ground, like snakes adorned with white, purple and red flowers. I was also shown pictures of another plant, one which looked similar, but was more robust, with erect inflorescences and violet and white flowers. My first thought was that it very much resembled *Haniffia cyanescens*,



▶ A close up preview of the flower of an undescribed *Newmania* species from Vietnam.

However, the small genus *Haniffia*, with only three species, occurs in Peninsular Malaysia and southern Thailand, localities some 1200 km distant from central Vietnam, hinting at the possibility that the mysterious Vietnam gingers might be exciting finds.

which has slender leafy shoots and white and purple flowers arising at the ground level. My other ginger colleagues who also saw these pictures thought likewise. However, the small genus *Haniffia*, with only three species, occurs in Peninsular Malaysia and southern Thailand, localities some 1200 km distant from central Vietnam, hinting at the possibility that the mysterious Vietnam gingers might be exciting finds.

It was obvious that more material for herbarium and "spirit" specimens (those that are preserved in solution rather than by drying) was needed. My colleague Sâm returned to the field twice, and when enough flowering and fruiting material had been collected to advance our studies, we tabulated all the characters of these two gingers and compared them with those of all the other known genera in the family Zingiberaceae. When this arduous task was finished, we found no good match, not even to *Haniffia*, the most (superficially) similar genus, from which they differ by having leafless sheaths that are tubular at the base, as well as bracteoles which are often tubular at the basal part and lack epigynous glands. All flower parts of the new species (including the anthers) are completely glabrous, while *Haniffia* flowers are covered by short glandular hairs, a difference that is visible to the naked eye. In addition, the fruits of both new species are smooth and glabrous, which is in contrast to those of the three known *Haniffia* species (the fruits of *H. flavescens* and *H. cyanescens* are bluntly ridged, and those of *H. flavescens* are also rough and covered with small warts).

Some ten years back, the morphological differences of our finds would perhaps have been enough to convince us about the novelty of their genus. But in this molecular age, we knew that it would be foolish not to test if the genetic codes conveyed the same message. We are very grateful to Sam Yen Yen, our ginger colleague from the Forest Research Institute Malaysia, who sent us leaf tissue samples of *Haniffia* species for inclusion in our comparative analyses. These investigations were performed in the laboratory at the Royal Botanic Garden Edinburgh. After a few weeks, the exciting results were revealed, which confirmed that the two strange species were indeed formed of a distinct "branch" of evolution. The taxonomic conclusion: a new genus should be recognised to accommodate these species. This new genus would have to be published according to scientific protocol, which was accomplished in the



► The inflorescences of *Newmania serpens*, the type species of the new genus, creep on the floor. The flowers have a purple labellum with a red patch in the centre—a colour combination which is unique amongst gingers so far. (Photo credit: Ngoc-Sâm Lý)



► *Newmania* fruits are smooth, irregularly dehiscent capsules. (Photo credit: Jana Leong-Škorničková)



► Dr. Mark Fleming Newman during a fieldtrip in Vietnam. (Photo credit: Jana Leong-Škorničková)



► Typical habitat of *Newmania* species in Vietnam.

October 2011 issue of *Taxon*, a journal devoted to plant taxonomy.

This new genus has been named *Newmania*, in honour of Dr. Mark Fleming Newman, a prominent ginger specialist at the Royal Botanic Gardens Edinburgh, and who has made many remarkable scientific contributions to Zingiberaceae research in the past two decades. He has also increased our knowledge of the fascinating floras of Cambodia, Laos and Vietnam, and supervised students and researchers from the Indochinese region. The two specific epithets *serpens* (creeping) and *orthostachys* ([of] erect spike) were chosen to reflect the main difference in the inflorescences of the two species.

Since the publication of the new genus in 2011, we have conducted fieldwork in central Vietnam. There, I was delighted to finally see *Newmania* in the wild, those plants with which I had become so familiar from pictures and specimens. They are fairly rare gingers, growing in the moist and shady understorey of broadleaved forests. As a result of logging, the forests that we visited are quickly disappearing. Given that the *Newmania* species, like many other gingers, have a very limited range, this could well have been my last opportunity to see them in their natural habitat.

Jana Leong-Škorničková
Herbarium

BOTANICAL RESEARCH FELLOWS IN THE GARDENS 2011–2012

► The Singapore Herbarium (SING) houses a collection of plants pressed, dried, and stitched onto sheets and stored according to an international system of plant classification. These specimens form a permanent collection for reference and research. Our oldest specimen dates from 1790, but collecting started in earnest in 1875, after the Singapore Botanic Gardens was established.

On a competitive basis, the Gardens offers several SBG Research Fellowship grants each year. In addition, one grant from the H.M. Burkill Research Fellowship is given. These grants are awarded to botanists to do research at SING. The 2011 SBG Research Fellows and their achievements are presented below.



