

Gardenwise



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Singapore's newly discovered endemic ginger, *Zingiber singaporense*. (Photo credit: Jana Leong-Škorničková)

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Opposite page

Possibly the last of its kind in the region, Burkill Hall is architecturally significant and also one of the Gardens' treasured heritage features. (Photo credit: Benjamin Aw)



MESSAGE FROM THE DIRECTOR

THIS issue is the first to be published in Singapore's 50th anniversary year and one in which we hope the Botanic Gardens will be inscribed as the Republic's first UNESCO World Heritage Site. That outcome we will not know until early July, but in this issue we already have some special birthday presents in the botanical sense. It has long been the tradition at SBG of its scientists pioneering new discoveries and not least in the Ginger Order of families (Zingiberales), which is so richly represented in Southeast Asia. Undoubtedly the most remarkable find in recent times is *Zingiber singaporense*, reported in Jana's blow-by-blow account on pages 17–20.

That Singapore is not 100% understood botanically is made even more apparent by the discovery of *Margaritaria indica* at Kent Ridge (see pages 15–16), which was made immediately into an officially recognised Heritage Tree, along with six candidates from the Gardens: the 1884 Burmese teak (*Tectona grandis*) beside Botany Centre, the buah keluak (*Pangium edule*) near the Sun Garden, Corner's cannonball tree (*Couroupita guianensis*) in the Ginger Garden, Mandel's *Cola gigantea* beside Orchid Plaza, the West Indian locust (*Hymenaea courbaril*) on Corner House Lawn and the great *Shorea macroptera* in the Rain Forest, at the bend in the Liane Road boardwalk. These are all giants of the plant world.

SBG is also regularly visited by human giants of the botanical world, attracting

some of the great contemporary plant experts. In October, staff were treated to a palm master class by Dr John Dransfield and his bamboo expert wife, Soejatmi. Both ceremonially planted special specimens in the Gardens (see page 28): John his extraordinary Madagascan discovery, the suicide palm, *Tahina spectabilis*, and Soejatmi her eponymous climbing bamboo, *Soejatmia ridleyi*, which is found in the Bukit Timah Nature Reserve. Another giant name in SBG's history is that of the Burkill family after whom Burkill Hall is named. In this issue we discuss the historic architectural significance of Burkill Hall and report on the recent visit of a fourth generation Burkill, Simon, who was shown around his great grandfather's and grandfather's home on 12 December, while on his honeymoon with wife Amy.

Flower shows are deeply rooted in SBG's history and here we report on the earliest and the latest – August's hugely successful biennial Singapore Garden Festival hosted at Gardens by the Bay, which attracted around 300,000 visitors. This extravaganza differed significantly from the preceding four examples (2006–2012) in that it was held partly outdoors and thus closely resembled the Chelsea Flower Show in format. We believe its standards were equal too! In the run up to the show, the weather was a big worry for the organisers and participants, but they say the brave bring their own luck and the heavy rain that we feared largely stayed away.

Visitors to SBG have continued to show their support for and love of the Gardens as we head for another record year in 2015, while behind-the-scenes we are planning enhancements to help satisfy the growing visitor demand. The year 2015 promises to be a special one in many respects.

Enjoy... 🌿

Nigel P. Taylor

GARDEN FESTIVALS AND THE HERITAGE OF THE GARDENS

THE Singapore Garden Festival (SGF) is part of a long running tradition. In the wake of the most successful SGF to date, held at Gardens by the Bay in August 2014, let's reflect on its origins. Flower shows are not a modern phenomenon in Singapore at all – the first was organised by the Agri-Horticultural Society that founded the Singapore Botanic Gardens (SBG) and held at the Esplanade on Saturday, 27 July 1861. The tent put up for the purpose was “fairly decorated with bouquets of cut flowers from the [Botanic] Garden” (newspaper report quoted by Henry Burkill in his history of the Botanic Gardens published in 1918). Thus, the tradition of SBG mounting flower shows goes back 154 years and is almost as old as the Gardens itself.

Early shows were essentially fund-raisers for the Agri-Horticultural Society, whose main costs were those incurred in developing and running the Gardens. These shows were not all held at the Esplanade, for in 1864 and 1866, the unoccupied new army barracks across Napier Road (where the Ministry of Foreign Affairs is now based) was the venue. Later, in 1871, the annual show was held in temporary buildings inside the Botanic Gardens and visited by the young King Chulalongkorn of Siam (Thailand) who posed with a grand assembly of notables for the first known photograph taken of SBG (see the article by Daniel Tham in *Gardenwise* 42: 4–5, 2014).

So important were such shows that by 1882, SBG Superintendent Nathaniel Cantley was constructing The [Large] Plant House as a permanent venue for shows. According to Burkill's history, this building was used “again and again for that purpose, the collection of pot plants within it being removed temporarily”. The Plant House was given a roof in 1885 and its name and location are still preserved today, though the building has given way to a pergola

supporting a collection of flowering climbers. The annual reports after 1885 regularly mention flower shows, and by Director Henry Ridley's time there were even major international exhibitions mounted by the Gardens, such as the Agri-Horticultural Exhibition of Peninsular Malaya held in Singapore in 1906, which was said to be the largest exhibition ever held in the East.

Moving to the 1930s we know that Director Eric Holttum was a strong supporter of local flower shows, which soon developed a flavour for orchids. Holttum also contributed to the development of a local gardening culture by helping to form two groups – the Malayan Orchid Society (which is today known as the Orchid Society of South East Asia) in 1928 and the Singapore Gardening Society in 1936 (see *The Gardens' Bulletin: A special issue to mark the eightieth birthday of R.E. Holttum* 30: 9–12, 1975). Under Holttum's guidance, both societies flourished to promote enthusiasm for gardening and orchid cultivation in Singapore and the region. They continue to play prominent roles today, and their participation as key partners of SGF provides evidence of this.

SGF – SINGAPORE'S CONTEMPORARY GARDEN FESTIVAL

More than one hundred and forty years after the Agri-Horticultural Society held the first flower show in Singapore, Dr Kiat Tan, the then-CEO of NParks and former director of SBG (and current CEO of Gardens by the Bay), initiated SGF with the objective of bringing together members of the community and industry to share their passion for horticulture and gardening. Another key motive behind organising SGF was to build capacity in horticulture and landscape design within NParks. While it was not possible to bring the body of staff that would benefit from such a trip to major botanic gardens and garden festivals around the world, a representation of such talent and skills was brought to Singapore in the form of a major regional garden festival. From its launch in 2006, this biennial event has provided an international platform to attract horticulturists, florists and landscape designers from around the world to showcase their skills in the tropics.

NParks organised SGF 2006 and the three editions which followed (in 2008, 2010 and 2012), with SBG taking a key



SGF 2014 attracted thousands of attendees. (Photo credit: Singapore Garden Festival)

leadership role, and starting with SGF 2014, now organises the event jointly with Gardens by the Bay. Much of the hard work required for the production of such a large event is managed by a dedicated

team under two branches of SBG – the Singapore Garden Festival branch and Horticulture, Exhibitions and Events branch. Previous editions of SGF were held at the indoor setting of Suntec Singapore,



Deputy CEO of Gardens by the Bay, Ms Peggy Chong (centre), and Singapore Garden Festival Deputy Director Mr Dennis Lim (right) received the 2014 International Garden Tourism – Achievement of the Year Award in Metz, France. They are shown here with the Canadian Garden Council Executive Director Mr Michel Gauthier (left). (Photo credit: Singapore Garden Festival)

but in 2014 the festival moved to Gardens by the Bay. SGF 2014 proved to be hugely successful, undoubtedly due not only to the new world-class garden setting, but the collaborative efforts of staff from SBG and Gardens by the Bay in organising it. SGF 2014 was attended by more than 300,000 tourists and locals, and also won the 2014 International Garden Tourism – Achievement of the Year Award, by the Canadian Garden Tourism Council.

Although SGF is a relatively young event – it will only mark its 10th anniversary in 2016, when it will be held again at Gardens by the Bay – it can perhaps be considered a contemporary version of the earliest flower shows put on by SBG, and in this way, also part of a long-running tradition dating more than 150 years and tied to the heritage of the Gardens.

HIGHLIGHTS OF SGF 2014

OVER 50 designers from 15 countries competed for top awards in the categories of Landscape Gardens, Fantasy Gardens, Balcony Gardens, Floral Windows to the World and Celebrations! Floral Table Series. The displays showcased more than 250,000 plants and over 1,000 different species. Awards were determined by an international panel of judges renowned from the gardening and floristry worlds. The highest prize, the Horticultural Excellence Award, was given to Jim Fogarty of Australia, for his Landscape Garden entitled ‘Australasia’, and his implementing partner Home Landscape Pte Ltd.

Best of Show awards were also given in each of the five categories. In the Landscape Gardens category, British designers Andrew Wilson and Gavin McWilliam (and their local implementing partner Evershine Projects Pte Ltd) won for their elevated ‘Sacred Grove’ display. The Best of Show in the Fantasy Gardens category went to Michael Petrie from the USA (and his local implementing partner Eco-scape Maintenance) for his recycled-themed garden entitled ‘Back to the Wild’. In the Balcony Gardens category, ‘Secret Garden’ from Singapore’s Andy Eng (partnered with Nye Phoe Flower Garden Pte Ltd) won the Best of Show, and Annette von Einem from Denmark won the Best of Show award for her stunning entry in the Floral Windows to the World category, ‘The Ice Queen’s Spring Breath’.

For the first time in SGF history, three technical prizes were also awarded. The

Best Construction award, which recognises the workmanship of the Singaporean implementing partners for the designs, was given to two participants which tied for the honour – Hawaii Landscape Pte Ltd for construction of Brendan Moar’s ‘Vertical’ Landscape Garden, and Landscape Engineering Pte Ltd for the implementation of James Basson’s ‘Tartarus’ Fantasy Garden. ‘Tartarus’ was recognised with another new award, for Best Indoor Lighting. The third of the new awards, for Best Outdoor Lighting, was awarded to Andy Sturgeon and his implementing partner Sweet Bee Contractor Pte Ltd for their ‘Full Circle?’ display.

In addition to the awards given by the panel of international judges, the public was provided an opportunity to vote for their favourite entries. The People’s Choice award winners were New Zealanders Kate Hillier and Dan Rutherford, who partnered with local landscape firm Flora Landscape Pte

Ltd in the creation of their ‘Winter Illusion’ entry as a Fantasy Garden.

One of the major highlights of SGF 2014 was Orchid Extravaganza. The impressive display, which was designed by award-winning landscape architect Jun-ichi Inada from Japan, was installed in the Flower Dome of Gardens by the Bay. This giant immersive display featured more than 40 different species and hybrids of orchids, a total of 18,000 plants, mounted onto a 10 m tall kaleidoscope. Visitors were welcome to enter this colourful exhibit and view the kaleidoscope from within.

An intriguing addition to this most recent edition of SGF was a Miniature Gardens display, which featured six intricately designed gardens that were inspired by popular fiction, such as ‘Harry Potter’s Greenhouse’ and ‘Alfred Hitchcock’s *The Birds*’. These tiny gardens, approximately 0.5 m by 1 m each, showcased miniature plants in settings of intricately-designed furniture and accessories. There were long queues of families intrigued to see this new genre for Singapore.

SGF 2014 also provided opportunities for local talent to showcase their skills and enthusiasm for gardening and horticulture. The Community in Bloom (CIB)



▶ Andy Eng's 'Secret Garden' won the Best of Show in the Balcony Gardens category. (Photo credit: Singapore Garden Festival)



▶ 'Back to the Wild', by Michael Petrie, won Best of Show in the Fantasy Gardens category. (Photo credit: Singapore Garden Festival)



▶ The kaleidoscope of orchids featured in the Flower Dome of Gardens by the Bay was a big hit with visitors. (Photo credit: Gardens by the Bay)



▶ Two table top floral displays won Best of Show awards – the winning Amateur display was 'Miracle Dining Table' (top) by Tan Han Xiang @ Han Ashworth and the winning Professional display was 'Enchanted Night' (bottom) by Winston Chin. (Photo credit: Singapore Garden Festival)



► The Flower Dome at Gardens by the Bay held the impressive 10 m tall kaleidoscope featured as part of Orchid Extravaganza. (Photo credit: Gardens by the Bay)



► 'Sacred Grove', which won Best of Show in the Landscape Gardens category, was designed by Andrew Wilson and Gavin McWilliam. (Photo credit: Singapore Garden Festival)

Gardeners' Cup competition embraced the participation of 37 community gardening groups from around Singapore, and a number of these won awards for their efforts. The Celebrations! Floral Table Series competition provided an opportunity for local florists to showcase their artistry, and seven teams presented stunning floral table top creations in this category. Two entries won Best of Show awards – 'Miracle Dining Table' by Tan Han Xiang @ Han Ashworth (Amateur) and 'Enchanted Night' by Winston Chin (Professional). 🌿

Nigel P. Taylor
Director SBG

Dennis Lim
Singapore Garden Festival

Ada Davis
Communications and Community
Engagement



► The Best of Show award in the Floral Windows to the World category went to Annette von Einem for her entry entitled 'The Ice Queen's Spring Breath'. (Photo credit: Singapore Garden Festival)



► The historic Burkill Hall overlooks the National Orchid Garden. (Photo credit: Benjamin Aw)

COMPLETED in 1868, Burkill Hall is the oldest building constructed on site at the Singapore Botanic Gardens (SBG). It is named for two generations of Gardens’ directors from the Burkill family (Henry Burkill, in office 1912–1925 and Humphrey Burkill, 1957–1969), who each lived in it during their separate tenures. It was originally built as a residence for Lawrence Niven, the Scotsman who designed and developed SBG between 1860 and 1875 for the Agri-Horticultural Society. Published sources of information on the Gardens mostly refer to Burkill Hall as a ‘black-and-white’ bungalow. For example, it is so described in three places in Bonnie Tinsley’s *Gardens of Perpetual Summer* (pages 77, 141 and 176), published in 2009 for SBG’s 150th anniversary. However, it turns out that this description is misleading and furthermore actually obscures the real significance of the building in historic terms. One can be forgiven for thinking of it as a black-and-white, because that is how it is currently decorated, though it was not always painted in this style.

