

Gardenwise

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EXECUTIVE DIRECTOR'S MESSAGE

BOTANIC GARDENS LIBRARY
SINGAPORE

- 6 MAY 1994

Singapore is not only the most densely populated nation in the world today, but it also appears to be one of the areas on earth most prone to lightning strikes. At 12.5 strikes per square kilometre per year, the danger posed to the general public is not of major concern. But for our tall trees, that is a different matter. Based on the strike rate, the Singapore Botanic Gardens would average some 7 strikes per year. In the past year alone, however, 18 trees were struck by lightning! This explains the small mystery of why in a premier tropical botanic garden more than 134 years old and comprising a portion of primary forest, so few of our trees rise beyond 40 metres. Over the years, too many have succumbed to the thunderbolts from our heavens.

This information regarding our tree casualties came to light when our staff conducted research on the Angsana wilt. The significant impact of lightning on the mortality rate of Singapore's Angsana tree population caused us to take another look at electrical tree-kill in the Gardens. The disturbing statistics resulted in the formation of a team to look into lightning protection methods for conserving some of our monumental trees.

This in turn necessitates further research and experimentation.

The lightning-Angsana wilt link deriving from a line of investigation by our Plant Health Unit is just one demonstration of the least public and obvious activities of the National Parks Board, namely the research programme. The proper maintenance of the green estate, the curatorship of the living and preserved collections, and the development of new horticultural products and services are underpinned by a strong technical and professional backup provided by the research staff. Not only do our research staff conduct research in botany and horticulture, they also serve as instructors in our education programmes and provide advisory services to members of the public as well as to fellow institutions and statutory bodies. Certainly, if we are to achieve our goal in developing the Singapore Botanic Gardens as a premier institution of tropical botany and horticulture, our research role must be nurtured as carefully as the more visible components of our heritage parks and nature reserves.

Tan Wee Kiat
Executive Director

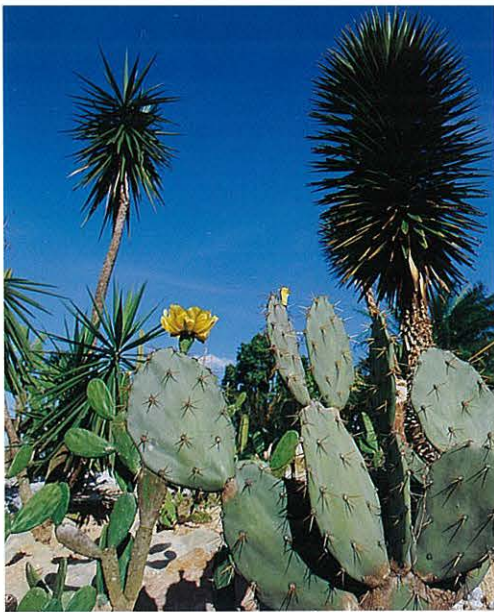


△ This West Indian Locust (*Hymenaea* sp.) introduced into the Garden in 1875, showed no physical damage from lightning apart from rapid defoliation, which could be confused with normal senescence. A massive invasion of *Ambrosia* pin hole borers following the strike, however, heralded the death of the tree.

▷ Unlike the West Indian Locust, this Meranti (*Shorea* sp.) showed extensive physical damage following the lightning strike. Large pieces of bark and wood were found 20 metres away.



◁ On the cover, the Common Birdwing (*Troides helena*) poised on a garden creeper.



Desert Plants Soak Up the Sun at SBG

When you step into a tropical garden, you hardly expect “desert” plants to thrive in an area with an average annual rainfall of over 2,000 mm. Here at lawn O of the Singapore Botanic Gardens, a habitat for these arid plants has been created — with a proper drainage system, an open sunny space, and dedication and diligence.

Since 1922, sun rockeries have been features of the Singapore Botanic Gardens. The first rockery, located on the terraces of Lawn X, was shifted a few times and then split into new locations. When these areas became shaded by surrounding trees, it was decided to consolidate the collection under full sun, and the site at Lawn O near the Bandstand was chosen.

Plants at the new Sun Rockery are arranged according to their geographical origins, namely Africa, America and Asia. The ground is specially laid with 3 parts sand to 1 part top soil. Underneath this mixture is an extensive pipe system to drain off excess rainwater. The gradual slope on which the Sun Rockery is situated serves to lead visitors, including the handicapped, from one terrain to another without requiring steps.