Photo credit K.M. Wong

Dr M.M.J. van Balgooy (18 Aug to 31 Aug 2011), a Dutch botanist, was a staff member of the *Nationaal Herbarium Nederland* (L), Leiden University branch, the Netherlands, from 1961 to 1994. Although trained as a plant geographer, he has been involved in the identification of plant collections since his appointment at the National Herbarium. From 1984, Dr Balgooy was in charge of the identification of incoming collections sent from those countries located between Sri Lanka and the Pacific. He voluntarily continues this work, even after his retirement in 1994. The *Malesian Seed Plants* series (consisting of three volumes, *Spot-characters* (1997), *Portraits of tree families* (1998), and *Portraits of non-tree families* (2001)) is among his more notable publications. This work is still a frequently-thumbed reference in the botanical arena. Dr Balgooy is a guru of plant identification. On many an occasion, with his wealth of experience, all it takes is a look at a dried old specimen and he can tease a name from the plant. In the short period that he was here, over 500 specimens were annotated by him.



Photo credit W.L. Goh

Ms Goh Wei Lim (22 Aug to 4 Sep 2011), a PhD candidate from the University of Malaya in Malaysia, is the second recipient of the H.M. Burkill Research Fellowship. She is working on *Bambusinae*, one of the subtribes of the tropical woody bamboos, as well as a number of climbing-scrambling bamboos which are placed doubtfully within the *Bambusinae*. While here on the Burkill Fellowship, Wei Lim worked on the systematics of the *Bambusinae* complex in SE Asia under the supervision of our bamboo specialist, Dr K.M. Wong. She consulted the bamboo specimens housed at SING in her research of morphological features that may be used in combination with the results of her ongoing molecular phylogenetic analyses for an improved classification of the complex. She also made a trip to Bukit Timah Nature Reserve to examine a rare species, *Soejatmia ridleyi*, which is known only from very few populations in Peninsular Malaysia and Singapore. Her wider study is carried out in collaboration with colleagues from Australia and various Asian countries, and a scientific publication from this research is underway.



Dr Nguyen Quoc Binh (18 Nov to 14 Dec 2011) is Researcher at Vietnam National Museum of Nature and is a collaborator of our ginger specialist Dr Jana Leong-Škorničková. While here, he worked with plant material of *Zingiberaceae* and *Lowiaceae* collected from his visits to northern and central Vietnam from 1995 to 2011. He studied SING herbarium specimens from Indochina and made comparisons to his collections to aid him in their identification. Dr Nguyen also studied the rare reference literature held at the Garden's Asian *Zingiberaceae* Information Centre (AZIC), which enabled him to establish a database on the genus *Alpinia* of Indochina. A manuscript describing a new species of *Distichoclamys* collected in northern Vietnam in 2011 has been published in the *Gardens' Bulletin*, Singapore 64(1).



Dr Paweena Traiperm (4 to 17 Dec 2011) is a lecturer at the Department of Plant Science, Mahidol University in Thailand, and a collaborator of our Convolvulaceae specialist Dr George Staples. While here, Dr Traiperm researched the taxonomic diversity of Thai *Argyreia* (Convolvulaceae), as many recent Thai specimens of *Argyreia* have not yet been identified to species. During her research visit, Dr Traiperm made a critical examination of these materials, and determined that in total, there are now 18 unidentified taxa from Thailand and surrounding countries. In addition to working out the naming of these Thai specimens, she collaborated with George to compile a draft checklist for the entire genus *Argyreia* (approximately 130 taxa), and contributed information and photographs for an upcoming photo exhibition to be held at the Gardens, titled *Argyreia—Silvery Asian Beauties*, which is scheduled to open in early July 2012 and run for two months.



Dr Caroline Pannell (6 Feb to 24 Feb 2012) is a Research Associate in Biodiversity and Plant Taxonomy at the University of Oxford, U.K. She is no newcomer to Southeast Asia, having performed fieldwork for her doctoral studies on the species-rich and complex genus *Aglaia* in Peninsular Malaysia and other places. Her monograph on the genus was published with Kew in 1992 and still novelties and new information continue to surface. Currently, she is working out an updated account for the Flora of Peninsular Malaysia project. Dr Pannell curated all *Aglaia* specimens in our holdings (numbering 1621 sheets in total). She also conducted an afternoon workshop for staff on the *Aglaia* of Peninsular Malaysia.



Mr Virgilio C. Linis (6 Feb to 12 Mar 2012) is a PhD candidate from the University of New England in Armidale, Australia. Vir's project sought to better understand the limits of species in the moss genus *Ectropothecium* (Hypnaceae). The Fellowship allowed him to spend a good amount of time on biometric studies (those that rely heavily on analysing measurements) that will aid in the construction of phylogenetic trees. While at SING, he annotated 197 specimens and made 35 collections of bryophytes from around the Gardens and Bukit Timah Nature Reserve. Vir's interest also includes a biogeographic slant, recently focussing on the Sorsogon peninsular region of Luzon.