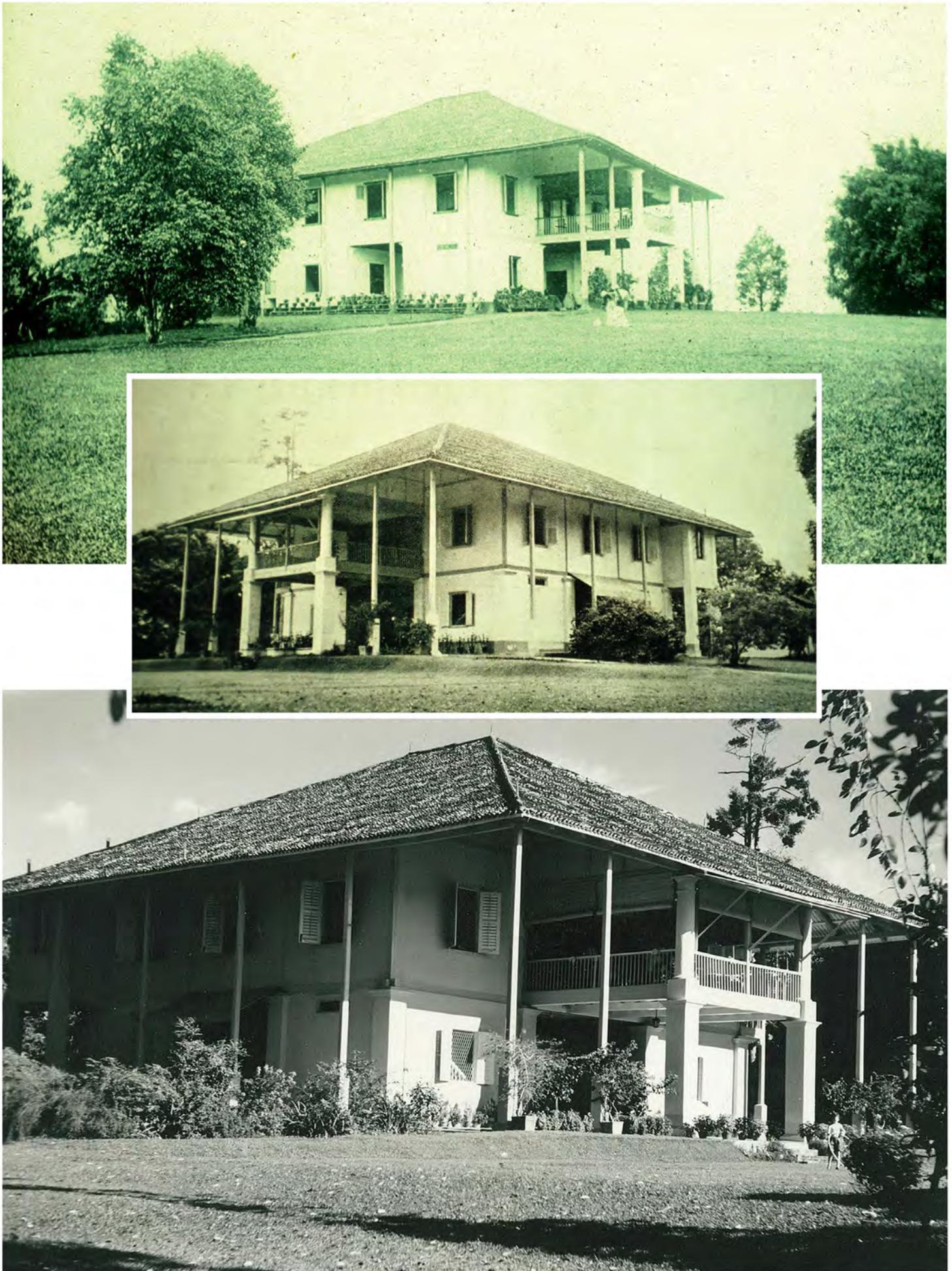
According to the scholarly work by Julian Davison, *Black and White: The Singapore House 1898–1941*, houses or bungalows in that style, which are characteristic of Singapore, began with the first commission given to R A J Bidwell, an architect at the firm of Swan & Maclaren. This was the house named Atbara (built 1898) at 5 Gallop Road, to the west of SBG, and which was recently restored to its former glory by the Singapore Government. The concept of the black-and-white bungalow was inspired by the British Arts and Crafts Movement, dating from the mid 19th century and taking its style from mocking the Tudor and Elizabethan (15th–16th centuries) timber-framed houses of medieval Britain. In Singapore this style was adapted to suit local climatic conditions, building materials and craftsmen, and constructed both for private

owners as well as for expatriate public employees and officers of the armed forces stationed in the British colony. SBG has a classic example of this genre in Corner House, built in 1910 (not “in the 1920s” as Davison’s book suggests), which currently houses a fine dining restaurant.

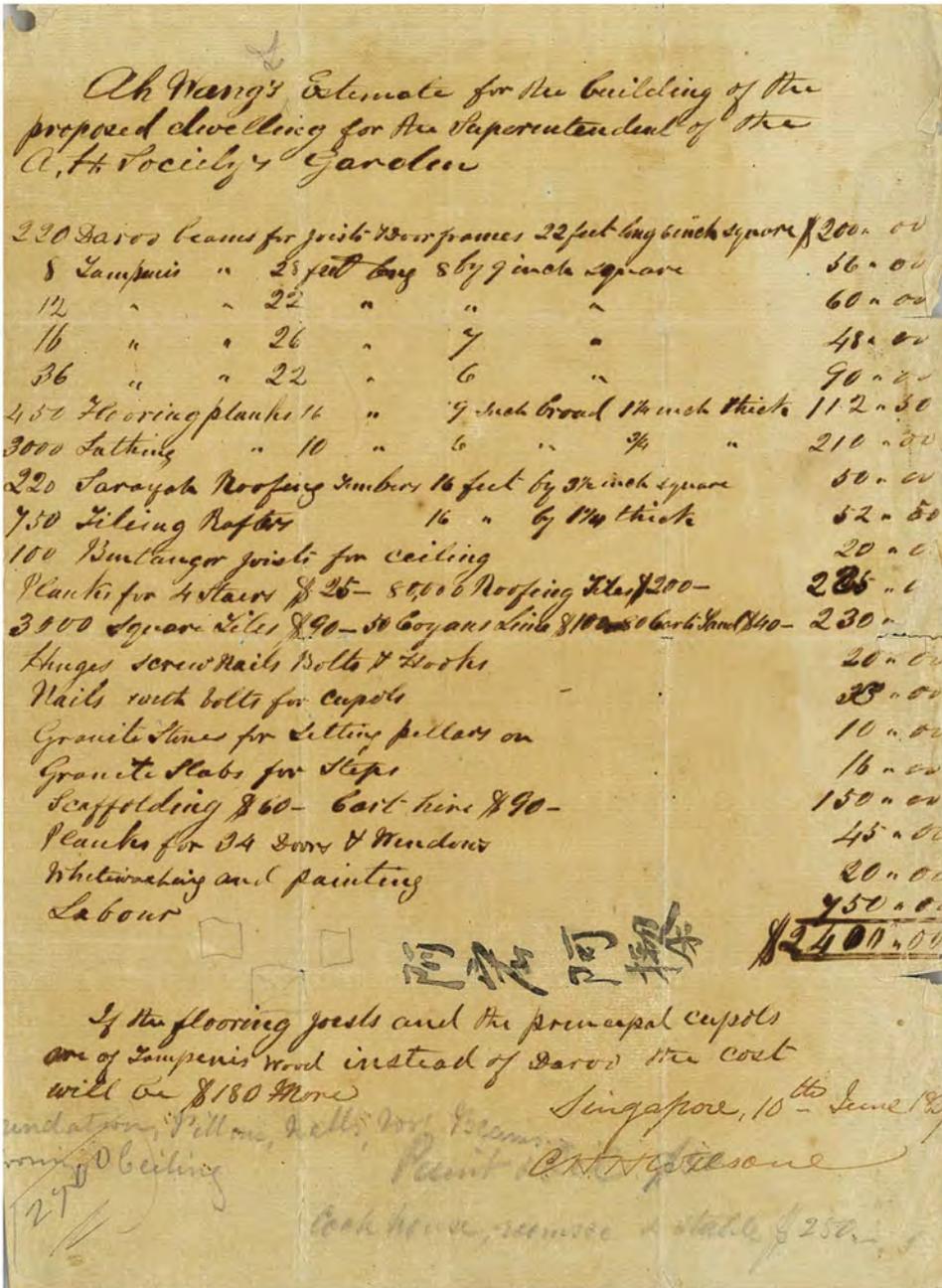
So, to what architectural category does Burkill Hall belong? The answer to this question can also be gleaned from Davison’s book, which suggests that it is an example of the Anglo-Malay plantation style residence (others have referred to these more specifically as Anglo-Singaporean bungalows). This style in turn had developed from the Anglo-Indian bungalow (a word which derives from the Hindustani *bangala*, meaning “of, or belonging to, Bengal”), which evolved during the 17th and 18th centuries in

British India for the residences of officers of the East India Company. In Singapore the first Anglo-Malay plantation houses were likely associated with nutmeg production and were built along the hills on either side of Orchard Road, which, of course, is named for the nutmeg orchards that dominated the area in the 1840s and 1850s. The first such house to be recorded was at Cairn Hill (originally named Carnie Hill; today it is referred to as Cairnhill), depicted in the famous painting by Charles Dyce of Mr Carnie’s nutmeg plantation in 1842. Early photographs of such houses can be seen on pages 76–77 of Gretchen Liu’s admirable tome, *Singapore: A Pictorial History 1819–2000*. They also formerly existed in Peninsular Malaysia, an extremely similar example to Burkill Hall being the Rajah Rest House in Penang, as seen in the image from 1910 reproduced in Cheah Jin Seng’s *Penang: 500 Early Postcards* (Editions Didier Millet, 2012). This Burkill Hall look-alike was demolished in 1935 and replaced by the Istana of Kedah.

Characteristic of Anglo-Malay plantation style houses are their almost pyramidal roofs with only a very short or non-existent ridge and greatly over-hanging eaves, the entrance protecting the arriving visitor from the weather by a covered porch or *porte cochère* – all features seen in Burkill Hall. The living quarters were on the upper floor, which was largely constructed of timber supported upon brick pillars to keep



► Burkill Hall in 1877 (top), 1910 (centre) and 1959 (bottom). (Courtesy of Singapore Botanic Gardens Archives)



► The estimated bill of works from 1867. (Courtesy of Singapore Botanic Gardens Archives)

the wood away from termites and floods. Verandas were a common feature of this level, which received cooling breezes in the late afternoons and evenings, making them favourite places to relax after the heat and toil of the day. Burkill Hall's verandas are on the east and west sides of the building and are connected by a common area from which the bedrooms are accessed, giving what the architectural historian Dr Jon Lim (personal communication) calls a wind-tunnel effect of through-breezes.

The simplest examples of Anglo-Malay plantation style houses had thatched roofs of *atap* (from leaves of the *Nypa* mangrove palm), but the roof of Burkill Hall was tiled from the start. Another remarkable thing about this last survivor is that we have the estimated bill of works (1867) drawn up by the contracted builder, Ah Wang, which

lists all the building materials and costs them out (for example, the estimate states "80,000 roofing tiles - \$200"). The total labour charge was \$750 and the complete building cost \$2400!

Sadly, this style of house has all but completely disappeared and Burkill Hall may even be the very last of its kind in the region, not counting its somewhat different Singaporean sister, the Sri Temasek (1867), a colonial secretary's bungalow built on the grounds of the Istana (Government House). Many plantation houses in Singapore gave way to urbanisation as the city conquered the former plantation land, especially since from 1857 the nutmeg was in decline due to disease. Others were not maintained and likely rotted and crumbled away, or were replaced with more lavish dwellings as the wealth of



► The upper level of Burkill Hall held the living quarters of Aw)



► A large open common area connects the rooms of the upper level for special occasions, but otherwise the upper floor is reserved for the

the inhabitants and land values increased during the rubber and subsequent economic booms.

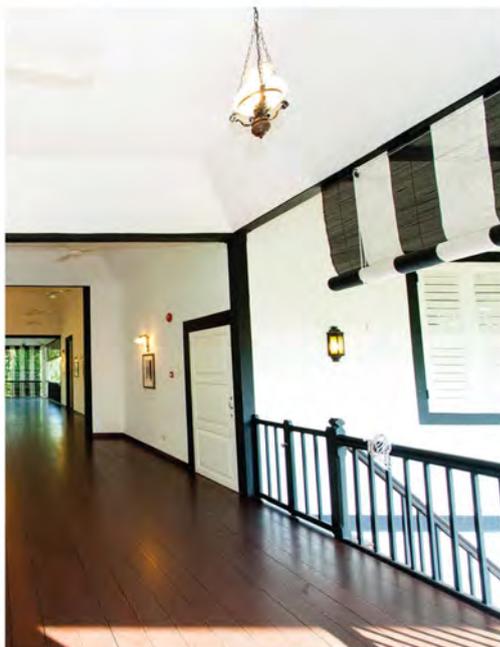
Thus, Burkill Hall can now be seen as a very special building unmatched elsewhere. That it was not a typical black-and-white bungalow was already recognised 10 years ago by Ruth Kiew, former Keeper of the Singapore Herbarium, who wrote (in *Gardenwise* 23: 17, 2004): "Today, Burkill Hall is one of the few outstanding examples of early residences in Singapore with an elegance not matched by the later mock Tudor black-and-white houses that became popular later in the nineteenth century".



rs of former SBG directors. (Photo credit: Benjamin



► Simon and Amy Burkill stopped by SBG during a recent visit to Singapore while on their honeymoon. Simon is the grandson of Humphrey Burkill and great-grandson of Henry, for whom the building is named. (Photo credit: Benjamin Aw)



ie upper floor. Burkill Hall can be hired by the public is rarely seen by visitors. (Photo credit: Benjamin Aw)



► Current SBG director Nigel Taylor with Amy and Simon Burkill outside of Burkill Hall. (Photo credit: Benjamin Aw)

When she wrote that remark, Burkill Hall was already decorated as a black-and-white and, according to former director Dr Kiat Tan (personal communication), was already so when he joined the Gardens in 1983. Even earlier, Prof. Peter Burkill (son of Humphrey) and his sister remember staying in the house in the early 1960s during school holidays, and they say it was already decorated in black and white, so it seems likely that its current decoration could date from when Humphrey became director in 1957. There are at least three early halftone images of the building, dating from around 1959, 1910 and the 1870s, that show it differently decorated over a period

of 80 years, with the main wooden supports to the roof in white and the other wooden frames painted in a darker hue, but clearly not in black. The earlier-mentioned 1867 bill of works states that when built, it was to be white-washed, a common treatment for such houses, but alas we do not know exactly how it looked upon completion in 1868.

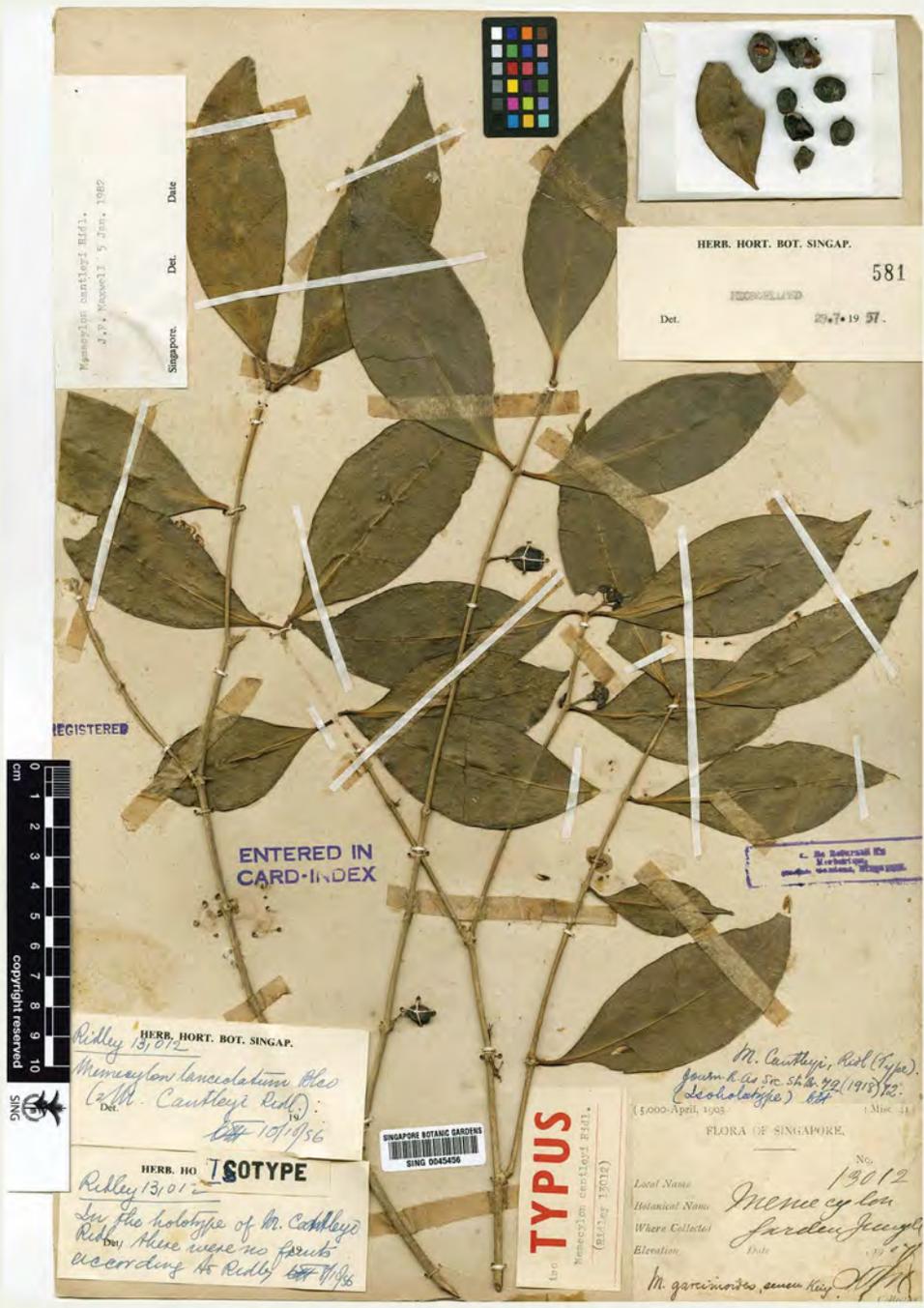
One day we will need to decide how to redecorate this grand survivor of a bygone era. The author is keen to hear from anyone who either knows its former colours or can advise on the best guess for how it should be painted. For now, all we can be sure

about is that for 80 years of its life it was not painted in the black and white combination as we see it today.