There are two broad categories of plants here: succulents and cacti. The Latin word *succus* means juice and succulent plants have fleshy (or juicy) thick organs. The hall-mark of most cacti is the existence of areoles, which look like miniature pin-cushions. Succulents, on the other hand, may or may not be spiny, but may produce a milky exudate when injured.

Here at the Sun Rockery, you can find the *Epiphyllum* (or orchid cactus), a type of leafy cactus introduced into Europe about three hundred years ago. You can spot *Euphorbia lactea* (or Dragon Bone) which resembles a massive candlestick with branching support for a large number of candles, and the *E. tirucali* (known in Malay as “Tulang-tulang”, meaning

“like bones”) in the form of a tree with slender stems clustered irregularly at the crown. If you are thinking of a name for your mother-in-law, why not call her *Sansevieria trifasciata* (aptly named the Mother-in-law’s Tongue).

Leaves of *Agave sisalana*, commonly called the Sisal Hemp plant, are a source of strong fibrous materials. Look carefully at some of the large fruits of *Cereus* and especially those of the *Opuntias*. They may not look delicious but many of these “cactus figs” may be eaten fresh or preserved with sugar or else made into alcoholic drinks. Certain cacti have medicinal properties, too. Traditionally, peoples of the New World, which is home to virtually all cacti, depend heavily on them for both food and water.

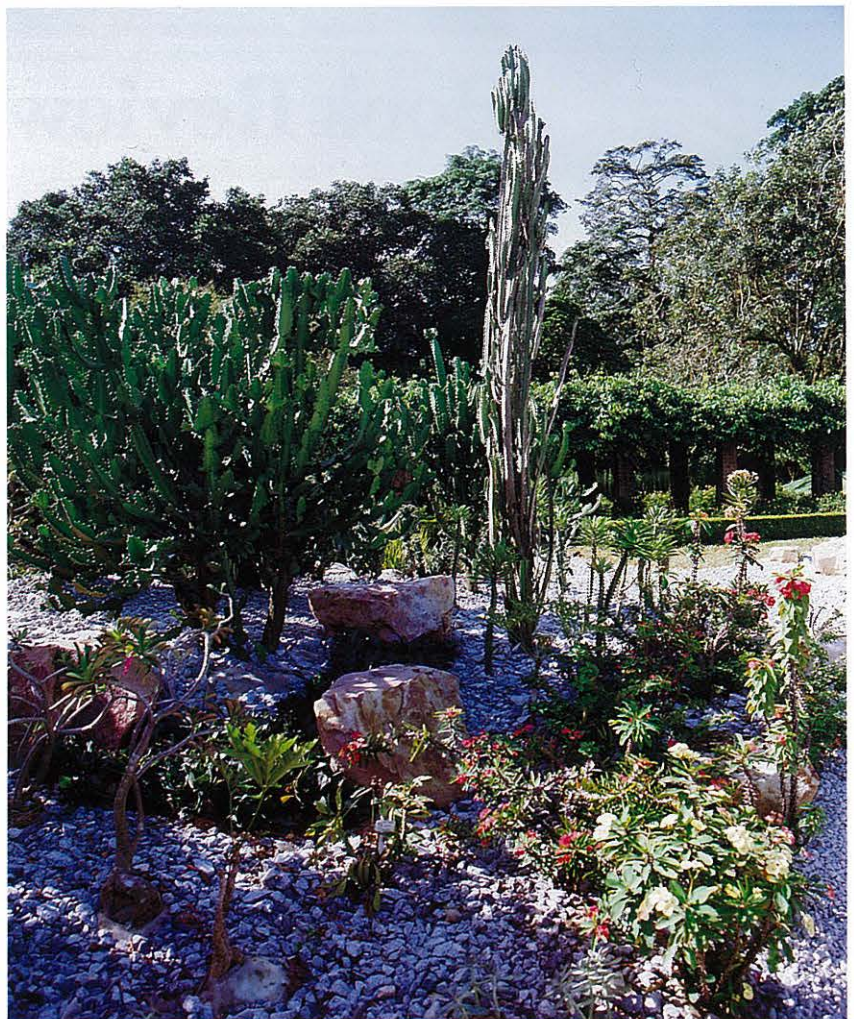
When you visit the Sun Rockery, take a close look at the special features of these plants which have been acquired to prevent or reduce water loss. Most of them have small modified leaves sometimes in the form of spines, a thick waxy cuticle on their leaves, or large fleshy stems which function as water storage organs. As these plants evolved, they developed succulence as a result of the influence of climate and habitat, and their odd physical appearance is due to their adaptations to the conditions of their habitats.