Serena Lee
Herbarium

All photos by Serena Lee unless otherwise stated

NONIS, FORBIDDEN FRUITS AND FISH- KILLERS...

Close-up of the small tubular *noni* flowers and an unripe fruit. (Photo credit: Nura A. Karim)



The sturdy *noni* tree with its beautifully large glossy leaves. (Photo credit: Nura A. Karim)



The ripe whitish potato-like *noni* fruits which have many medicinal properties. (Photo credit: Chua S.S.)



The various commercially-available *noni* juice tonics are hailed as a cure for many common illnesses. (Photo credit: Various sources from the web)

Exploring the Healing Garden, one never fails to find something interesting in bloom. Most of these plants have beneficial properties, scientifically proven or otherwise. Some of these are commonly grown in gardens around Singapore and the region, and may even have been used by us for their health benefits.

Morinda citrifolia

One interesting plant on display in the Healing Garden is *Morinda citrifolia*, also known as *mengkudu*, *noni* or Indian mulberry. The botanical name for this genus was derived from the two Latin words *indicus*, meaning "of India", and *morus*, for mulberry, in reference to the similarity of the fruit to that of the true mulberry (*Morus alba*). The species name, *citrifolia*, indicates the resemblance of the plant foliage to some citrus species.

The native range of *noni* extends through Southeast Asia and Australia, but the species is now widely cultivated throughout the tropics. It belongs to the family Rubiaceae (the coffee family). It can grow in infertile, acidic and alkaline soils and is at home in very dry to very wet areas as well.

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► The stunning and fragrant night-blooming flowers of the *putat laut*. (Photo credit: Nura A. Karim)

In some areas, it is treated as a weed since it is very persistent and difficult to remove. However, it is not invasive and does not threaten the ecosystem.

Morinda citrifolia is a tree that can grow up to 9 m in height. This small handsome tree bears flowers and fruits all year round. Its leaf measures about 10–15 cm wide by 20–30 cm long, and is large, broadly elliptic, soft and glossy dark green. It is easy to identify this plant by its beautifully shiny, deeply veined leaf, and also from its unusual potato-like fruit. *Noni* produces delicate, small, perfect tubular white flowers that grow out from a fleshy structure. The fruit is oval, about 4–7 cm in size, and is a multiple fruit, ripening to yellowish-white from light greyish-green in colour. As the fruit ripens it has a pungent odour that is likened to the smell of bad cheese or even vomit!

All parts of the plant have medicinal value. In Malaysia, the leaves are heated and applied to the chest and abdomen area to treat coughs, nausea, colic and enlarged spleen. A decoction of it is taken orally for treating fever, dysentery and diarrhoea. The leaves are used as a body wrap for massages, and are also cooked as vegetables and eaten with rice.

In many countries, *noni* fruits have been eaten in times of famine, and in some Pacific Islands, continue to be a staple food source where they are cooked or eaten raw. The *noni* fruit has also been used to treat lumbago, asthma and dysentery in Indo-china, and is widely used for soothing the throat and for toothaches. Literature

has also noted that a poultice of the fruits can be applied for treating tuberculosis, sprains and deep bruising. Although not common, the pulp of the fruit is used to cleanse the hair, and for cleaning of iron and steel.

In modern times, the fruit is commonly used in the making of juice. *Noni* juice is widely available commercially as a tonic drink. The juice is claimed to be good for treating diabetes, high blood pressure, headaches, heart diseases, AIDS, cancers, gastric ulcers, mental depression, senility, poor digestion and even for preventing drug addiction. Besides the leaves and fruits, the roots are also used as a cathartic and febrifuge, while a decoction of its bark has been used to treat jaundice.

Even though *Morinda citrifolia* is known as a healing plant, it can cause adverse reactions as well. Nausea, vomiting, anorexia and hypersensitivity may occur when this plant is taken incorrectly. It is strongly advised to refrain from excessive usage without prior consultation with medical experts.

Besides growing it for its medicinal properties, this species has been commonly cultivated as a dye plant; the bark contains a red pigment and the roots a yellow pigment that are used in dyeing traditional fabrics.

Barringtonia asiatica

As we wander along the paths of the Healing Garden, we may chance upon a majestic old tree, *Barringtonia asiatica*. Native to



The beautiful and fragrant flowers of the "forbidden fruit". (Photo credit: Md. Fadli Baharudin)



Putat laut's unusual fruits are buoyant in water. (Photo credit: Koh Sin Lan)

Africa, temperate and tropical Asia and Australia, *Barringtonia asiatica* is also known as putat laut, beach barringtonia, or fish-killer tree. It belongs to the family Lecythidaceae, and is a large tree that can grow well on sandy and rocky shores.