Acknowledgments: the author would like to thank Dr Kevin Tan (Singapore Heritage Society), Dr Jon Lim and Prof. Peter Burkill for their valuable contributions to the development of this note. 🌿

Nigel P. Taylor
Director SBG

THE ENIGMATIC CANTLEY'S MEMECCYLON



▶ Type specimen held at the Herbarium, collected from a tree in the Gardens' Rain Forest in 1907. (Photo credit: Siti Bazillah)

THERE is something mysterious about two small trees in the Gardens' Rain Forest which stand beside the gate of the Potting Yard. These are *Memecylon cantleyi*, a species that was described by Henry Ridley, the first director of the Gardens (1888–1912), from a herbarium specimen that he collected in 1907 from the Gardens Jungle (today's Rain Forest). However, he didn't know that the species was unknown to science at the time, and it wasn't until 1918, after Ridley realised that this was a new species, that he described and named it in honour of his predecessor, Nathaniel Cantley, who was the second superintendent of the Gardens (1880–1888).

What's puzzling is that *Memecylon cantleyi* has not been encountered in any of Singapore's forests, other than the two trees in the Gardens' Rain Forest, in the 107 years since its discovery. So then, was one of our trees the source of the type herbarium specimen (Ridley's original specimen from which the plant was first named and the description of the species based on)? If so, then that would mean the tree is more than 107 years old, a viable possibility given that our trees are of mature size for the species. If not, are these trees the descendants of that original?

We do not know why this species is so rare in Singapore, nor do we know how it is pollinated or how the seeds are dispersed. Although one of our trees has been seen fruiting several times over the years, as far as we know, any collected seeds have not germinated well, and the few seedlings that have managed to germinate have not survived to maturity.

Well, the good news is that two more trees were recently discovered during flora surveys, resulting in the species now being recorded to exist in two localities of the MacRitchie forest, and providing us with two new seed sources of local genetic material for potential propagation.

MACRITCHIE FOREST

The MacRitchie forest is one of the most visited and recognised nature areas in Singapore. Like the Bukit Timah Nature Reserve, it is a favourite of many people, whether for their regular running fix, cross-country training, hiking or relaxing walks through the forest. Located at the southern part of the Central Catchment Nature Reserve (CCNR), this forest, which is about 553 hectares in size (excluding the reservoir and park areas), was largely exploited for its timber more than a century and a half ago. To meet the needs of a growing population, in 1867 the then-Colonial public works department constructed a reservoir, and recognising the value of protecting the forested cover of the reservoir's natural water catchment, gazetted most of this land. This resulted in the conservation of today's few remaining scattered patches of primary forest in Singapore, and the secondary regrowth that has regenerated around it. The MacRitchie forest also comprises



► The attractive greyish-white trunk of the tree. (Photo credit: Paul Leong)



► A tree in flower in the Gardens' Rain Forest. (Photo credit: Paul Leong)

some remnants of an abandoned rubber plantation and fruit orchards.

While several floristic studies have been conducted within the MacRitchie forest over the years, mainly using sample plots or observations along the numerous forest trails, no comprehensive surveys have been done. As the last flora checklist of CCNR was published in 1997, a revision is currently in the works. Hence, in April 2014, an inter-divisional effort was undertaken to survey parts of the MacRitchie forest, with the main objectives of documenting the richness of the biodiversity, especially in the primary forest patches. The effort comprised staff from the National Biodiversity Centre, the Singapore Herbarium, the Centre for Urban Greenery and Ecology (CUGE) and tree climbers from NParks' Streetscape Division.

Attesting to the fact that much of the MacRitchie forest had been previously poorly studied, the survey resulted in many interesting finds from both the primary forest and the mature secondary forest. Discoveries included some species that were previously thought to be extinct in Singapore as well as some species rarely found outside this forest. It was quite fortuitous that the survey turned up two individuals of *Memecylon cantleyi* almost two kilometres apart, one deep within the forest, running through a primary forest patch, and the other just along a well-used public trail within secondary forest vegetation.

MEMECYLON CANTLEYI

Memecylon cantleyi is a large shrub or small tree that can reach a height of about 10 m and a trunk diameter of 25 cm. It is found in the Malesian region, from Thailand in the north to Peninsular Malaysia and Singapore in the south, and from Sumatra in the west to Borneo in the east. Other than its rather attractive greyish-white trunk, when not in bloom, *M. cantleyi* is almost inconspicuous in a forest setting. However, it is transformed into a captivating sight when flowering and then again during fruiting. Subsequent to that, flushes of thin textured new leaves of an attractive glossy bronze-green appear. The leaves are held by pale brown twigs and become more leathery as they mature. The upper surface of the elliptic leaves is a mid-green colour and the underside is slightly paler. The venation is indistinct.

Flowering tends to occur from March to early May, and is followed by fruiting from May to July. There is another less defined flowering period starting around mid-September. When in bloom, inflorescences can sprout from almost every node of the



► Various stages of flowering on a twig. (Photo credit: Paul Leong)



► Young buds exhibiting the deep pink calyx and a hint of bluish on the unopened petals. (Photo credit: Paul Leong)



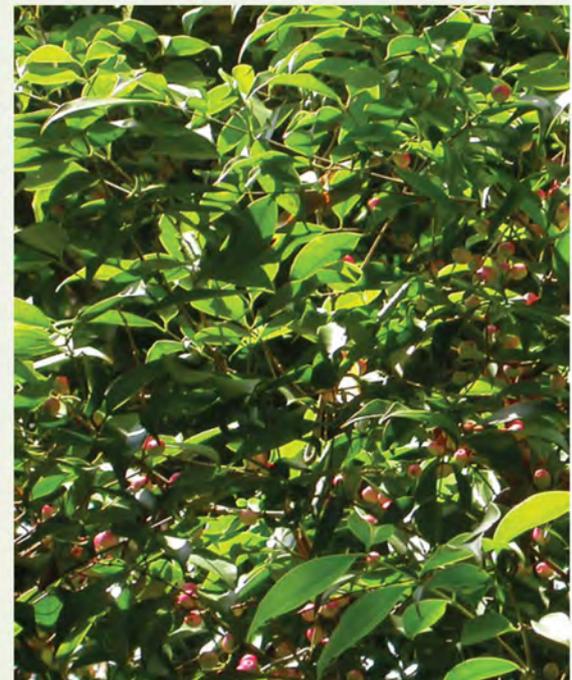
► An inflorescence of blue flowers hugging a twig. (Photo credit: Paul Leong)



► Urn-shaped young white fruit and various hues of the aborted calyx. (Photo credit: Serena Lee)



► When in flower, almost every node on the twigs is covered with inflorescences. (Photo credit: Paul Leong)



► One of the trees in the Gardens' Rain Forest covered with pi



► Mature buds exhibiting the pale pink to almost white calyx. (Photo credit: Paul Leong)



► A twig with lovely pink-white fruits. (Photo credit: Paul Leong)



► A bush with lovely pink fruits. (Photo credit: Paul Leong)

CANTLEY – A MAN OF ORDER

NATHANIEL Cantley, a native of Thurso on the northern coast of Scotland (c. 59°N latitude), came to SBG as superintendent in November 1880. He had been serving as assistant superintendent at the botanic gardens of Mauritius following his training at Kew Gardens. It seems the environment in Singapore did not suit him, since within four months of his arrival he was forced to take sick leave and returned to England for six months in March 1881. This was not lost time, however, since he was able to learn how to manage a herbarium and brought back more than 260 new plants for cultivation from Kew and commercial nurseries. He also visited the London Zoo, where he determined the identities of caged birds in SBG's collection. Again, at the end of 1887, ill health returned and he went on sick leave to Australia where he died the following year. Nonetheless, his seven years in charge resulted in many positive changes to the Gardens.

Cantley, Henry Burkill tells us, “was a great advocate of order”, in contrast with his immediate predecessor, James Murton, who had left the Gardens' finances in disarray. Cantley's first action seems to have been to suppress a catalogue of the Gardens' living collections sent to press by Murton shortly before he resigned, because the former claimed it was altogether unreliable (there are certainly a lot of misprints in it). Cantley was soon successful in bidding for funds to make a wide range of improvements to the Gardens' order and infrastructure. Having reported to the government on his sick leave studies at Kew he went on to request the building of a herbarium and library, which became Ridley Hall (1882). Then he rationalised the accommodation of the garden workers into a single area so that they had no excuse to wander around visiting each other at night as had been the case previously and was thought conducive to thefts. He got the collections properly labelled and founded two new nurseries, one of which supplied trees for Singapore's forest reserves, streets and parks. Between 1882 and 1885 he constructed the Plant House as a permanent venue for public flower shows and tender plant displays. Last, he built the Main Gate pillars in 1886 – their modern equivalents are maintained at the same spacing as Cantley's.

But the Botanic Gardens were not Cantley's only responsibility. During the latter part of his tenure he was increasingly occupied with Singapore's forest reserves, which the government had realised were in danger of disappearing under the axe. His successor in 1888, the first director, Henry Ridley, inherited a Botanic Gardens in much better order and an Economic Garden with more than 1,000 Pará rubber trees ripe for tapping their latex. It is thus not surprising that Ridley saw fit to honour Cantley in his naming of *Memecylon cantleyi*. 🌿

Nigel P. Taylor
Director SBG



► Fruits and seeds at different stages of ripeness. (Photo credit: Lua, H.K.)



► Single-seeded fruits. (Photo credit: Paul Leong)

leaf axils, generally exhibiting two shortly-stalked bunches per node, each with about six to more than 10 flowers. The goblet-shaped calyces of the fresh flower buds appear a deep pink, budding from the basal, leafless parts of the twigs first and then progressing to the leafy apical regions. The calyces mature to a paler pink colour, to almost whitish, before the flowers open.

The profusion of inflorescences, with the tonal graduations of the calyces in shades of pink and white amongst the pale brown twigs, is a delightful sight. The beauty is further enhanced when the flowers start to open. The petals are reflexed, bluish-white

at the apex and violet-blue near the base. The stamens exhibit deep blue anthers with crescent-shaped connective tissues, each with a maroon gland at the centre, like the eye of a bean, and pale yellow pollen sacs. Each flower is about 0.8 cm across and held in a bunch that is about 3 cm across. As blue-coloured flowers are a rarity, especially in the tropics, bunches of these seen hugging the twigs are truly a magnificent sight to behold.

When pollinated, a single-seeded fruit is formed, which is initially urn-shaped but develops to almost round

as it matures. The colour also changes with maturity, from white to pink, with many fruits exhibiting a suffusion of these colours, not unlike peaches. It then ripens to a purplish-blue, almost blackish colour. A mature fruit is about 1.5 cm by 1.3 cm in size. Thus, when the tree is covered with an assortment of fruit in colours of white, pink, purplish-blue and almost blackish-blue, it is again a lovely sight to behold.

PROPAGATION

In the past, we have tried to propagate *Memecylon cantleyi* from material collected from the specimens in the Gardens' Rain Forest, but our attempts have largely been unsuccessful. Seeds have germinated poorly while stem cuttings have been difficult to establish; those that have established have had a low survival rate when planted out. So when the newly-discovered MacRitchie specimens fruited recently, we were eager to collect material from these two new seed sources.

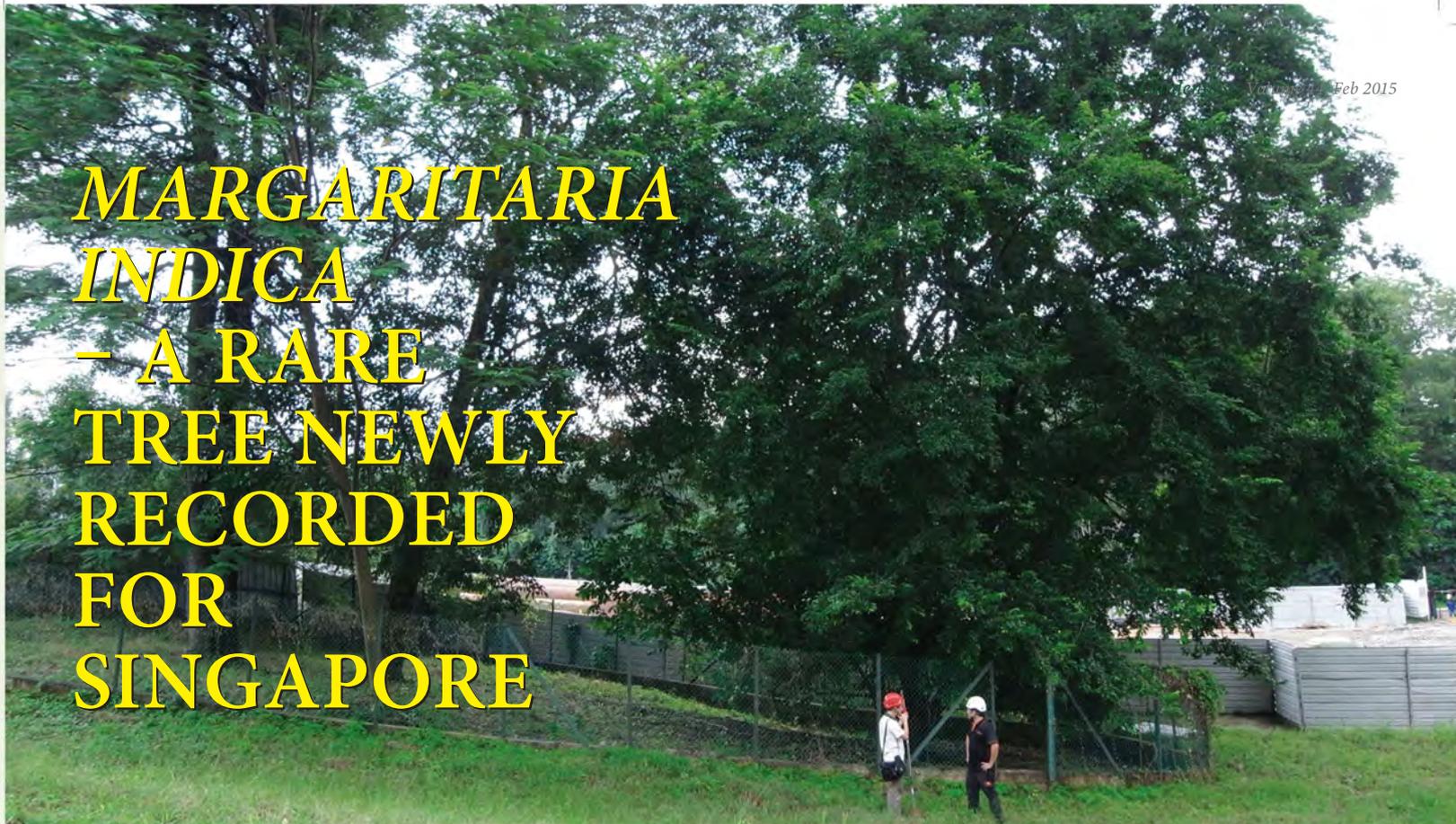
The seeds collected from the MacRitchie specimens were given to staff from the Gardens' Plant Resource Centre, who then cleaned and sowed the seeds in a media of peat, perlite and washed sand. We are delighted to report that the initial results have been good. Although the seeds collected from the tree deep in the forest near the primary patch did not germinate, those collected from the tree near the secondary forest patch began to germinate in July of last year. The germination rate was very high: out of the 47 seeds sown, a total of 36 germinated! If these manage to grow to a suitable size, we will try to reintroduce some back into our forests, beginning with the Gardens' Rain Forest, where they can be monitored easily. 🌱

Paul Leong and Parusuraman Athen
Herbarium

Lua Hock Keong
National Biodiversity Centre

Sunia Teo
Horticulture, Exhibitions and Events

MARGARITARIA INDICA - A RARE TREE NEWLY RECORDED FOR SINGAPORE



► The *Margaritaria indica* tree (right) inside the tree protection zone at the UTown construction site at Kent Ridge in 2012.