So next time when you come to the Botanic Gardens, do remember to see our latest attraction — the Sun Rockery.

Lim Kar Yee
Public Affairs Officer

△ A view of the Sun Rockery highlighting *Yucca*, *Dracaena* and flowering *Opuntia* species in the foreground.

▽ An assortment of succulents highlighting species of *Euphorbia*, *Cussonia*, *Adenium* and *Sansevieria*.



Nature Trail Launched at MacRitchie

The Central Catchment Nature Reserve is Singapore's largest nature area containing some 2,000 ha of rainforest. It is estimated that there are still over 250 ha of primary forest surrounded by secondary forest in various stages of regeneration there. One of the richest areas is between MacRitchie Reservoir and Lower Peirce Reservoir. It was here that NParks launched its first nature trail in the Central Catchment Nature Reserve on 11 November 1993.

The Guest-of-Honour, Dr John Chen, Chairman of the Parliamentary Committee on the Environment, launched the trail. Over 150 guests and staff turned up in support of the launch.

The 3-km MacRitchie Nature Trail runs through a mixture of secondary and primary rainforest. The first half of the trail is bounded on both sides by secondary forest and species like the Fish-tail Palm, Terentang and Common Mahang are easily found. The presence of the introduced



Our Guest of Honour, Mr John Chen, and HongkongBank Chief Executive Officer, Mr Richard Hale, "greenstepping" through MacRitchie forest with their guide, Senior Research Officer, Mr Tay Eng Pin.

Para Rubber Tree is also obvious, especially at the beginning of the trail. Good stands of primary rainforest mark the beginning of the second half of the trail. Dipterocarps like *Dipterocarpus sublamellatus*, *Dipterocarpus cornutus*, *Dipterocarpus grandiflorus* and *Shorea pauciflora* can be seen on either side of the trail. Other tree species include Gaharu, Kempas, Petai, *Irvingia malayana*, *Lophopetalum wightianum*, *Scaphium macropodium* and *Kokoona reflexa*. Along the edges of the trail can be seen herbs and shrubs like *Tectaria singaporeana*, *Tacca integrifolia*, *Curculigo villosa*, *Thottea grandiflora*, *Tabernaemontana malaccensis*, *Randia macrophylla*, and *Hornstedtia scyphifera*.

A great diversity of animals can be seen or heard. Visitors will encounter at least two troops of Long-tailed Macaques, one of which frequents the entrance to the trail. The Slender Squirrel chirps like a bird and is adept at running along branches and trunks, occasionally taking a leap in the air. Visitors may chance a rare meeting with the well-camouflaged Flying Lemur which can glide from tree to tree. Except for the raucous Greater Racket-tailed Drongo, most birds are more often heard than seen. The Banded Woodpecker is easily recognizable when it lets out its piercing scream. The Striped Tit-babbler is perhaps the most common bird in the area and can be heard moving through the undergrowth in groups. Along the water edge, the Malayan Water Monitor can sometimes be spotted while Malayan Box Turtles bask in the sun.

Book Review

Living Legacy: Singapore's Architectural Heritage Renewed by Robert Powell with photographs by Albert Lim K. S. and Luca Invernizzi Tettoni (Singapore Heritage Society, 1994, Singapore)

To live in as rapidly developing a nation as Singapore is to live in the shadow of the demolition ball. Or so it seemed until about 10 years ago. An audible sigh of relief went out when the trend shifted from 'tear down and redevelop' to 'conserve and reuse'. What forces influenced that shift is the subject of a carefully prepared study, by Architect, Planning Consultant and NUS Academician Robert Powell. Powell argues convincingly that architecture is part and parcel of recorded history and thus architectural conservation must be essential to a nation striving to establish a cultural identity.