This magnificent tree can grow up to 25 m and is a common mangrove associate. *Putat laut* has large simple leaves that are held in rosettes at the ends of its branches, and when young, are beautifully bronze in colour with pinkish veins. It produces delightfully large puffballs of white flowers that hold numerous extended white stamens with pink tips. The lovely flowers are heavily scented and bloom at night. They are pollinated by moths and bats, and this tree is among the few plants that host the magnificent Atlas moth. The flowers are short-lived, and the

stamens are often found beneath the tree in the morning after the flower opens. The fruits are green in colour and turn brown when ripe. The middle layer of the fruit is spongy, allowing it to float on water, while the innermost layer is hard and thick to protect the round seed. The interesting-looking fruits are lantern-shaped and can survive drifting in the sea over long distances for up to two years!

All parts of the *Barringtonia asiatica* tree contain *saponin*, a poison. *Putat laut* has been recorded to be used in the treatment of fungal infections, burns and wounds. In the Philippines, the leaves are heated and used to treat stomach ache and rheumatism, and its decoction is used in Fiji to treat hernia. The juice from the fruit is reportedly ingested to control scabies, but is also used as fish poison in Asia and Australia (hence the common name of fish-killer tree). Traditionally, its bark was used in the treatment of tuberculosis, and a decoction of it was taken for constipation and epilepsy.

Putat laut has been recorded to be used in the treatment of fungal infections, burns and wounds. In the Philippines, the leaves are heated and used to treat stomach ache and rheumatism, and its decoction is used in Fiji to treat hernia.



► The fruit of *Tabernaemontana dichotoma* or better known as the "forbidden fruit", or Eve's apple. Are you able to see Eve's teeth marks? (Photo credit: Koh Sin Lan)

Literature has cited that the most commonly-used part of *Barringtonia asiatica* for medicine is the seed. The fresh nut is scraped and applied to sores and used as a vermifuge. Other treatments include in the easing of sores, influenza, diarrhoea, swollen spleen resulting from malaria, cough and sore throat. Aside from its medicinal values, *Barringtonia asiatica* is noted to have antibacterial and antifungal properties, and also has some insect repellent properties. The leaves can also be consumed as vegetables when cooked thoroughly.

Tabernaemontana dichotoma

Besides the grand old *putat laut* and the sturdy *noni*, in the Healing Garden one will also find an unassuming treelet that blooms regularly and would be a treat to have in any garden. This treelet is *Tabernaemontana dichotoma*, and belongs to the family Apocynaceae (the frangipani family).

Tabernaemontana dichotoma originates from Sri Lanka, and is widely distributed in Myanmar and Peninsular Malaysia. It can be found in a wide range of habitats, from relatively open scrub vegetation to forest understorey, from dry limestone outcrops

to inundated riverine and swamp forest.

This species is commonly known as "forbidden fruit" or Eve's apple. The origin of the vernacular names is a very entertaining read. Centuries ago, someone with an active imagination had likened the bright reddish seeds that are exposed inside the dehiscent yellow fruit to the curious resemblance of Eve's teeth marks on the heavenly forbidden fruit that had caused the expulsion of man from paradise.

Tabernaemontana dichotoma is a small treelet or shrub with an average height of 6 m with repeated dichotomous branching from the base. The bark contains copious amounts of white latex (typical of plants in the Apocynaceae), and the wood is rather soft, supporting branches with conspicuous leaf scars. Its leaves are opposite and simple, and elliptical to oblong in shape. It has a corymbose inflorescence which bears tubular white flowers that are beautifully fragrant and open during the night. The fruit is composed of two mericarps variably united at the base and attached to a pendulous stalk, and the shape is similar to an inflated half-crescent with an obvious depression along one side. *T. dichotoma* produces flowers and fruits all year round,

particularly in areas without a pronounced dry season.

In Sri Lanka, the remarkably bright yellow fruits are used in the treatment of ulcers and fistulae. The latex has been used to soften and ripen boils and carbuncles, and the leaves and bark are pounded and applied externally to snake and centipede bites in rural areas. Villagers have been reported to chew the roots to relieve toothaches. Literature has mentioned that the seeds can cause delirium and symptoms similar to those induced by *Datura* (nightshade).

Besides having useful healing properties, *Tabernaemontana dichotoma* is widely cultivated as an ornamental. This treelet grows best in full sun or partial shade, and in a well drained but moisture-retentive, high-fertility, loam-based mix.