THE Warren Golf Club, which was founded in 1962 by Brigadier Derek Warren, commanding officer of the 18th Signal Regiment of the British Army, was originally located along Dover Road in south central Singapore. The club was relocated to its current location at Choa Chu Kang Way in 2000, as the Dover Road site was earmarked for an extension of the National University of Singapore (NUS) complex located at Kent Ridge. This new extension, named University Town or ‘UTown’, was functional by 2011, except for the north western portion of the site, which is currently still under construction. It was within this area, next to a buggy path, that a large unidentified tree (more than 20 m tall and with an approximate girth of 2.5 m) was encountered in 2012. A herbarium voucher consisting of a leafy branch with fruits was forwarded to NParks’ Streetscape Division, and then on to SBG for identification. At the Singapore Herbarium, this specimen was eventually matched to *Margaritaria indica* (Dalzell) Airy Shaw, which is a new genus and species record for the Singapore flora*.

Margaritaria is a pantropical genus (excluding the Pacific Islands) in the family Phyllanthaceae, with 14 species recognised. The species are variously found in deciduous forest, dry forest and evergreen forest in the lowlands, as well as on limestone or in riparian vegetation, and also in secondary forests. All *Margaritaria* species are dioecious, that is, individuals are either male or female. Other characteristic features of the genus include a distichous leaf arrangement (the leaves are arranged in two rows on either side of the stem) and axillary flowers that lack petals and have four sepals which occur in two series. The fruits are capsules with three locules (cavities), and the seeds have a bluish-purple sarcotesta (outer layer) and a thick bony endotesta (inner layer).

In Malesia, the genus was revised by Christine Barker (published in 2001 in *Blumea*), with only two species enumerated,

Margaritaria indica and *Margaritaria luzoniensis*. She has also recognised two forms within *Margaritaria indica*, namely *Margaritaria indica* f. *indica* and *Margaritaria indica* f. *vestita*. The first of these is completely glabrous, with leaves drying dark brown, acute to acuminate leaf apices and slender fruiting pedicels (stalks) that are 0.3 mm in diameter (in dried material). In contrast, *Margaritaria indica* f. *vestita* is sparsely pubescent on at least the pedicels, with leaves drying olive brown, obtuse to rounded leaf apices and thicker fruiting pedicels that are approximately 1 mm diameter (in dried material); this form is known only from East Java. The Singapore material is clearly *Margaritaria indica* f. *indica*.

Margaritaria indica is an extremely rare species but it has a very wide distribution, occurring from India (on the Deccan Plateau) and Sri Lanka through Myanmar,



► The attractive salmon pink to orange-brown scaly-dippled bark of the recently discovered tree at Kent Ridge.

Thailand, northern Vietnam, southern China (in the south western part of Guangxi) and Taiwan, across Malesia and up to Australia (North Queensland). In



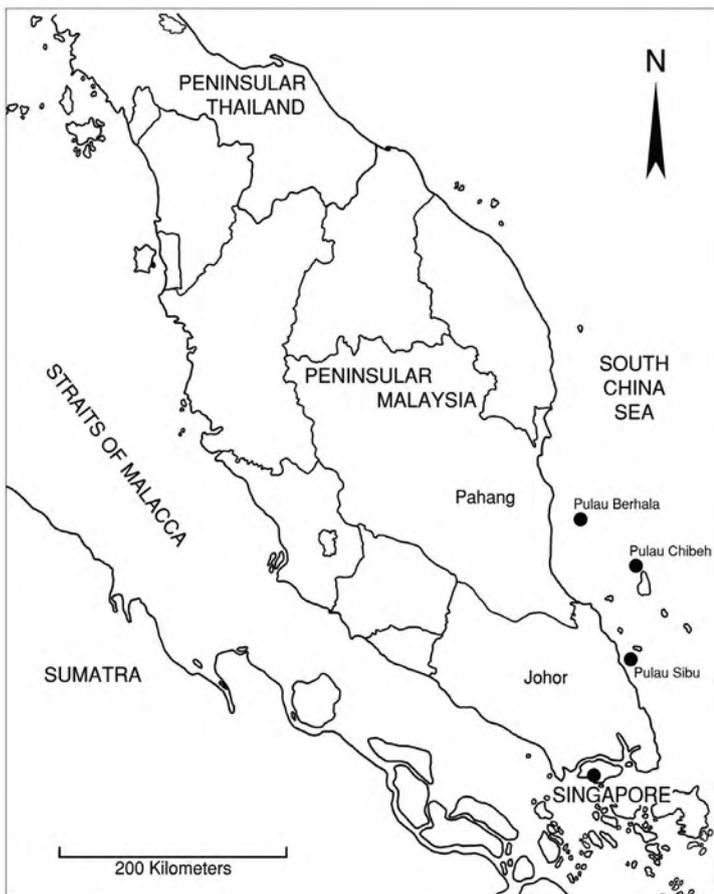
► The characteristically long, pendulous branches with distichous leaves.



► A close-up of a fruiting branch showing immature fruits in small clusters.



► Each immature fruit has conspicuous fine sutures along its length and a flat-spreading forked stigma.



► The distribution of *Margaritaria indica* in Peninsular Malaysia and Singapore, indicated by black dots.

Peninsular Malaysia, the species has only been collected three times, from islands off the south west coast of Pahang (Pulau Chibeh) and Johor (Pulau Berhala and Pulau Sibul). The recently discovered individual is the only one known to occur in Singapore.

Margaritaria indica has been categorised as ‘Critically Endangered’ in Singapore, based on the Red Data Book (2008) categories. The individual located at the former Warren Golf Club site is also protected by Singapore’s Parks and Trees Act (because it occurs within a Tree Conservation Area and has a trunk girth of more than one metre), and has also recently become recognised as a Heritage Tree. NParks has already initiated *ex situ* conservation efforts to propagate this rare species.

Low Yee Wen
Paul Leong
Wong Khoon Meng
 Herbarium

Tee Swee Ping
 NParks’ Streetscape Division

Rajesh Singh
Martin Tay
 ArborCulture Pte Ltd

All photos by Low Yee Wen

* Low, Y.W., Leong, P.K.F., Tee, S.P., Rajesh Singh, Tay, M.L.C. & Wong, K.M. (2014). *Margaritaria* (Phyllanthaceae), a new generic record for the Singapore flora. *Gardens’ Bulletin Singapore* 66: 47–56.

A GINGER FOR SINGAPORE



► The spindle-shaped inflorescences of *Zingiber singapurense* are made of inflated orange-red bracts, giving them a somewhat bullate or 'bumpy' appearance. (Photo credit: Jana Leong-Škorničková)

THERE are moments in the life of a botanist that are very special. The first discovery of a new species for science is certainly a milestone in the career of a budding young botanist, and I will always remember the moment I stumbled on my 'first new species'. But as I've gotten older and ventured into lesser explored locations teeming with numerous undescribed plants, documenting a new species has become a rather mundane exercise. Yet from time to time, a new species turns up to start my heart racing again.

I started coming to Singapore regularly in 2002 as a visiting researcher. At that time, my knowledge of the place could have been summarised in a short paragraph which would read something like: "The Singapore Botanic Gardens is a centre of ginger research, pioneered by H.N. Ridley and R.E. Holttum. About 26 gingers are native to Singapore, but almost half of them are extinct due to deforestation and change in climate."

During these visits, I would often accompany my future colleagues from NParks on field trips to Singapore's nature reserves. When I eventually settled down and joined the Singapore Botanic Gardens in 2006, we started intensive ginger-focused surveys of forested areas, hoping to rediscover some of those species thought to be extinct. Our hard work paid off and a few gingers have indeed been 'brought back from the dead' since. But in the back of my mind, I have always wondered if there was any possibility of a still-undescribed species hidden somewhere in Singapore.

To be clear, the chances of such a discovery were close to zero. Today, less than 3% of Singapore is still covered by primary forests. Moreover, gingers are not exactly tiny plants particularly difficult to spot, and botanical explorations of Singapore date



► The leafy shoots of *Zingiber singaporense* are composed of narrow and glossy leaves. Unless flowering, they are hard to spot as they blend very well with other understory vegetation and at first glance are reminiscent of young palm fronds or even some terrestrial orchids. (Photo credit: Jana Leong-Škorničková)

back to the 1890s. Gingers in particular were of great interest to two of the Gardens' former directors, H.N. Ridley and R.E. Holttum. Both were excellent botanists who collected gingers from across the island and deposited specimens in our herbarium, where they were all identified. There was nothing to suggest that Singapore's gingers were not completely represented.

Fast-forward 10 years. Just when my Singapore ginger dream had almost totally faded away, a slight ray of hope appeared. On an ordinary day in 2012, my NParks colleague William Ng came out of the forest with two small ginger plants. They did not look like anything I had seen before in Singapore, although the leaves reminded me of several ginger species known from Malaysia. There was no flower, and it was not even clear if the plants were fully grown or just young plantlets. We tried to return to the location where they were found, but with no GPS reading, we were unable to find the spot again. Sadly, neither plant survived. It was such a pity. Not one to give up easily though, I

intensified surveys of potential areas and many of my colleagues helped to keep a special eye out for it.

It took more than a year, but we finally found the plant again, and in fact, we found populations in more than one location. None was in flower, but once the locations were known, it was only a matter of patience and fortnightly monitoring before we were able to observe the flowers. Six months later, we started to see the first signs of inflorescences. Although it usually takes a few weeks for ginger inflorescences to develop, we didn't want to miss the first flowers, so monitoring was intensified. Finally, just on my birthday, there it was – a beautiful spindle-shaped inflorescence, formed by orange-red, somewhat bullate bracts and a pale yellow, almost white, flower. I was overjoyed! But at the same time, I knew that the work was far from over. In fact, it had just started. Gingers belong to a taxonomically complicated plant group and the common saying “same, same, but different” sums them up best. The question to unravel was whether this

was a known species already described from somewhere else, in which case the finding would mean a new distributional record for it in Singapore, or if this was a new species that we had on our hands. Sleepless nights lay ahead.

To figure out the answer to our question, it was critical to have a good understanding of the identities of all the other *Zingiber* species described so far. The combination of characters such as a small habit, fusiform orange inflorescence with pale yellow flowers and narrow leaves revealed that this ginger belongs to the complicated subgroup of similar-looking species that are related to *Zingiber gracile*. Sieving through descriptions of more than 240 species names previously published and putting aside all those belonging to the same subgenus was fairly fast. So was a further selection, which narrowed it down to seven very similar (and therefore potentially the same) species, all described from Peninsular Malaysia. The nitty-gritty, which could also be called ‘botanical forensics’, followed.



► The two closely related species, *Zingiber aurantiacum* (top) from Fraser's Hill and *Z. elatius* (bottom) from Penang, have very similar leafy shoots, but differ in the shape of the inflorescence and flowers. (Photo credit: Jana Leong-Škorničková)



William Ng from NParks' Conservation team was the first to encounter *Zingiber singaporense* in the forest. (Photo credit: Dr Yam Tim Wing)



Aung Thame and Jana from Singapore Botanic Gardens during a routine botanical survey. (Photo credit: Michael Fook Hong Leong)

The next steps were to carefully read all the original publications describing the related species, and to study the original dried plant specimens (known as type material) located in various herbaria that were cited by the authors. Akin to a matching game, this process would enable us to identify the unknown ginger if we could match it perfectly to an already described species – the existence of any differences would allow us to strike each known species off the list in a process of elimination. However, some of the original descriptions reviewed were sparse in details, and the quality of the herbarium material also posed an obstacle in our investigation. A typical problem for gingers, herbarium material often loses critical characters in the process of pressing and drying, particularly on the flowers. Between poorly-detailed descriptions and poor-quality dried herbarium material, the investigation was stuck, and it became apparent that more effort was required to identify the unknown ginger. It turned out that it was necessary to make a quick trip to the type localities of the two most closely related species, *Zingiber aurantiacum* and *Zingiber elatius*, to observe flowering material and determine if they were indeed different from the Singapore plants. Luck was with me as both species were flowering during family holidays to Fraser's Hill and Penang, where I photographed them, and I was able to eliminate them as matches to the Singapore ginger.

It became clear that the Singapore ginger was unknown to science!

Once the detective work was over, worries over its conservation started to creep into the excitement. The absence of any existing herbarium material from Singapore in various herbaria hinted that this species was rare, and based on our knowledge we knew that it would have to be labelled as 'Critically Endangered'. Neither a search of the Singapore Herbarium, which is particularly rich in historical material from Peninsular Malaysia, nor of the largest herbarium in Peninsular Malaysia (housed in the Forest Research Institute in Kepong), which is rich in more recent collections, had revealed any existence of this species beyond the shores of Singapore. The evidence pointed to it being restricted to Singapore. In scientific jargon, it is endemic. Such an exclusive label comes with a great price though – the heavy responsibility to protect it. If we cannot ensure the survival of this Critically Endangered species, it will be lost forever. Can we keep it safe?

Even before our ginger flowered and we were unsure how precious and rare it was, several plants had been established in cultivation by the Singapore Botanic Gardens, a standard procedure for all native gingers. It is truly good fortune that unlike most native ginger species, this new species can be propagated from stem cuttings. The plants at the Gardens will be used to propagate more material, so that the species can eventually be planted into

various nature reserves. Once the stock has been built up, we also aim to distribute some material to gardening enthusiasts, who can serve as yet another layer of protection against the loss of this species. I am sure that all of us at NParks will do our utmost to continue to protect the tiny remnants of our primary forests, and will keep a special vigil in those areas known to contain this precious gem of a ginger.

Once it was clear that Singapore has one ginger more and I have one dream less, it was time to calm down and go hit the keyboard. The scientific publication describing and illustrating this new species had to be prepared, and a name was needed for it. While sometimes I take ages to mull over a new name, this time it was a no brainer. This small yet resilient species with orange-red bracts and almost white flowers, endemic to Singapore, is just about the perfect gift for this little red dot of ours, which somewhat accidentally has become my home. Just in time as we celebrate our nation's Golden Jubilee.

Zingiber singaporense was officially published in *The Gardens' Bulletin Singapore* in November 2014.

Happy 50th Birthday, Singapore! 🌿

Jana Leong-Škorničková
Herbarium

CRAKES OF THE NIGHT: AN INTRODUCTION TO THE RED-LEGGED CRAKE



▶ A red-legged crake parent poses with its well-developed chick. (Photo Credit: Francis Yap)

THE Singapore Botanic Gardens is a readily accessible green space located close to Singapore's highly urbanised city centre. Its comparatively large area of 74 hectares, coupled with a mosaic of habitats ranging from tropical rainforests to freshwater wetlands, has resulted in a site that supports a significant number of both resident and migratory birds. One of the most sought-after avian residents by visiting birdwatchers is the attractive red-legged crake (*Rallina fasciata*), and the Gardens holds the distinction of being one of the easiest places in the world to encounter this secretive species.

Crakes are members of the family Rallidae, which also includes rails, coots and gallinules. The family comprises 138 species spread across all continents, with the exception of Antarctica, and features numerous species endemic to oceanic islands. While most species are associated with densely vegetated wetlands, representatives of the family are also found in a wide variety of habitats ranging

from tropical rainforests to urban parks and water bodies. Of these 138 species, 12 have been recorded from Singapore. These include two members of the genus *Rallina*, or 'forest rails' – the red-legged crake and the slaty-legged crake (*Rallina eurizonoides*), the latter recorded as a rare migrant to Singapore.