Living Legacy takes up where *Pastel Portraits* left off in tracing the success of the conservation movement since the latter book raised the nation's conscience to the urgency of keeping what remained of its architectural treasures in the wake of an intensive period of urban renewal. Powell gives the government planning authorities and supportive legislation high marks for advancing the cause of conservation of Singapore's built heritage beginning in the 1980s and culminating in

1991 with URA's Conservation Master Plan. Says the author, on a cautiously optimistic note, the "built heritage and the natural environment were increasingly under threat from pragmatic developmental policies, but it has been recognised, just in time, that they are valuable components of a developed and cultured society."

Two of the National Parks Board's monuments are featured here. They were selected for their recognisable standard of excellence, for the care and concern taken in maintaining cultural continuity, and for compatibility with their new use.

Fort Canning Centre takes its place under the "Significant Buildings" section, in company with Alkaff Mansion, Raffles Hotel and the Telok Ayer Market. Originally constructed to house British troops in 1926, the former Military Barracks block was converted into a squash-court complex when the hill was designated a central park in the 1970s. In its current "recycling", the imposing piece of Classical-inspired military architecture houses two performing arts groups, and studio, function hall and office spaces. Today, and well into the night, the walls resound with ballet rehearsals, dramatic performances, gallery exhibitions and wedding parties — where soldiers used to sleep.



Burkill Hall's front verandah enjoys the tropical breezes of evening.

HongkongBank Sponsors Reforestation at Lower Peirce

In our ongoing efforts to enhance the conservation value of our Nature Reserves, NParks is reforesting a 3 ha area at Lower Peirce with funding from HongkongBank.

The area selected was previously covered with Resam ferns taller than a man. Without human intervention, the area would remain in an arrested stage of succession as seedlings of trees are not able to grow under the thick Resam carpet. Rehan Yusof, our Management Officer (Nature Reserves) worked hard with his team of workers and our term contractor

to clear and remove the ferns in preparation for planting.

In the late afternoon of 20 November 1993, the project was launched when Mr Richard Hale, Chief Executive Officer of Hongkong Bank, together with Dr Tan Wee Kiat, Executive Director of NParks, planted a sapling of Temahai, *Kleinhovia hospita*. The Bank staff and their families then worked side by side with NParks staff and friends to gently plant and water about 300 saplings of over 20 forest tree species. These included Jelutong, Pulai, Tembusu, Kedondong and Jelawai.

In the next phase of the project, another 600 saplings will be planted. We look forward to seeing, in the years ahead, a forest where there was once only Resam. This forest will eventually provide refuge and sustenance for the animals in the area as they move in to establish new niches.



HongkongBank making reforestation a family affair.

Basic amenities like benches and distance markers provide rest and enable joggers and hikers to gauge the distance travelled. Interpretative plaques enable identification of some commonly seen plants and animals and will hopefully contribute to visitors' deeper appreciation of our natural heritage. A trail guide, "Green Steps", is also available free of charge from the Nature Reserves Visitor Centre at Bukit Timah, Singapore Botanic Gardens, Fort Canning Park, and HongkongBank outlets.

NParks is developing a masterplan for recreation in the Nature Reserves and more nature trails are in the pipeline. The challenge is to make the Nature Reserves more relevant to the community through the provision of recreation accesses and facilities and in the process, create in Singaporeans a greater awareness and appreciation for our natural heritage.

Robert Teo
Manager, Nature Reserves

Included in the section on "Bungalows and 'Black-and-White' Houses," Burkill Hall is recommended to students of modern architecture as a good example of residential design that is responsive to tropical climatic conditions. Constructed for the Botanic Gardens' Superintendent in 1866, this "house of character", as former Director H. M. Burkill described it, became home to several generations of Gardens' Directors and their families. These were among Singapore's earliest men of science and pioneers of the rubber and orchid industries. From the 1970s onwards, the house served well as classroom facilities for the School of Horticulture.

In 1992 the building was named in honour of two Directors, father and son, who served the Gardens for a combined period of over 25 years. As one would imagine, much lore and a good deal of legend is attached to the 130-year-old house.

In its next phase of life, Burkill Hall will be the VIP reception hall for state visitors and the ultimate welcome point for visitors to the new Orchid Garden presently under construction. Also housed here will be exhibits on VIP orchids and the products of Singapore Botanic Gardens' breeding and conservation programme — a fitting cultural tie that connects the achievements of generations past and present.