The next time you are in the Healing Garden or strolling around Singapore, keep a look-out for the impressive *noni*, forbidden fruit, and fish-killer trees that are commonly grown here, and remember their wonderful uses and unusual vernacular names. Still, we should always remember not to consume anything without a clear understanding of the biochemical nature or treatment use of plant parts, especially without confirmed identifications.

Nura Abdul Karim
Siti Amalina Norazman
Plant Records



STORYTIME IN THE GARDENS—OUTREACH TO OUR YOUNG VISITORS

▶ A young participant petting Fluff-Tail, the squirrel puppet, in a storytelling session. (Photo credit: Winnie Wong)



▶ Muhammad Taufiq engaging the young participants in a fun activity about the interesting behavior of *Mimosa pudica*. (Photo credit: Winnie Wong)



▶ During a guided walk, Kelvin Lim showing our young participants and their parents how red dyes are produced from the seeds of annatto fruit. (Photo credit: Sabariyah Bte Razali)

▶ Embark on another journey around the Gardens with Sara, the 'Botanicosaurus', and her squirrel friends. This time, it is a brand new educational programme specially designed for toddlers who are two to three years old. In *Storytime with Sara at the Jacob Ballas Children's Garden*, children participate in a storytelling session, followed by a guided walk around the Children's Garden.

Designed and developed in-house by SBG's education team, *Storytime with Sara at the Jacob Ballas Children's Garden* features Sara, our very own 'Botanicosaurus' and her two squirrel friends and family. The programme allows the children to get up-close and personal with the plants featured in the story, exploring the Children's

Garden together with Sara and her friends. Children are introduced to a variety of interesting and useful plants, including some that are utilised for natural dyes, such as annatto (*Bixa orellana*) and blue butterfly pea (*Clitoria ternatea*); others used to produce beverages, such as the cacao tree (*Theobroma cacao*), the seeds of which can be used to make hot chocolate; and fruits and vegetables such as banana (*Musa species*), sweet potato (*Ipomoea batatas*), and sugar cane (*Saccharum officinarum*). We also engage our young participants in fun activities with plants through their senses, encouraging the children to touch touch-me-not (*Mimosa pudica*) and experience the smells of peppermint (*Mentha*) and lemongrass (*Cymbopogon*).

Apart from educating the toddlers about plants, the programme teaches them that plants make all other life on earth possible, planting a seed for a conservation mindset.

Since the January 2012 launch of *Storytime with Sara at the Jacob Ballas Children's Garden*, the response from various pre-schools and the general public has been overwhelming. Over 700 toddlers, as well as their parents and teachers, have participated in the programme. Many parents have shared positive feedback about the programme, providing us thanks for "such a wonderful story-telling session", and telling us that their kids loved it. "My sons usually get bored in 15 minutes. Today, they sat throughout your session and participated in the educational tour around the Children's Garden", commented a father who brought with him his two young children. A mother commented that "my daughter followed you, walking ahead of me. Usually she 'sticks' next to me!"

Do look out for our new addition to our education programmes in year 2013: *Storytime with Sara—The 3Rs (Reduce, Reuse, Recycle)*.

Winnie Wong & Kelvin Lim
Education Branch

SOUTHEAST ASIA BOTANIC GARDENS (SEABG) NETWORK STAFF EXCHANGE PROGRAMME

► In November 2011, at the fourth SEABG Directors' Meeting, held at the Xishuangbanna Tropical Botanical Garden in China, members collectively agreed upon the establishment of a network staff exchange programme.

This initiative was started in the hopes of beginning collaborations between SEABG member institutions and other international botanical gardens, to advance horticultural and field work skills and to strengthen ties between staff members of the various botanical gardens. Mr Rik Gadella, General Director of the Pha Tad Ke Botanical Garden (PTK) in Laos, volunteered to collate the responses of the various interested parties, and on March 2012 released the announcements on SEABG 2009 (the online discussion group of the SEABG, hosted by Google Groups) to attract relevant participation. Thus far, three botanical institutions, namely Xishuangbanna Tropical Botanic Garden, PTK, and Fairchild Tropical Botanic Garden (USA), have officially broadcast their willingness to participate in the exchange programme and accept staff from SEABG member institutions.

Singapore Botanic Gardens (SBG) became the first of the SEABG network institutions to receive neighbouring staff through the network's exchange programme. SBG, along with Botanic Gardens Conservation International (BGCI), kindly funded four staff from the newly established PTK on a trip to Singapore. Mr Gadella accompanied his staff to discuss with Dr. Nigel Taylor (Director of SBG) the possibility of further collaboration between the two gardens. The PTK staff members, Mssrs. Insavai Sithivohane, Somdy Oudomsack,



► The Director and staff of PTK Botanical Garden, from left to right, Kittisack, Udome, Rik Gadella, Insavai and Somdy, during their visit to the Singapore Botanic Gardens.