The red-legged crake is a striking member

of its family, with its primarily chestnut-brown plumage, distinctive black-and-white bands on its belly as well as bright red legs and iris. Surprisingly, this colour combination provides good camouflage as it forages unobtrusively in the gloom of the forest floor. Males and females are similar in appearance, although females reportedly have a whitish throat. One particularly interesting aspect of its behaviour is that the species is partially nocturnal, and the unusual nasal vocalisations of single males or pairs are frequently heard in the middle of the night, when they are often dismissed as frog calls. Diurnal encounters are infrequent, most of which involve adults escorting young chicks or individuals presumably patrolling their territory. However, the likelihood of an encounter increases at dusk, when individuals often



▶ A red-legged crane crossing the walking trail at the Healing Garden (Photo Credit: Francis Yap)



▶ A red-legged crane parent oversees a tussle between two chicks for a caterpillar (Photo Credit: Low Bing Wen).



▶ A red-legged crane chick forages with its parent (Photo Credit: Low Bing Wen).

visit favoured water sources such as drains and shallow ponds to bathe.

Little is known about the foraging or breeding behaviour of the species, but anecdotal observations of the Gardens' crane population have shed some light on these aspects of their ecology. Adults have been observed to forage with slow, deliberate movements in both forested areas and open lawns, opportunistically consuming a variety of ground-dwelling invertebrates which are either detected visually or by turning over dead leaves. While no nests have been detected within the Gardens thus far, the presence of adults escorting chicks in the months of January and July suggests that the species may breed more than once within a calendar year. Like most rails, chicks start out flightless and uniformly black, and are escorted by their

parents for at least six weeks, during which time they gradually acquire flight feathers and adult colouration. Brood sizes of up to five chicks have been observed within the Gardens, but despite the constant attention of their parents, mortality rates are high and on several occasions only one chick was observed to fledge successfully. Sources of mortality are varied and potentially include birds of prey, snakes and monitor lizards as well as stray cats which inhabit the Gardens.

The red-legged crane is distributed widely across Asia, ranging from north east India through Indochina south to the Moluccan islands in Indonesia. The species is also partially migratory, with resident populations being supplemented between October and April by migratory populations from more northerly latitudes during the boreal winter. In Singapore,

the species was once considered to be rare and restricted to a few sites, but increased observer coverage and understanding of its behaviour and vocalisations have found it to be widespread in secondary woodland in Singapore. Individuals, presumably on migration, have also been recorded in freshwater wetlands, including those found in urban parks such as Bishan-Ang Mo Kio Park.

Due to its widespread distribution, the red-legged crane has not been assessed as being globally threatened with extinction. However, the species has been classified as nationally Vulnerable in Singapore as its preferred woodland habitat continues to be cleared to make way for development. Within the Gardens, the species was previously only infrequently encountered in the 1990s, mostly in the remnant rainforest fragment. However, the population appears to have increased in recent years and the species has now been recorded throughout the Gardens. Two particularly good areas for observing the crane are the area around the artificial waterfall at the Ginger Garden as well as the Healing Garden. The increasing population of this nationally threatened species within the Gardens highlights the potential for urban green spaces to serve as refugia for threatened wildlife and also showcases the effectiveness of habitat enhancement efforts to make the Gardens more conducive to biodiversity. 🌿

Low Bing Wen
National Biodiversity Centre

A SPOTLIGHT ON COELOGYNE ROCHUSSENII, A RECENTLY REDISCOVERED SINGAPORE NATIVE

SOME 200 species of *Coelogyne* are distributed from the Himalayas through China and Indonesia to the Pacific Islands. The name is derived from the Greek words *koilos* (meaning 'hollow') and *gyne* (meaning 'woman'), referring to the concave stigmatic cavity. Taxonomically, *Coelogyne* belongs to the subfamily Epidendroideae, in the tribe Coelogyneae and subtribe Coelogyneinae. The related genera are *Dendrochilum*, *Pholidota* and *Pleione*, and the vegetative states of these orchids look very similar to those of *Coelogyne*.



► *Coelogyne rochussenii* has rather large leaves and pendulous inflorescences.



► The flowers emit a light, musky, jasmine scent in the morning.

While most *Coelogyne* species are epiphytic, some are lithophytes and several are terrestrial herbs. Plant height varies considerably between species, and the roots, which are slender, can be either branched or unbranched. The pseudobulbs are partially covered in scales at the base and bear one or two leaves each. Other characteristics of the pseudobulbs vary between species, with some being closely arranged in clumps and others spaced widely apart, and with the shape ranging from

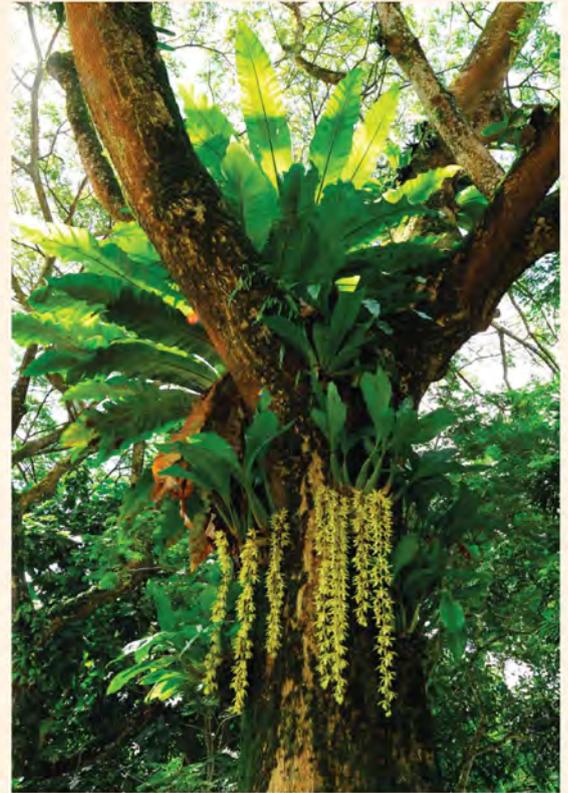


► *Coelogyne rochussenii* is a targeted species of the Orchid Reintroduction Programme, and some seedlings are planted high off the ground on the trunks of trees such as this rain tree.

cylindric, conical, pyriform or fusiform to ovoid. The leaves are generally stiffly herbaceous, long-lived and have stalks. The shape of the leaf blades varies between the species, from broad to elliptic or plicate (folded). Inflorescences can be terminal or lateral on mature pseudobulbs, and can carry one to many flowers which range in size.

There are seven species of *Coelogyne* native to Singapore, including *Coelogyne cumingii*, *C. foerstermannii*, *C. mayeriana*, *C. rochussenii*, *C. septemcostata*, *C. testacea* and *C. tomentosa*. Unfortunately, all of these but one are believed to be locally

extinct. *C. rochussenii* was previously also thought to have disappeared from the wild in Singapore, and had been encountered only rarely in the past – herbarium records show that until recently, it had only been collected four times in Singapore, all of which were in the late 1800s (including a collection from Seletar by Ridley). Fortunately, though, in November 2010, *C. rochussenii* was rediscovered in Singapore, when a mature specimen was encountered during a botanical survey of Nee Soon Freshwater Swamp. In 2013, more individuals were found in the same area, although they were smaller than the earlier-discovered specimen.



► Selected host trees have deeply-fissured bark and support other epiphytes.

COELOGYNE ROCHUSSENI

Other than Singapore, *Coelogyne rochussenii* is distributed in Borneo, Java, Peninsular Malaysia, the Philippines (on Luzon and Mindanao), Southern Thailand, Sulawesi (the Minahassa Peninsula) and Sumatra, and can be found from sea level to 1,500 m in elevation. *Coelogyne rochussenii* is found in a wide range of habitats, including riverine and hill forest, freshwater and peat swamp. It is usually found growing as an epiphyte but occasionally it grows as a lithophyte. In Peninsular Malaysia, it is also found on isolated wayside trees.

The species has rather close, narrowly conical, ribbed pseudobulbs that are spaced 3 to 5 cm apart on a creeping rhizome. The pseudobulbs bear two ovate leaves each. The leaves are around 20–28 cm long and 10–15 cm wide, with several main veins, and are wider in the apical half, narrowing gradually to the base and stalk. The inflorescences are delicate, slender and pendulous, and appear only from new shoots prior to the development of the pseudobulb and leaves. The rachis is 60–70 cm long and bears up to 50 well-spaced flowers along most of its length. The flowers are sweetly-scented, lemon yellow in colour, and measure 5 cm across. The sepals are 2.5 cm long and 0.5 cm wide, and the petals are narrower. The lip is three-lobed; the middle lobe is convex with five yellow keels, and the side-lobes are brown with white veins on the insides.



► This *Coelogyne rochussenii*, planted on a *Cassia fistula* tree, flowered at Sembawang Park in early 2014.



► Dr Tim Yam Wing standing underneath a flowering specimen at Pasir Ris Park. (Photo credit: Dr Shawn Lum)



► A *Coelogyne rochussenii* flowering on a *Podocarpus* tree at Dairy Farm Nature Park.



► A *Coelogyne rochussenii* flowering along Napier Road.



▶ A monitor lizard was spotted near a flowering *Coelogyne rochussenii* at Dairy Farm Nature Park in early 2014.



▶ *Coelogyne rochussenii* seedlings are planted at the forks of the host tree's main branches.

REINTRODUCTION EFFORTS

The Orchid Reintroduction Programme is a project which aims to monitor existing native orchid species and increase their numbers through reintroduction into appropriate habitats, including on roadside trees, and in parks and nature areas. Following its rediscovery in 2010, *Coelogyne rochussenii* has been a targeted species of the programme. Thus far, we have been unable to propagate the newly discovered specimens because they have yet to flower or fruit, so we select seedlings from nearby southern Peninsular Malaysia for planting. However, we are closely monitoring the development of the plants in Nee Soon Freshwater Swamp, and hope to be able to propagate them for future reintroductions.

Only mature plants with at least 10 pseudobulbs are selected for planting, which are secured to the tree trunks or branches of selected host trees using horticultural wires. Suitable host trees are

those which have deeply-fissured bark and bear other epiphytes. Some example host tree species are *Samanea saman* (rain tree), *Tabebuia rosea* (trumpet tree), *Cassia fistula* (golden shower), *Swietenia macrophylla* (broad-leaved mahogany) and *Pterocarpus indicus* (angšana). Seedlings are planted at the forks of the host tree's main branches, areas which tend to accumulate moisture.

To date, we have planted *Coelogyne rochussenii* at 12 different sites around Singapore, including several parks, park connectors and roadsides, and many of these have gone on to flower and produce new shoots since planting. In Singapore, the species flowers several times during the year. When in full bloom, it is a sight to behold. The flowers open widely in the morning, when they emit a light musky jasmine scent (attracting small bees and flies), and close partially in the afternoon and evening, a process which lasts for several days before the flowers fade. So,

visitors to some of Singapore's parks – including Bukit Batok Nature Park, Changi Beach Park, East Coast Park, Kim Seng Park, Pasir Ris Park, Sembawang Park, West Coast Park and Zhenghua Park – might get a glimpse of this beautiful native flowering on our trees, if they're lucky and keep an eye out! 🌿

Yam Tim Wing
Orchid Breeding and Conservation
Biotechnology Laboratory

All photos by Yam Tim Wing unless otherwise stated



▶ Ms Karen Tambayong with delegates from the Indonesian Ministry of Public Works at the Evolution Garden with Dr Nura Abdul Karim. (Photo credit: Dr Nura Abdul Karim)

THE year 2014 saw a number of staff from various botanic gardens from around the world doing study visits to the Singapore Botanic Gardens. The first of these was a team of administrators from the Gullele Botanic Garden in Addis Ababa, Ethiopia, who visited in late June. The team was led by H.E. Mr Ato Abate Setotawu, the Deputy Mayor of Addis Ababa and Board Chairman of the Gullele Botanic Garden, and Dr Tekle Woldegerima, Executive Director of the Gullele Botanic Garden. The delegation was briefed by the various branches of the Singapore Botanic Gardens on the topics of horticulture, education and visitor services management. The delegation was particularly impressed with the high level of effort that goes into our maintenance and visitor management, as well as our educational outreach programmes.

On 12 August, a delegation from the Indonesia Ministry of Public Works conducted a study visit to the Gardens. The group was led by Ms Karen Tambayong, Chairperson of the Green City Committee, and was briefed by Dr Nura Abdul Karim, Assistant Director of Horticulture, Exhibitions and Events, and Ms Shimin Kin, Manager of Visitor Services, on the work carried out within their respective branches. The Indonesian delegation informed us that their Ministry of Public Works and the Ministry of Home Affairs, together with the Indonesian Institute of Sciences (LIPI), are planning to develop 47 botanical gardens in a number of regions in Indonesia, which will serve as *ex situ* conservation sites for the rich flora of those regions. The team from Indonesia was inspired by our landscaping and living collections, and hopes to mirror our efforts in conservation, educational outreach and visitor management.

The next study group to visit the Gardens came on 15 August. This was a delegation of horticulturists from the Geelong Botanic Garden and Warrnambool Botanic Garden in Victoria, Australia, which was led by curator Mr John Sheely. The team was briefed on the work of our horticulture branch and taken on a tour of the Gardens'

many thematic collections. The Australian horticulturists were very impressed with our landscaping and high standard of tropical horticulture, and voiced an interest in sending their staff here on attachment in the future. From 24 to 28 November, the Gardens hosted six staff from the Bogor Botanical Gardens, Indonesia. This group was given a short briefing on the work carried out by the Horticulture, Exhibitions and Events branch and also had the opportunity to work with the Gardens' lawn managers, which gave them first-hand knowledge of some of the issues faced by our ground staff. The Bogor team was also briefed by Dr Nura Abdul Karim on the documentation of our collections, as they are interested in improving their database processes. The team was very grateful for the experience, and mentioned their intention to start a staff exchange programme with the Singapore Botanic Gardens in the future.

The last study visit for the year was a team from the Magok Development Division of the Seoul Metropolitan Government, South Korea. The Magok District is a new high tech city near Gimpo International Airport and it will have a large central park. The team was here to get some tips on establishing a botanic garden, which



▶ The Bogor Botanical Gardens' team during the recent study visit to the Singapore Botanic Gardens. (Photo credit: Dr Nura Abdul Karim)



▶ The team from Bogor Botanical Gardens being briefed by Ms Ada Tan Miao Yuan, manager of our Ginger Garden. (Photo credit: Dr Nura Abdul Karim)



▶ Mr Koh Teng Seah showing the team from Bogor Botanical Gardens the micro-propagation laboratory and explaining our orchid conservation efforts. (Photo credit: Dr Nura Abdul Karim)

will be located within the central park. The group was briefed on the maintenance and landscape work that we do at our Gardens, as well as our visitor management and marketing efforts, and was very impressed with the overall presentation of the Gardens as well as our work towards conservation and educational outreach.

Study visits such as these attest to the importance of the Singapore Botanic Gardens as the lead tropical botanical garden in Asia, and we hope that the future will bring us many new opportunities to share our experiences and knowledge with other botanical gardens around the world.

Nura Abdul Karim
Horticulture, Exhibitions and Events

SBG WELCOMES PALM AND BAMBOO EXPERTS



► Dr John Dransfield planting the *Tahina spectabilis* that was grown from seeds received back in 2008. (Photo credit: Keith Lin)



► Drs John and Soejatmi Dransfield standing by the *Tahina spectabilis* (Madagascan suicide palm) planted in Palm Valley during their stay. (Photo credit: Keith Lin)



► Dr John Dransfield sharing his knowledge on palms with the participants of his master class. (Photo credit: Ali Ibrahim)

FROM 8 to 23 October 2014, Dr John Dransfield and his wife, Dr Soejatmi Dransfield, Honorary Research Associates from the Royal Botanic Gardens, Kew, were in Singapore to assist in the curation of the Gardens' palm and bamboo collections, both in the living collections and in the Herbarium. This work was conducted as part of the Singapore Botanic Gardens Research Fellowships that were awarded to them.