Living Legacy is more than an important addition to the reference literature already documenting Singapore's architectural heritage. The book combines a quality of photography and an image-sensitive layout, lavish on interior richness, that altogether make it worth spending a long evening with. Ed

One striking feature of Burkill Hall is its long, slender timber posts extending from the ground floor to the eaves of the roof. These posts were made of native *Tempinis*, once abundant in the Tampines area.

Title: Raffles Reviewed: Sir Stamford Raffles
175 Years Later
Place: Fort Canning Centre
Dates: 29 January to 31 May 1994, except
Mondays
Admission: Free

"An Appreciation of Raffles": A Lecture by
Dr John Bastin Given in Conjunction with the
Raffles Exhibition

What manner of man was the founder of modern Singapore? And why does he continue to excite such a high level of interest after 175 years? Noted historian Dr John Bastin addressed these questions in an hour-long paper presented to 150 teachers and history buffs at Fort Canning Gallery on 4th February.

EXHIBITION



Two studios at Fort Canning Centre are devoted to an exhibition marking the 175th anniversary of Raffles' landing in Singapore. Part one concentrates on Raffles' vision for Singapore as the British-controlled crossroads between East and West; part two details Raffles' life in Singapore.

Students of history may remember that Raffles chose to build his bungalow on top of Fort Canning (near today's Telecom Tower) for the beautiful view it commanded, and it was here that he established the first botanical and experimental garden in Singapore.

Along with examples of archaeological remains of the early British colonial period unearthed at Fort Canning, a rather grand silver epergne (branched serving dish used as a table centrepiece) is on display. The Chinese community presented this unusual decorative item to Colonel Farquhar, whom Raffles designated first Resident of Singapore (1819-1822).

The exhibition at Fort Canning Centre supplements the larger collection of artefacts from the British Museum and British Library on display at the National Museum.

Bastin noted how the reputation of the man seems to fluctuate from generation to generation. With the celebrations marking the 50th anniversary of Victoria's ascension to the throne, for example, the statue erected on the Esplanade in 1887 was in the likeness of Raffles, not Queen Victoria. When the Japanese took Singapore in 1942, it was to honour the founder of Singapore that they raised a cheer. In more recent years, however, with the accumulation of more information and more careful methods of research, the human side of the legendary figure has been revealed.

While modern researchers would question his right to claim the foundation of modern Singapore and would cast a disparaging eye on some of his irresponsible dealings with the Dutch, the vast and lasting contributions of the man manage to survive all efforts to discredit him.

Raffles was an unusual imperialist. A humanitarian and a truly good and kind-hearted man, nonetheless he had ambitions of becoming a Duke. Although he pushed for British economic superiority believing in the Empire's right to control trade routes as well as the progress of civilisation in the Archipelago, his methods were reformist and his dealings with the native peoples, gentle and fair. He believed in the civilising and reforming power of education, and one of his

earliest missions in Singapore was to found a school, Raffles Institution. A master in drawing up regulations and laws, he developed the plans that would make Singapore a free port.

As an historian, Raffles accumulated massive materials on the customs, language, and literature of Java which he utilised in his *History of Java*. Highly original, systematic and comprehensive, the book opened Java to public scrutiny for the first time and laid the foundation for modern Indonesian studies.

In his lecture, Bastin painted a sympathetic and, at the same time, honest portrait of the many-layered man. "He was a great man," said Dr Bastin, "worthy of being the founder of this marvellous modern state of Singapore." Ed