Kittisack Phouthavong and Udome Souvannakhommane, were from the garden's horticulture and research teams. For 11 days, from 13 February to 24 February, the PTK staff had a very intensive botanical training programme that was customised to meet their requests. They were trained by the managers of SGB's Plant Records unit, National Orchid Gardens, Plant Resource Centre, Living Collections and the Herbarium.

At SBG, the staff learnt the importance of documenting and maintaining accurate records of botanical and horticultural information, as well as the standard data captured by most botanic gardens. They were also shown the various online taxonomic and botanical resources available to assist them in their future

identification and documentation work. On the grounds, the staff had hands-on training in the propagation of plants such as orchids, ferns and dicots. The staff of the National Orchid Garden and Ginger Garden taught their Lao counterparts basic principles of plant display and design, to help them ensure an attractive and practical landscape while maintaining a good conservation collection. They also had a short stint in the herbarium, where they learnt basic taxonomy and identification of the Zingiberaceae, and how to collect voucher specimens of this particular family.

The PTK staff also visited the Pasir Panjang Nursery, where they were shown some of the work in progress toward meeting the greening efforts of the National Parks Board. They also learnt about establishing



► PTK staff having hands-on training in the preparation of a planting bed and getting their hands dirty planting some ginger plants.



► PTK staff enquiring about designing a butterfly garden and the care of butterflies.

a butterfly garden from the staff of the Hort Park Butterfly Garden; they were particularly intrigued by the care and equipment required to rear the butterflies from pupas, and the types of flowering plants most suited to attract and feed the butterflies.

The Director and staff of PTK were grateful for the chance to learn about the various types of work carried out at the Gardens. They mentioned that this allowed them to obtain some basic horticultural and botanical skills, an opportunity that is not widely available in Laos. They left Singapore determined to put into practice the knowledge they had gained from the short and intensive training programme at SBG.

To reciprocate this exchange, PTK will be welcoming staff from the SBG Herbarium and National Orchid Garden in June 2012 and January 2013, respectively, to do field work and also to further train their staff on orchid propagation and maintenance. The staff of both institutions will also explore possibilities for various collaborative efforts that could help the conservation of the Laos flora.

Nura Abdul Karim
Plant Records

All photos by Pha Tad Ke Botanical Garden staff

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KEY VISITORS TO THE GARDENS

(JANUARY-JUNE 2012)



► HE Serzh Sargsyan (left with purple tie), President of the Republic of Armenia in the Cool House of the National Orchid Garden with N Parks' CEO, Mr Poon Hong Yuen (right).



► HE Juan Manuel Santos Calderon (centre), President of the Republic of Colombia and N Parks' DCEO, Dr Leong Chee Chiew (right) admiring, *Rhyncattleanthe* Juan Manuel Santos Calderon, the newly named orchid hybrid named after His Excellency.