Every morning for two weeks, Dr Dransfield, along with a small team of our grounds staff, did an inventory check of our living palm collection. Dr Dransfield systematically examined and verified the name of every single palm in the collection. The team worked first in Palm Valley, which holds the largest number of species in the collection, then moved on to the Ginger Garden and Lawn R in order to study the understory palms held there, and finished up at Lawn A and the Saraca Stream area.

The inventory was not an easy task, as some of the palms were neither flowering nor fruiting at the time, so confirming their identities took awhile. As with many

botanic gardens open to the public, the team was challenged with the problem of missing plant labels, or in some cases, even switched labels. As a result, Dr Dransfield had to be particularly careful in assessing the names and matching them to the printed list of species from the palm collection database. A significant number of the palms needed re-labelling and revised identifications. Some of the sterile palms were unable to be identified with confidence, so tentative generic identifications were assigned to these until the plants become fertile and can be verified at a later date.

It was fortunate that even though heavy rains occurred every afternoon during the survey period, the inventory of the entire palm collection was completed within two weeks. Dr Dransfield concluded that the Gardens has a very rich collection that has been amassed over the years, but that the aging collections found in Palm Valley and the Ginger Garden should be rejuvenated through the acquisition of new, well-documented accessions of palms, whether from field work, plant exchanges or purchases from reputable commercial nurseries. The transplanting of some of the Gardens' palms to more suitable growing areas was also discussed, and some of these have already been relocated. Temporary labels have also been installed since the inventory, and will soon be replaced with the permanent labels that are currently being fabricated.

During his stay in the Gardens, Dr Dransfield gave a very well-received public lecture through the Gardens' Speaker Series. The lecture was held on 10 October,

and focused on the discovery, examination, naming and conservation of the rare Madagascar palm genus *Tahina*, which he published in 2008. He also gave a master class on 16 October to about 45 of our staff and interns. During this session, he briefed participants on the morphology and key identification characters of the various palm species, and also shared interesting stories of the many uses of palms that he had encountered throughout his research career.

Dr Dransfield was honoured with the planting of two saplings of *Tahina spectabilis* (the Madagascan suicide palm), which were germinated by the Gardens from seeds given to us in 2008 by the Royal Botanic Gardens, Kew. The two saplings can be sighted in Palm Valley, where they will hopefully thrive and grow steadily to reach the great size attained by this species in its native Madagascar. Dr Soejatmi Dransfield was also invited to plant a sapling; in her case, a species of bamboo that has been named after her, *Soejatmia ridleyi*. It can be seen next to the long waterfall in the Cascade Garden near the Upper Palm Valley Road entrance of the Rain Forest.

Indeed, the visit of Drs John and Soejatmi Dransfield was not only extremely helpful to our staff, but significant to the Gardens itself. The benefits of their visit will be felt into the future, as we apply the knowledge gained toward the continued improvement of our living collections and the conservation of tropical plant species. 🌿

Nura Abdul Karim
Horticulture, Exhibitions and Events

‘PRE-LINNAEAN’ LITERATURE – REALLY OLD BOOKS DON’T MATTER DO THEY?



▮ An image of Rheedt from *Hortus Malabaricus*. (Image from the Biodiversity Heritage Library. Digitised by Missouri Botanical Garden, Peter H. Raven Library.)

IN the last issue of *Gardenwise*, volume 43, we discussed the rules governing the correct publication of scientific plant names. In that article it was noted that the system we use today started with Linnaeus’s *Species Plantarum* in 1753, and that “names published before then simply don’t count”. This is true, but does it mean that books on plants published before 1753, the so-called ‘pre-Linnaean’ literature, have no use in the naming of species? Can we ignore early works on Asian plants, such as Rheedt’s *Hortus Malabaricus* (1678–1703) and Rumphius’s *Herbarium Amboinense* (1741–1750)? The simple answer is No.

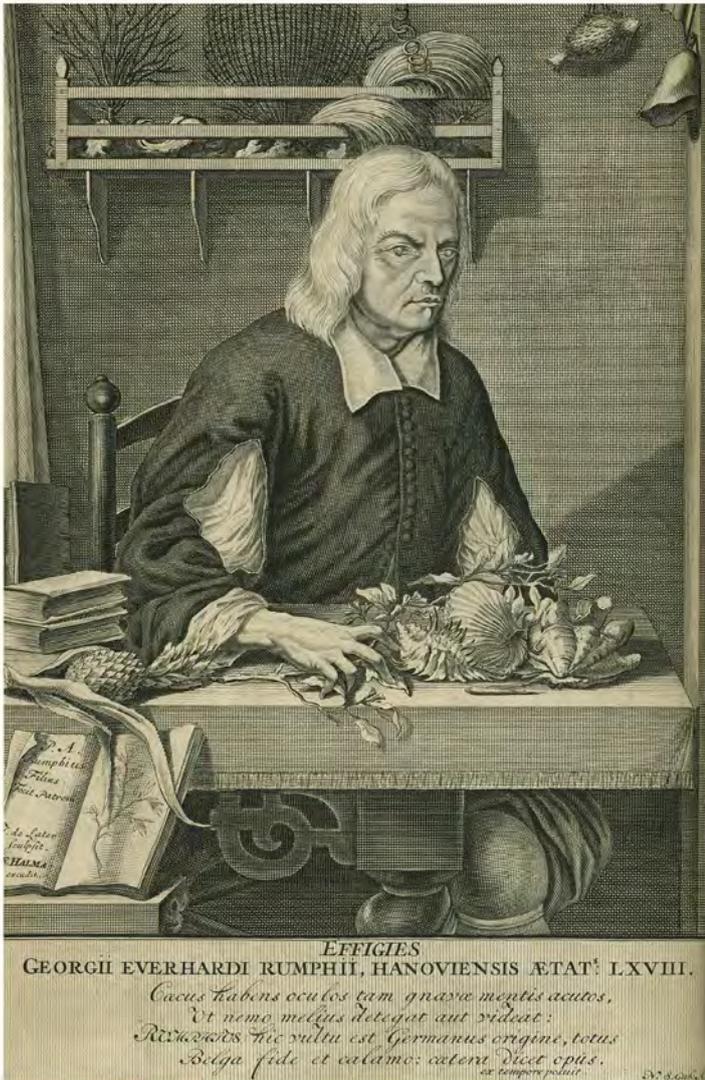
Firstly, these are important works that give us insights into the discovery and uses of plants in Asia in the 17th and 18th centuries. Rheedt’s *Hortus Malabaricus*, in particular, paints a fascinating social and cultural picture from southern India with its medicinal information, rich illustrations and multi-lingual captions. Secondly, Linnaeus and later authors drew heavily

on their predecessors’ knowledge of the world’s flora. Linnaeus himself may have popularised the binomial – the use of a genus name plus a species’ epithet – but he and later authors liberally cited and credited many earlier authors for their discoveries. These authors did not have a concept of a 1753 start date for botanical nomenclature and simply saw themselves as building

upon the insights of their predecessors. Crucially, in so doing, they included the Linnaean binomials we still use today.

In the years after 1753, authors sometimes gave descriptions of species along with the binomial, thereby satisfying the rules for publication of a new name at that time. Often, however, the only reference that authors included as to the derivation of their species was a reference to a pre-Linnaean book. In many cases these early works are not associated with any known specimens but they often do have illustrations. In these cases an illustration is all that is available to be the type of the name, which means that the name is permanently attached to that illustration (as long as the illustration is informative enough to match to an actual species). An example of this is the Singapore native (but presumed locally extinct) *Ochrosia oppositifolia* (Lam.) K. Schum., which was originally published as *Cerbera oppositifolia* by Lamarck. Lamarck drew his inspiration for this species from Rumphius’s *Herbarium Amboinense*, a book on the plants of Ambon Island in the Moluccas. More specifically he based his *Cerbera oppositifolia* on Rumphius’s *Lactaria salubris* in volume 2, page 255, plate 84 published in 1741. Rumphius’s name doesn’t count under the rules of botanical nomenclature (because even though it is a binomial it was published before 1753) but Lamarck’s reference to this name and illustration, and this work alone, means that the type is Rumphius’s illustration in plate 84.

Occasionally, later authors did take up the names used by pre-Linnaean authors. A good example is *Cerbera odollam* Gaertn., the pong-pong tree that was once so commonly planted along Singapore’s streets. Gaertner based his species on Rheedt’s *Odallam* from *Hortus Malabaricus*, which was illustrated in volume 1, plate 39, in 1678. This illustration is the type of the name. Often when illustrations are the types of names it can be difficult to interpret exactly what species was really intended, depending on the level of botanical accuracy and the skill of the artist. There is, however, no doubting at all to which species the illustration of *Odallam* belongs.



► An image of Rumphius from his *Herbarium Amboinense*. (Courtesy of Singapore Botanic Gardens Library)



► The illustration of Rheede's *Kudici-kodi* featured in his *Hortus Malabaricus*. (Courtesy of Singapore Botanic Gardens Library)



► Rheede's *Odallam* as illustrated in his *Hortus Malabaricus*. (Courtesy of Singapore Botanic Gardens Library)



► The illustration of *Lactaria salubris* included in Rumphius's *Herbarium Amboinense*. (Courtesy of Singapore Botanic Gardens Library)

Another species which has a nomenclatural history tied to a pre-Linnaean work is *Parsonsia alboflavescens* (Dennst.) Mabb. This Singapore native was originally published as *Periploca alboflavescens* by Dennstedt in 1818, in a book which presents and cross-references three unadorned lists – Rheede's names for plants, the corresponding plate numbers in *Hortus Malabaricus*, and the binomial names given by Dennstedt himself. There are no descriptions and no illustrations in Dennstedt's book, so on face value it would appear that names which appear in this work for the first time would not be validly published (see *Gardenwise* 43). *Periploca alboflavescens* is, however, validly published due to Dennstedt's reference back to Rheede's name for this species, *Kudici-kodi*, and thereby its description. Rheede's accompanying illustration, also referenced by Dennstedt, is easily matched to a species known from the region. We know, therefore, to what plant the name *Kudici-kodi* refers, that this species was

published by Dennstedt as *Periploca alboflavescens*, and that today it is known as *Parsonsia alboflavescens*. The illustration also, therefore, serves as the type for this species.

Here we have three examples from the Apocynaceae – *Ochrosia oppositifolia*, *Cerbera odollam* and *Parsonsia alboflavescens* – of the value of pre-Linnaean literature in assigning correct names to species, in these cases for species that are native to Singapore. There are, of course, many other species in many other plant families for which the same is true. Singapore Botanic Gardens has both *Hortus Malabaricus* and *Herbarium Amboinense* in safe keeping in the Archives of the Library of Botany and Horticulture. In addition, both works can be viewed online through the *Biodiversity Heritage Library*. 🌿

David Middleton
Herbarium

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Compiled by Ada Davis
Communications and Community Engagement

HOT PINK BELLS – *TECOMANTHE DENDROPHILA*



► The New Guinea trumpet vine growing on a trellis at the Bukit Timah Gate entrance to the Gardens. Note that the leaves shown to the left of the flowers belong to a different plant. (Photo credit: Dr Nura Abdul Karim)

► The beautiful hot pink bell-shaped flowers of the New Guinea trumpet vine. (Photo credit: Dr Nura Abdul Karim)

DURING the earlier part of 2014, visitors coming through the Bukit Timah Gate of the Gardens were welcomed by the delightful sight of dangling, vibrant pink floral bells on one of the massive trellises along this entrance. These were the flowers of a species in the family Bignoniaceae – *Tecomanthe dendrophila*, a vine known by the common names of New Guinea trumpet vine and forest bell creeper. This fabulous woody climber is native to the Moluccas, New Guinea and adjacent islands. It is known to grow from sea level to about 1500 m in elevation, in various types of forest habitats, ranging from mangroves to freshwater riverine forests and inland rainforests.

New Guinea trumpet vine has compound leaves consisting of three to five leaflets each. An interesting characteristic of this vine is that the inflorescences usually grow below the leaves on old woody stems. Due

to this, the masses of flowers are mainly found on the lower parts of the stems. The inflorescences are large striking corymbs which hold pendent, tubular flowers. The flowers are about 10 cm in length, with

petals that are hot pink on the outsides with a rose pink centre graduating to a creamy white tip on the insides. It has been mentioned in literature that the blooms usually emerge from the same stem year after year. Unfortunately, the lovely flower clusters are unsuitable for use in floral arrangements as they do not last long and have very short stalks.

Even though New Guinea trumpet vine is rather attractive when in flower, it is rarely cultivated. However, its brilliant luxuriant foliage and beautiful clusters of large flowers would make it a beautiful addition to any garden with a pergola or trellis. It thrives under partial shade, provided it is given ample moisture and a good support on which to climb. It can be propagated from suckers or by seed. 🌱

Nura Abdul Karim
Horticulture, Exhibitions and Events

ALLURING BUT FOUL – *BULBOPHYLLUM GRAVEOLENS*



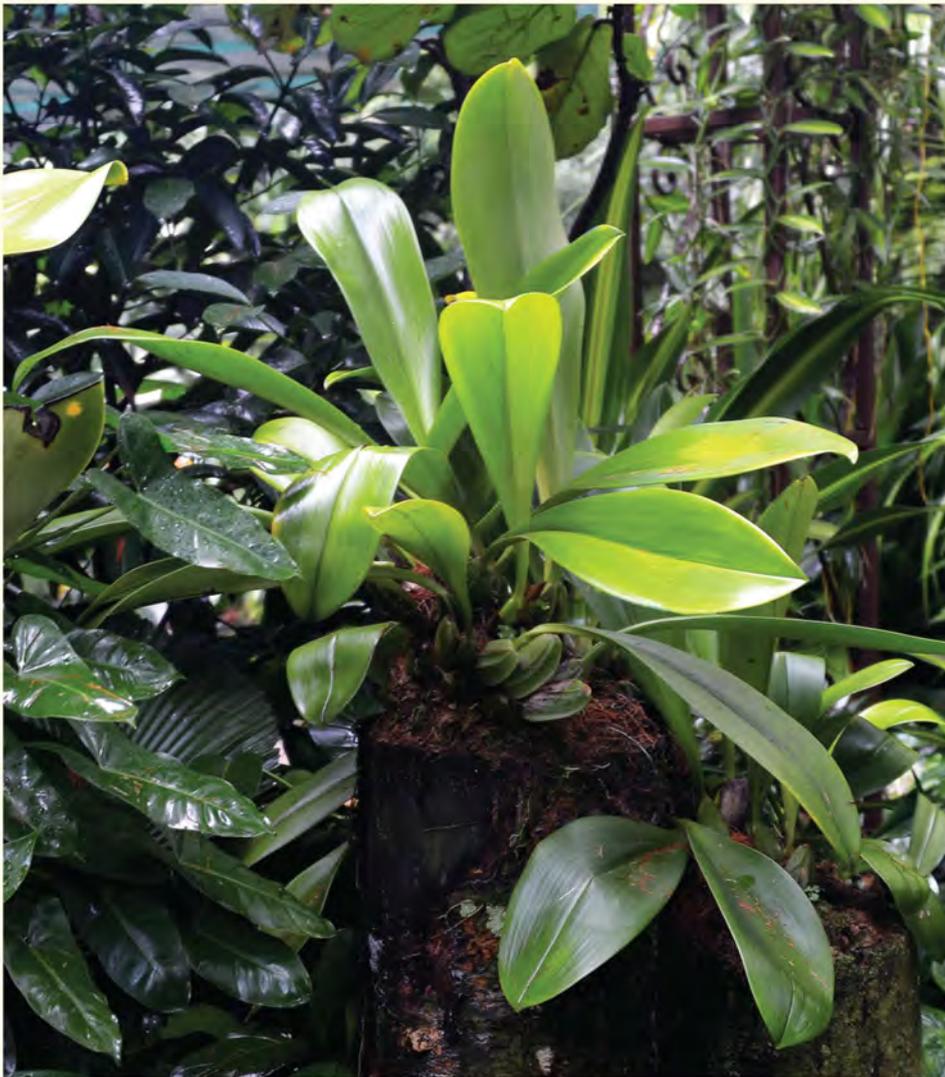
► The pretty but stinky flowers of *Bulbophyllum graveolens*. (Photo credit: Dr Nura Abdul Karim)

IN the Mist House of the National Orchid Garden, a rather offensive smell recently wafted around an area dedicated to a small collection of scented orchids. Visitors with sensitive noses would not have been faulted for immediately thinking that there was a dead and decaying animal hidden there amongst the beautiful orchids. On further investigation, however, these visitors would have discovered that the odour was emanating from a rather large clump of the epiphytic orchid *Bulbophyllum graveolens*.

With an estimated 1,000 to 1,500 species, *Bulbophyllum* is one of the largest orchid genera in the world. Its species are found throughout the tropics, from the Americas to Africa, with the majority in Asia. The natural habitat of *Bulbophyllum graveolens* is the rainforest of New Guinea, where it is uncommon and usually found only in isolated stands of trees, growing on tree trunks. It occurs at elevations ranging from about 100 to 600 m.

This very robust orchid species has a creeping rhizome with unusually large fleshy green pseudobulbs (specialised thickened storage stems) that are spaced at intervals of 3 to 4 cm apart. Each pseudobulb holds a single very large leathery leaf that can measure up to 65 cm long and 10 cm wide, making this species recognisable even when not in bloom. When flowering, it forms a fairly stout, short inflorescence which ends in

a horizontal fan of six to nine distinctive flowers. Each of the strange looking, long-lasting flowers can reach a length of 8 to 9 cm. The sepals and small petals are a lovely waxy yellow-green colour with darker green veins and numerous small red spots near the bases. The lateral sepals are joined together to form a hollow, flattened, tongue-like tube, the insides of which are yellow and densely covered in red spots. The small lip is deep scarlet and hairy on its upper surface and orangey with red spots underneath. The column (which is derived from the fusion of the male and female parts) is yellow with red spots. The specimens in the Gardens bloom from around September to October, with the flowers lasting for about two weeks.



► The fascinating epiphytic orchid, *Bulbophyllum graveolens*, when not in flower. (Photo credit: David Lim)

While the rather unpleasant scent might deter humans from fully appreciating the outstanding-looking flowers, to the flies which pollinate it, the odour is an instant draw and sometimes even a fatal attraction. It has been observed that in its natural habitat, the flowers attract flies during the day, when the smell is strongest. The flies become very agitated by the scent and stumble over the lip, which then catapults them, upside-down, onto the column! Sometimes, the flies become stuck and perish because they are unable to free themselves from the sticky stigma of the column.

Bulbophyllum graveolens requires a hot and humid climate, partial shade, good air circulation and moist but not wet conditions to thrive in cultivation. It is definitely not a species for a beginner orchid grower to cultivate.

So the next time you visit the Mist House, do not be quick to conclude that any rotting smell radiating from the lovely orchids is due to a dead animal; it just might be *Bulbophyllum graveolens* in bloom again. 🌿

Nura Abdul Karim
Horticulture, Exhibitions and Events

Crediting error acknowledgement

We regret that the following images included in the previous issue (volume 43) of 'What's Blooming' were incorrectly credited. The corrected photo credits are provided below:



From page 28:
A lovely carpet of fragrant flower petals produced by the stately monkey pot tree delighted photographers. (Corrected photo credit: Rachelyn Gordon / SBG Facebook)



From page 30:
(Left) The Vietnamese Mickey Mouse tree located near Ridley Hall. (Corrected photo credit: Keith Lin)

(Above) Close-up of a branch of the Vietnamese Mickey Mouse plant with massive clusters of cheery bright yellow flowers. (Corrected photo credit: Keith Lin)

CONTINUED EFFORT IN KNOWLEDGE SHARING



▶ Miniature garden specialist Louise Krasniewicz sharing the essence of creating miniature gardens with staff. (Photo credit: Nancy Grube)



▶ Everyone was deeply engrossed in assembling their gazebos. (Photo credit: Louise Krasniewicz)

THE Gardens' Education Branch has initiated a plan to organise more training and sharing sessions among staff. This initiative will not only enhance the development of new educational programmes and introduce elements that will add value to our existing programme repertoire, but will also hopefully bring staff together, encourage continual learning and strengthen our working relationships.

AS a start, two training sessions were held in the second half of 2014, the first of which was a workshop on miniature gardening, and the other a session on the identification of the common birds found in the Gardens.

MINIATURE GARDEN WORKSHOP

In August, during the Singapore Garden Festival (SGF) 2014, a total of seven staff and trainers from our Education Branch participated in a six hour workshop on miniature gardening. This special session was conducted by Deborah Mackie, Louise Krasniewicz and Nancy Grube, experienced creators of miniature gardens who have won multiple awards at the Philadelphia Flower Show and also showcased their designs on the local stage during SGF 2014.

On the first day of the workshop, participants were introduced to the principles and concepts of creating miniature gardens, as well as special techniques used for the construction of dwarf-sized furniture and landscape materials using thin twigs and tiny ropes.



▶ The proud staff show off their creations. (Photo credit: Louise Krasniewicz)

On the second day, Nancy guided us in assembling small gazebos by following her user-friendly D-I-Y instructions. The procedure involved a colour coding system which was very easy for beginners to follow. Like eager children learning to take our first steps, we had to hold back our enthusiasm and wait patiently for the glue to dry completely during each stage of assembling our gazebos. Louise and Deborah also shared tips on how to create personalised miniature gardens through the selection of colours, painting techniques and the positioning of plants, gazebos and other landscape materials.

Although we were provided with the same set of plants and landscape materials, each of our miniature gardens turned out differently. Our collection of individualised miniature gardens included a tranquil garden centred with a swing, an adventure-themed campfire site, an elf garden, a classic

garden with Lego figurines and even a tornado garden symbolising the enormous power of nature.

After experiencing the magic of creating miniature gardens first-hand, the participants will have a chance to apply their newfound knowledge and skills as they conduct upcoming workshops on miniature gardening for the public. The pilot run will be held at the Gardens on 14 February 2015.

INTRODUCTORY TRAINING PROGRAMME ON THE GARDENS' BIRDS

On 21 October 2014, a total of 25 staff from NParks, including trainers from the Gardens' Education Branch, gathered in the Bukit Timah Core to participate in a three hour training programme covering the basics of identifying the common birds found in the Gardens. Targeting nature



► Low Bing Wen sharing his tips on bird watching. (Photo credit: Shereen Tan)



► Enjoying a 'high-definition' view of a bird. (Photo credit: Shereen Tan)



► Putting what we learnt into practice by studying the Banded Woodpecker (*Picus miniaceus*). (Photo credit: Shereen Tan)



► Cramping our necks to study the characteristics of a bird, and it was all worth it! (Photo credit: Shereen Tan)

enthusiasts who have little knowledge of birds, this workshop was led by Low Bing Wen, an NParks' colleague from the National Biodiversity Centre, and conceptualised together with Sri Zulaikha, a bird enthusiast and Horticulture Officer from the Gardens' Horticulture, Exhibitions and Events Branch. The training was held at the Jacob Ballas Children's Garden and in the Eco Garden.

The class began with a comprehensive indoor slide presentation by Bing Wen, who guided everyone on how to identify the Gardens' common birds by their colours, calls and preferred habitats. Shereen also shared her collection of abandoned bird nests that have been contributed by various colleagues from NParks' Streetscape Division, which are used for educational purposes. The poor weather didn't dampen

anyone's enthusiasm as we proceeded to the outdoor observation portion of the session. We were rewarded by sightings of an Asian brown flycatcher (*Muscicapa dauurica*) and a banded woodpecker (*Picus miniaceus*) in the Eco Garden.

Just a week after the training workshop, Parusuraman Athen, an officer from the Herbarium, encountered an injured Siberian blue robin (*Luscinia cyane*). He handled the bird carefully and was delighted to apply his newfound knowledge. His efforts enabled the migratory bird to continue its journey after its short stop in the Gardens!

A further aim of the training session was to equip staff with the knowledge to commence public education programmes on the birds of the Gardens. A workshop entitled "Let's Learn about Birds" was developed from this session and launched on 2 December 2014 as a sequel to "Let's Learn about Dragonflies". (These workshops are part of a series of programmes designed to introduce children to the rich biodiversity of the Singapore Botanic Gardens. They aim to educate children about insects and animals and generate interest in their habitats.)

Both the miniature garden workshop and the training programme on the Gardens' birds were successful events. The Education Branch hopes to continue our development of the Gardens' educational programmes, and we welcome the ideas of any staff who are interested in sharing their knowledge and experience with us. 🌿

Shereen Tan and Winnie Wong
Education Branch



Participants of the 7th Annual Global Plants Meeting in Panamá. (Photo credit: Smithsonian Tropical Research Institute)

THE 7TH ANNUAL GLOBAL PLANTS MEETING IN PANAMÁ

GLOBAL Plants is an international partnership of more than 330 herbaria in 75 countries with the goal of digitising and providing worldwide access to type specimens via the JSTOR Plant Science website (plants.jstor.org). To briefly summarise, this project has evolved from the African Plants Initiative, which came out of conversations at the AETFAT (Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale) meeting held in Ethiopia in 2003. The project then expanded to include the flora of Latin America and the Caribbean, and later grew to include Asia.

The Singapore Botanic Gardens' Herbarium (SING) first joined the Global Plants partnership in September 2012 (see *Gardenwise* 40: 24–25, 2013), and the most recent meeting, held in September 2014, was the third which we have attended. Funding by the Andrew Mellon Foundation is drawing to a close and so this was the last meeting to be funded by this source. Future meetings will be held as part of international conferences.

Meetings of the Global Plants partners provide opportunities to strengthen ties of cooperation, to exchange ideas on digitising works, potential funding sources and improving access to type specimens, and to share successes. The 2014 meeting, held from 22 to 26 September in Panamá, was attended by 145 delegates from 39 countries. Talks were presented in either English or Spanish, with simultaneous translations provided for attendees. There were 60 poster presentations, including one which we presented to update on our work-in-progress. For me, the meeting was very enlightening as most of the attendees were not taxonomists, in contrast to the symposia that I usually attend. Instead, this was a gathering of mostly people who work behind the scenes, including data information managers, herbarium curators

and managers, institution directors, horticulturists, collection managers and even a librarian.

On the first day of the meeting, the Steering Committee reported on its activities since the previous meeting. This was followed by a brief introduction of each participant and a status report from JSTOR. The rest of the days were packed with talks on gap analysis, minimising errors in metadata, online floras, citizen science programmes and other interesting topics. Each participant was also expected to attend two discussion groups and a workshop.

My attendance at the meeting was as a newly elected member of the Steering Committee. My responsibilities as a member of the committee include advising JSTOR and performing outreach and advocacy on behalf of JSTOR and the Global Plants community. It was a very novel and humbling experience for me to participate as a committee member and to make contact with people from other institutions who are working on the collective mission of achieving online accessibility of type specimens held all over the world. For our part, we have been able to digitise the type collections held at SING, as a result of funding from the Mellon Foundation and in accordance with specifications laid out by Global Plants and JSTOR Plant Science. To date, among the Global Plants community, over 2 million digital objects have been cross-linked to related JSTOR articles in the database, TROPICOS and Biodiversity Heritage Library.

Unfortunately, gap analysis has revealed that there are still many institutions, particularly in Asia, not participating



Elected Steering Committee. (Photo credit: Gloria Jované)

in the Global Plants partnership. The Steering Committee is keen to engage with non-participating institutions and help them identify ways of contributing to this monumental effort. We at SING would like to offer our assistance to currently non-participating institutions in Asia which would like to become involved, for the benefit of their institutions as well as the global scientific community. If you are involved in a herbarium that is not a Global Plants partner and would like to learn more, please contact me at Serena_Lee@Nparks.gov.sg and I would be most happy to assist.

I am sure that everyone who attended the annual meeting in Panamá would join me in congratulating the organisers, especially Gloria Jované and Nelly Florez, for another wonderful meeting. I continue to be very impressed with the amazing logistics team.

Acknowledgements: the author would like to thank Professor David Cantrill, Director of the Royal Botanic Gardens, Melbourne and Chairman of the Global Plants Steering Committee, for his assistance in the preparation of this article. 🌿

Serena Lee
Herbarium

THE 16TH FLORA OF THAILAND CONFERENCE AT THE ROYAL BOTANIC GARDENS, KEW, SEPTEMBER 2014



► Conference delegates outside the Princess of Wales Conservatory. (Photo credit: Andrew McRobb / Royal Botanic Gardens, Kew)

THAILAND has between 10,250 and 12,000 species of vascular plants in a wide variety of tropical habitats. Since the 1960s the *Flora of Thailand* project has been cataloguing the plant diversity of the country and publishing accounts of the families with keys, descriptions and illustrations. Around half of the species have now been published in a total of 33 instalments and, although it is already arguably the most active *Flora* project in Southeast Asia, plans are afoot to greatly increase the speed of production of the remaining families in order to complete the *Flora* in 2021. This ambitious task is spearheaded by the *Flora of Thailand* editorial board, on which Singapore Botanic Gardens has a seat as an institutional collaborator.

The *Flora of Thailand* conferences are held every three years, alternately between Thailand and one of the institutional collaborators. In 2011 it was held in Chiang Mai in Thailand and in September 2014 it was held at the Royal Botanic Gardens, Kew, which has had a long-standing relationship with the *Flora of Thailand* and holds a large number of Thai specimens and important archival materials. Over 130 delegates from many countries were represented at the conference, a large percentage of them having travelled to Kew from Thailand for both the conference and the opportunity to study Kew's collections.

The conference was opened by Her Royal Highness Princess Maha Chakri Sirindhorn, a senior member of the Thai royal family. It then proceeded with plenary talks exploring the theme of the conference: 'Thai Botany and the European Connection – Building on 100 Years of Collaboration'. Arthur Francis George Kerr (1877–1942)

was the subject of two talks and was mentioned in many others. An Irishman, he originally travelled to Thailand as a medical doctor but eventually became Thailand's first government botanist. Along with his contemporaries, both foreign and Thai, he collected huge numbers of plant specimens and laid the foundation for all future floristic work in the country.

The rest of the week consisted of talks on many and varied botanical subjects, mostly on Thai plants but also on the plants of neighbouring regions, particularly Indochina. It was very gratifying to see that many of the speakers were young Thai botanists, many of them presenting the results of their PhD studies. There was also a poster session and ample opportunity to catch up with old botanical friends and make new ones.

Singapore Botanic Gardens was represented at the conference by David Middleton



and Hubert Kurzweil. David gave a talk on the progress of a revision of the family Gesneriaceae for the *Flora of Thailand* (see *Gardenwise* 43) and attended the Editorial Board meetings. Hubert presented a poster on the affinities of the orchid floras of Myanmar and Thailand (co-authored by Saw Lwin, Myanmar). Both David and Hubert have already contributed accounts to the *Flora of Thailand*, including Hubert's revisions in the second instalment of the orchid volume that has recently been published.

The next conference will be held in Bangkok in 2017. 🌿

David Middleton and Hubert Kurzweil
Herbarium

TWO NEW BOOKS ON THE PLANTS OF HONG KONG

A Guide to Orchids of Hong Kong

by Stephan Gale, Abdelhamid Bizid, Liu Kwok Wai and Kinson Chan

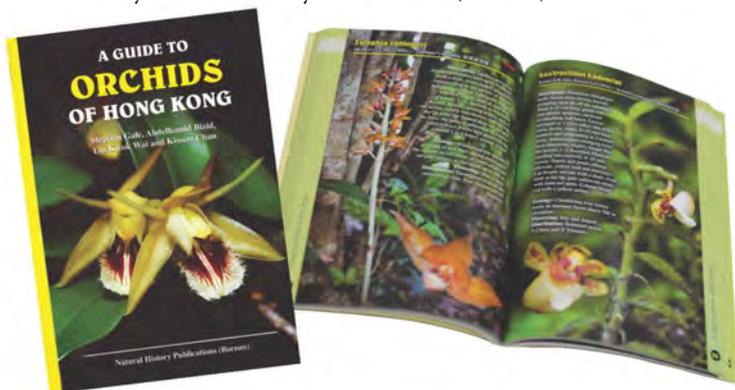
Published in 2014 by Natural History Publications (Borneo). 168 pp, 21.6 cm × 15.3 cm, paperback. Available online from the publisher at www.nhpborneo.com for RM 55.00 (approximately S\$22.00), excluding shipping charges. ISBN 978-983-812-155-2

At present, 133 native orchid species are enumerated for Hong Kong, which is about 10% of the number recorded for the whole of China. This pictorial guide includes the 97 extant species, and is part of a botanical pictorial series that was initiated by this publisher in 2011. The series was originally started to illustrate the diversity of Southeast Asian orchids, but has evolved to include other plant groups, such as begonias, ginger and hoyas (see *Gardenwise* 42: 35, 2014).