Datin Dr Hajah **ASMAH** Haji Morni

Ms Rani **ASMARAYANI**

Ms Katia **ASTAFIEFF**

His Excellency **BAN** Ki-moon & spouse

Mr Peter **BOYCE**

Her Excellency Quentin **BRYCE**

Dr Martin **CALLMANDER**

Dr Charles **CLARKE**

Dr Chris **DAVIDSON** & spouse

Dr Helena **DUISTERMAAT**

His Excellency **FALAH MOHAMMED** Al Ahbabi

The Honorable Mayor Vincent Franco **D. FRASCO**

Mr Rik **GADELLA** & delegation

The Honourable Ms Julia **GILLARD**

Mr **GOH** Chok Tong

Ms **GOH** Wei Lim

Dr Vinita **GOWDA**

Mr William **HAGUE**

Dr Mark **HUGHES**

Dr Chad **HUSBY**

Datin Paduka Hajah **JAHRAH** binti Hj Mohamad

Mr **JANG** Byeon-ho

Daw **KHIN KHIN WIN**

Dr Ruth **KIEW**

Dr **KIM** Woo-sang

Dr Miyako **KOIZUMI**

Mr **LI** Lei

Mr Virgilio **LINIS**

Cr Ir **LO** Kheree Chiang

Sir John **MAJOR**

Mr **MALLAWI** Mohd Shariff & delegation

Mr Otto **MIETTINEN**

Mr Matthew N. **MUSELLA**

Madam **NGUYEN** Nguyet Nga & delegation

Dr Caroline **PANNELL**

Mr Wonsoon **PARK**

Mr Cedric **POLLET**

Ms Carmen **PUGLISI**

His Excellency Mahinda **RAJAKSA** & spouse

Dr **RECEP** Akdag

Dr **RULIYANA SUSANTI**

His Excellency Juan Manuel **SANTOS** Calderon & spouse

Mr **SAOUD** Abdullah Al Hinzab

Her Royal Highness Paduka Seri Pengiran Anak Isteri Pengiran

Anak **SARAH** & His Royal Highness Pengiran Muda 'ABDUL MUNTAQIM

His Excellency Serzh **SARGSYAN**

Mr Matthias **SAUERBRUCH** & spouse

Dr Seetha **SHANMUGAM**

Dr Gongle **SHI**

His Excellency Anibal Cavaco **SILVA** & spouse

Ms Ana Rita **SIMÕES**

Ms Nadhanielie **SIMONSSON**

Mrs **SRANYA** Natalegawa

Mr Mark A. **STUART**

His Excellency Marc **THILL**

Dr Gothamie **WEERAKOON**

Dr Robert J. **WEISE**

Dr Peter **WILKIE**

His Royal Highness Prince **ZEID** Ra'ad Zeid Al-Hussein

Acting Senior Special Duties Officer/ Head of Early Childhood Care and Education, Ministry of Education, Negara Brunei Darussalam

University of Missouri, Saint Louis, USA

Assistant Director, Nancy Botanical Gardens, France

Secretary-General of the United Nations

Universiti Sains Malaysia, Pulau Pinang, Malaysia

Governor-General of Australia

Missouri Botanical Garden (USA) and Conservatoire et Jardin Botaniques de la Ville de Genève (Switzerland)

Monash University (Malaysia Campus), Selangor, Malaysia

Flora of the World, Boise, Idaho, USA

NCB Naturalis, Leiden, The Netherlands

General Manager, Abu Dhabi Urban Planning Council, Abu Dhabi, Saudi Arabia

Municipality of Liloan, Cebu Province, Republic of the Philippines

Pha Tad Ke Botanical Garden, Luang Prabang, Laos

Prime Minister of Australia

Emeritus Senior Minister, Republic of Singapore

University of Malaya, Kuala Lumpur, Malaysia

Department of Botany, Smithsonian Institution, USA

Foreign Secretary, UK

Royal Botanic Garden, Edinburgh, UK

Montgomery Botanical Center, Florida, US

Spouse of Education Minister of Negara Brunei Darussalam

Director, Jeonju Zoo, Republic of Korea

Spouse of the President, Republic of the Union of Myanmar

Forest Research Institute Malaysia (FRIM), Kepong, Malaysia

President, Korea Foundation, Republic of Korea

Tropical Forest Resources and Environment, Division of Forest and Biomaterials Science, Graduate School of

Agriculture, Kyoto University, Japan

Director-General, Nanjing Municipal Society of Landscape Architecture, PR China

University of New England, New South Wales, Australia

Council Chairman, Municipal Council of Padawan, Sarawak, Malaysia

Former Prime Minister of the United Kingdom and International Advisory Board of AECOM

Director, Chad Basin National Park, Nigeria

University of Helsinki, Finland

Chief Operating Officer, San Diego Zoo

Spouse of Foreign Minister of Vietnam

University of Oxford, UK

Longwood Graduate Program (LGP) in Public Horticulture, USA

Nice, France

Royal Botanic Garden, Edinburgh, UK

President, Democratic Socialist Republic of Sri Lanka

Health Minister of Turkey

Graduate School of Agriculture, Kyoto University, Japan/ Herbarium Bogoriense, Java, Indonesia

President, Republic of Colombia

Chairman of Qatar Central Municipal Council, Qatar

Crown Princess and Prince of Negara Brunei Darussalam

President, Republic of Armenia

Jury, President Design Award, Germany

Spouse of Foreign Minister of Singapore

Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing, PR China

President of the Portuguese Republic

University of Reading, UK

National Research Institute of Papua New Guinea, Papua New Guinea

Spouse of Foreign Minister of Indonesia

President, Foundation of the Zoological Society of San Diego/ Chief Development and Membership Officer,

Zoological Society of San Diego, USA

Ambassador of the Grand-Duche de Luxembourg to Thailand

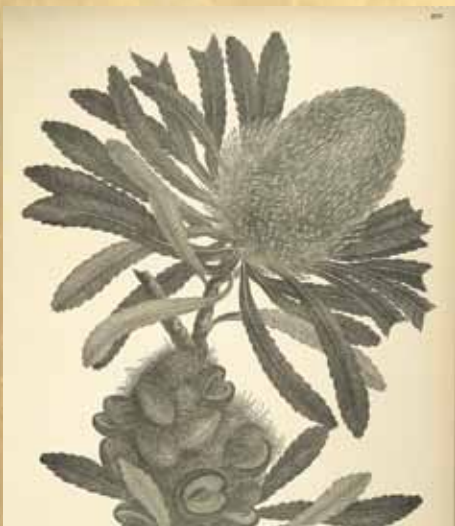
Department of Botany, The Field Museum, Chicago, USA

Chief Life Sciences Officer, San Diego Zoo

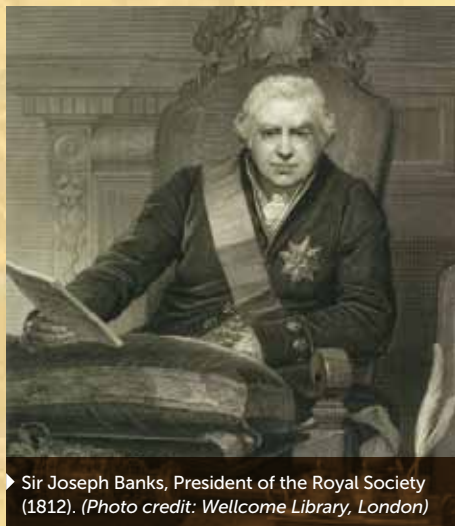
Royal Botanic Garden, Edinburgh, UK

Ambassador of the Hashemite Kingdom of Jordan to the United States of America

ILLUSTRATIONS OF AUSTRALIAN PLANTS BY SIR JOSEPH BANKS AND DANIEL SOLANDER, WITH DETERMINATIONS BY JAMES BRITTEN



► Lithograph of *Banksia serrata* (Proteaceae). *Banksia* is an Australian genus named after Sir Joseph Banks by the younger Linnaeus in 1782. The material on which this drawing was based is now kept at the Herbarium of the Natural History Museum, London (BM).



► Sir Joseph Banks, President of the Royal Society (1812). (Photo credit: Wellcome Library, London)



► Daniel Charles Solander. (Photo credit: Wellcome Library, London)

► The botanical history of Australia is intimately linked to Sir Joseph Banks (1743–1820) and Daniel Solander (1733–1782). Banks was a wealthy, multi-talented and influential English naturalist who was extremely fond of botany, while Solander was a Swedish botanist, trained under the much-celebrated Carl Linnaeus at the Uppsala University, Sweden. Upon Linnaeus' recommendation, Solander travelled to England, where he was employed as an assistant librarian at the British Museum. Later, Solander and his assistant Herman Spöring (a Finnish botanist at the Museum) were employed by Banks to join him on board H.M.S. *Endeavour* from 1768 to 1771, on her maiden voyage around the world led by Captain Cook. Also included in Banks' party were two talented artists, Sydney Parkinson (1745–1771) and Alexander Buchan (died in 1769), and four servants. Banks and his team (altogether nine) were listed in Cook's journal under the "civilian and staff" category.

A total of 674 sketches and 269 finished drawings were prepared by Parkinson; these were based on the vast number of plant collections made by Banks and Solander during the voyage. Unfortunately,

the sketches were never completed. Parkinson died of dysentery on board the *Endeavour* after leaving Batavia (now Jakarta) en route to Cape Town in 1771. A few years after his return to England, Banks engaged five well-known artists to complete some of Parkinson's unfinished drawings (based on his sketches), but completion of the 595 drawings was a laborious task, taking about 9 years and being completed only in 1781. From these, as well as Parkinson's completed drawings, Banks selected 743 depictions and commissioned their copperplate engravings for the publication of 14 folio volumes reporting their discoveries from the voyage. However, only 738 of these were completed by the 18 engravers employed. These copperplate engravings were personally supervised by Banks from 1772 to 1784, a period of over 13 years.

Still, the intended publication by Banks did not immediately materialise, and the plates were kept for about 200 years, stored in wooden crates at the British Museum (now the Natural History Museum, London). A number of these plates were finally selected for publication under the title *Illustrations of Australian Plants* (published 1900–1905). These included a total of 328 copperplates of Australian plants, which were issued as black-ink lithographs with most descriptions written by Banks and Solander. Newer determinations were then provided by James Britten.

This much anticipated work was issued as three instalments. Parts 1 and 2, published in 1900 and 1901, respectively, were brought out under the title *Illustrations of the botany of Captain Cook's voyage round the world in H.M.S. Endeavour in 1768–71*. However, Part 3 (published in 1905) was issued under a different title, *Illustrations of Australian plants collected in 1770 during Captain Cook's voyage round the world in H.M.S. Endeavour*. Apart from the marvellous lithographs, three maps were reproduced from Captain Cook's journal, and included with Part 3, namely:

- (i) A reduction of Captain Cook's original chart of East Australian coast line (North sheet);
- (ii) A reduction of Captain Cook's original chart of East Australian coast line (South sheet);
- (iii) Chart of New Zealand explored in 1769–1770.

The Singapore Botanic Gardens archives have two complete sets of this rare and important reference. To better appreciate this scientifically and historically important work, visit the Biodiversity Heritage Library's website at <http://www.biodiversitylibrary.org/>.

Low Yee Wen
Herbarium