This magnificent book is of superior production quality with impressive photographic layouts, a well-known trademark of the publisher. Most importantly, the guide is extremely user friendly. Most of the remarkable photographs featured in the book were taken in the wild by the authors; perhaps only a handful of the photographs were based on cultivated specimens. Growing habits and close-ups of individual flowers or inflorescences are included to aid in identifications. The guide also features a few comprehensive chapters that deal with general orchid morphology, the botanical history of orchid studies in Hong Kong and conservation issues pertinent to the wild orchids of Hong Kong.

Three useful appendices are included at the end of the book, namely (1) Appendix I, a list of the 34 species of native Hong Kong orchids regarded as extinct or with doubtful occurrence; (2) Appendix II, a table of flowering times recorded for the 97 taxa enumerated in the guide; and (3) Appendix III, an introduction to photographing orchids in the wild. A glossary is also provided to guide the reader through some of the uncommon botanical terms used in orchidology and applied in the book.

This guide is essential for naturalists and orchid enthusiasts who are interested in Hong Kong's orchids. The book weighs only 500 g and is small in size, making it suitable for carrying along on long hikes into the countryside. It is also a perfect companion to the comprehensive desk-bound monograph *The Wild Orchids of Hong Kong* by Gloria Barretto, Phillip Cribb and Stephan Gale, published in 2011 by Natural History Publications (Borneo).



A Photographic Guide to Common Urban Trees of Hong Kong

by Cheung Kwok-Wai, Pang Kuen-Shum, Lam Ying-Wai, Cheung Wing-Yu, Rachel, Chan Yuk-Man, Tong Ho-Tak, Li Ping-Lam, Chloris and Wong Tak-Ping

Published in 2014 by the Agriculture, Fisheries and Conservation Department, Hong Kong SAR Government. 315 pp, 21 cm × 14.8 cm, paperback. Available online at www.bookstore.gov.hk for HK\$108.00 (approximately S\$18.00), excluding shipping charges. ISBN 978-988-12021-3-0

This comprehensive pictorial guide covers 130 tree species, from 41 families, that are commonly cultivated in Hong Kong. The book is very well illustrated with colour photographs. The account begins with an introductory chapter to guide users through the book. There is also a comprehensive chapter on morphological terms used to describe leaves, flowers and fruits, with accompanying colour illustrations.

The 130 species that are featured in the book are grouped according to their respective families; unfortunately, the families are not arranged alphabetically, which might hinder quick referencing. However, two fold-up photo indices – one based on flowers and the other based on leaves – are helpful identification tools for users. These two indices are inserted at the end of the book and can be easily overlooked, so do watch out for them!

Portraits of each species were prepared in great detail, and include colour photographs demonstrating their habits, trunks, leaves, flowers, fruits and other distinctive features helpful for identification. This book is extremely handy to carry around, and it is highly recommended for arborists, horticulturists, landscape architects and tree lovers who are looking for fresh perspectives on the planted urban trees of Hong Kong.

Low Yee Wen
Herbarium

KEY VISITORS TO THE GARDENS

July–December 2014



▶ Simon Burkill, the grandson and great-grandson of former directors Humphrey Burkill and Henry Burkill, and his wife Amy visited the Gardens in December. (Photo credit: Benjamin Aw)



▶ To the delight of staff and visitors, two smooth-coated otters were recent visitors to Swan Lake.

Amy and Simon Burkill, United Kingdom

Ms Anchalee Nuammee, Mr Puttamon Pongkai, Chulalongkorn University, Thailand

H.E. Berit Basse, Ambassador of the Kingdom of Denmark to Singapore, and 13 staff from the Royal Danish Embassy, Denmark

Dr Bill McDonald, Queensland Herbarium, Australia

Mr Boris Johnson, Mayor of London, United Kingdom

Dr Brett Summerell, Deputy Director, Royal Botanic Garden, Sydney, Australia

Dr Bruce Maslin, Western Australia Herbarium, Australia

Dr Bryn Dentinger (Jodrell Laboratory), **Giles Coode-Adams** (former CEO, Foundation) and family, **Leo Pemberton** (former Principal, School of Horticulture), **Marcelo Sellaro** (Tropical Nursery), **Drs Soetjani and John Dransfield**, **Dr Sven Buerki**, Royal Botanic Gardens, Kew, United Kingdom

Dr Carl Lewis, Director, and his student **Emeily Warschelsky**, Fairchild Botanic Garden, United States of America

Dr Carmen Puglisi, **Dr Mark Hughes**, **Dr Mark Newman**, **Dr Mark Watson**, Royal Botanic Gardens, Edinburgh, United Kingdom

Dr Chapadorn Senakun, **Ms Lalita Khamtang**, **Ms Nittaya Chueawangkhom**, **Ms Pornpun Kajornjit**, **Ms Siwaporn Homhuan**, **Dr Surapol Saensook**, **Ms Wilailux Zumstein**, **Ms Wipawan Kiosanthie**, Mahasarakham University, Thailand

Mr Daniel Bishop, **Geoff Duggan**, **Graeme Errington**, The Australian Botanic Garden, Mount Annan, Australia

Dr Daniele Cicuzza, Xishuangbanna Tropical Botanical Garden, People's Republic of China

Delegates of the 3rd ASEAN Plus Three Cultural Cooperation Network (APTCCN)

Prof. Dr Dietmar Quandt, Nees-Institut für Biodiversität der Pflanzen, University of Bonn, Germany

Mr Feng Jing, Chief of Asia and the Pacific Unit at UNESCO World Heritage Centre

Monsignor Francesco Follo, Permanent Observer of the Holy See to UNESCO

Mr Fukuda Hirofumi, Director General of the Agriculture Department, Japan

H.E. Javad Ansari, Ambassador to Singapore of the Islamic Republic of Iran and the Vice Mayor of Tehran, Iran

Ms Julia Gillard, former Prime Minister of Australia

Mr Ha-joong Seong, Local Greenbelt Officer, and delegation, Eco-friendly Agricultural Division, Seocheon-gun of Choongnam-do, Republic of Korea

Mr Herman Hollander, Chairman of the Board, Kasteel Keukenhof, The Netherlands

Mr Herman Van Rompuy, former President of the European Council, and spouse

Dr Ho-Ming Chang, Endemic Species Research Institute, Taiwan

Dr Kim Hui, Mokpo National University, Republic of Korea

Mr Kim In-Ho, Director-General, Planning and Management Bureau, Ministry of National Defense, Republic of Korea

Dr Lee Durrell MBE, Durrell Wildlife Conservation Trust, Jersey, United Kingdom

Ms Luong Thien Tam, University of Science, Socialist Republic of Vietnam

Dr Martin W. Callmänder, Conservatoire et Jardin Botaniques, Switzerland

Mr Nico Wissing, Founder, NL Greenlabel, The Netherlands

Mr Paulo Baleeiro, University of São Paulo, Brazil

Dr Peter Wilif, Pennsylvania State University, United States of America

Dr Ratchada Pongsatyapipat and 17 staff, Queen Sirikit Botanic Garden, Thailand

Dr Razali Jaman, Forest Research Institute Malaysia, Malaysia

Mr Richard Schaefer, Ministry of Development, Industry and Foreign Trade, Brazil

Ms Ridha Mahyuni, Bogor Agricultural University, Indonesia

H.E. Rogelio Granguillhome, Ambassador to Singapore of Mexico, Mexico

Ms Salwa Shahim, Reading University, United Kingdom

Dr Sri Rahayu (Traub Lab), **Mr Wisnu Handoyo Ardi**, Bogor Botanic Garden, Indonesia

Dr Steve Scott, Melbourne, Australia

Mr Stuart Read, ICOMOS Technical Evaluation Mission

Ms Sylvia Midgett, chair, and a group of members from the Hong Kong Gardening Society, People's Republic of China

Prof. Dr Tetsuo Koyama, Makino Botanical Garden, Japan, and members of the Myanmar Flora Consortium

Their Excellencies, the Ambassadors of Lebanon, Qatar and Turkey to UNESCO

Tourism officials from Southeast Asia and the Pacific:

Ms Camila Sandra Soares Da Costa Mau, **Mr Maximiano Ximenes Gama**, Timor Leste

Ms Chanborey Rom, **Ms Konitha Nong**, **Ms Naty Tep**, **Mr Samnith Srey**, Cambodia

Mr Heni Dembis, **Mr Ohmana Fredrick**, Papua New Guinea

Mr Jace Halstead, Nauru

Mr Jerry Ricky Spooner, Vanuatu

Mr Jonathan Sinapati Taisia, Solomon Islands

Mrs Le Thi Thanh, **Mr Nguyen Hai Ninh**, **Mr Nguyen Thi Hong Van Van**, **Mr Tran Chi Vien**, Socialist Republic of Vietnam

Ms Litiana Talake, Tuvalu

Ms Marita Ah Sam, Samoa

Mr Maung Soe Khin, **Mr Tun Tun Oo**, Myanmar

Mrs Misepa Isamaela, **Mrs Noeline Mateanki**, Cook Islands

Mrs Nanise Masau, **Mr Peni Qalo**, **Mrs Prakashni Chandra**, Fiji

Mr Nivaxal Malathip, **Mr Phouthone Dalalom**, **Mr Subsin Sinuvong**, **Mr Vongdeuan Keosulivong**, Laos PDR

Prof. Vincent Demoulin, University of Leige, Belgium

Wife of Mr Shigeru Ishiba, Secretary-General Liberal Democratic Party, Japan

Ms Xu Min and five colleagues, Chenshan Botanic Garden, Shanghai, People's Republic of China

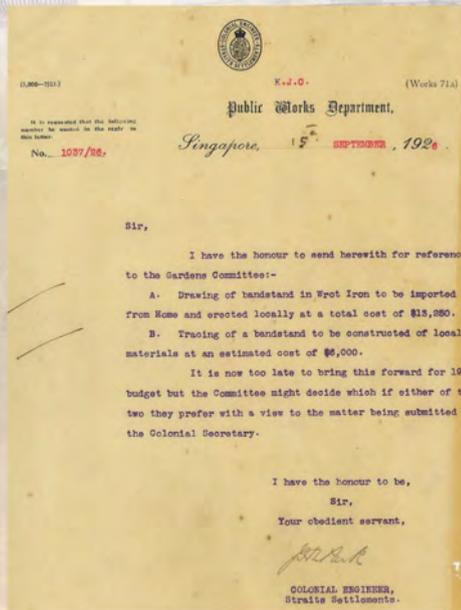
Dr Yu-Mei Wei, Guangxi Institute of Botany, People's Republic of China

Dr Zou Pu, South China Botanic Garden, People's Republic of China

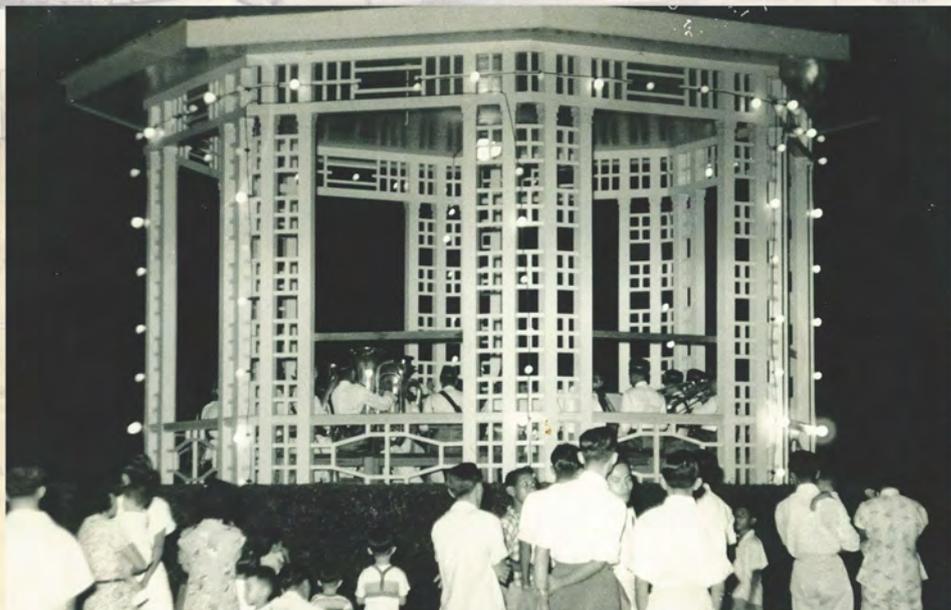
from the archives

THE ICONIC BANDSTAND

WHEN the Agri-Horticultural Society established the Gardens in 1859, the highest point (33 m above sea level) was planned for development into a bandstand promenade. The terraced hillside was planted with flower beds under the supervision of Mr Lawrence Niven, the first manager of the Gardens, and soon became a popular venue for concerts.



▶ The 1926 proposal for the construction of a bandstand.



▶ A band performance in the early days of the Bandstand.

In the early history of the Bandstand, music was provided by military bands from various regiments. They would play within the space surrounded by the Upper Ring Road, and on nights with a full moon, the scene was transformed into a social event. To improve sound, sometimes a removable platform was placed over the ground where the band played. Crowds of carriages would assemble as near as possible to hear the music, creating traffic near the hill. Performances were lively affairs, with large crowds and noisy children running around.

But the lack of a formal bandstand was noted. Commentary in *The Straits Times* on 8 March 1920 declared that it was “a pity that such a large and important place as Singapore has no bandstand. Perhaps it will have—some day.” Two years later, the absence of a bandstand was again lamented – “What a pity it is,” it was reported in *The Straits Times* on 14 March 1922, “that a town of the importance of Singapore apparently still cannot afford a bandstand”!

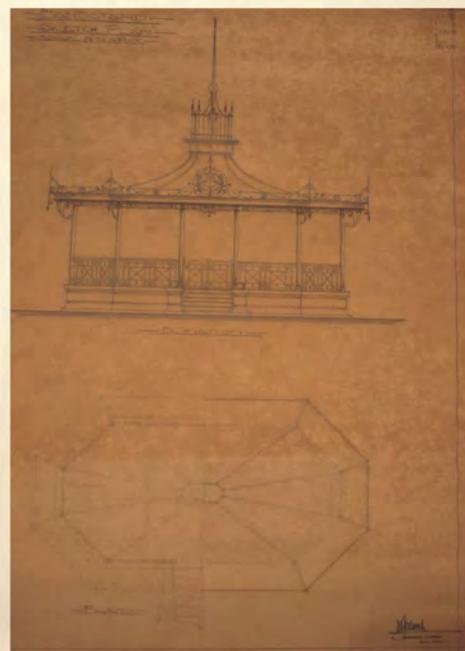
By 1926, a bandstand still had not been built, although a correspondence dated from that year provides evidence that it was under consideration. The letter, from the Colonial Engineer of the Straits Settlements and addressed to the Gardens Committee, included a drawing of a bandstand in wrought-iron which was proposed to be imported from England and erected



▶ A schematic showing the placement of the band and police officers as well as the direction of traffic during musical performances.

locally at a cost of \$13,250.00. An alternative proposal was also made, to construct a bandstand from locally-sourced material at an estimated cost of \$6,000.00. The Committee considered the two proposals, but still a bandstand did not materialise.

A bandstand was ultimately built in the latter



▶ A sketch of the proposed wrought-iron bandstand to be imported from England. This handsome structure is entirely different than the one that was ultimately built.

part of 1930 by the Public Works Department, and it is this structure that we see today. This iconic structure is one of the best-known features of the Gardens, and on occasion, is still used for musical performances. 🌿

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