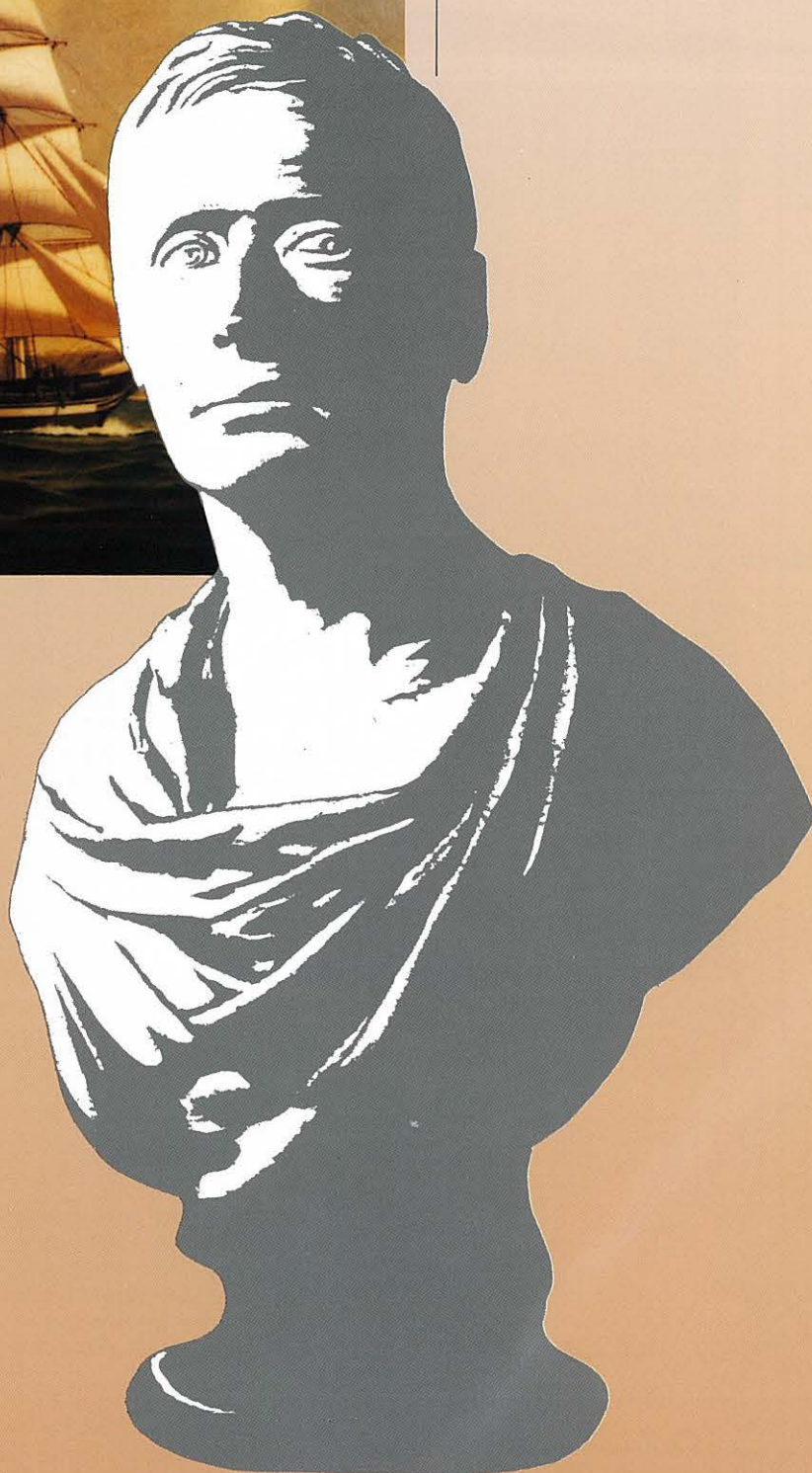
Opposite, visitors to the Exhibition note the chronological progression of Raffles' career in the Archipelago.

Left, a painting of the famous ship that first brought Raffles and his crew to the shores of Singapore — the *Indiana*, exhibited at Fort Canning.

His childhood love of gardening was to inspire in later years a keen amateur naturalist. He sponsored the work of the American naturalist Dr Thomas Horsfield, William Jack, Dr Joseph Arnold and other talented scientists and collectors. Counted among his most lasting achievements were those related to his burning passion for nature — the founding of the first botanical and experimental garden in Singapore, the joint discovery with Arnold of *Rafflesia arnoldi*, and the establishment of the London Zoological Society.

A small man of poor complexion, Raffles was said to have walked with a stoop and "spoken in smiles." Suave and affable, he had a charm unique to himself. He was a man entirely happy with himself, according to his mentor Lord Minto. He worked with a restless, burning energy, saying of himself, "I cannot be idle. I must always be doing something."

In later years, however, he was to turn fatalistic, after the loss of three children and the destruction by fire of his massive collection of plant and animal specimens stored on board the *Fame*. These tragedies, coupled with blinding headaches, may have accounted for his great mood swings. In 1826, one day before his 45th birthday, Raffles died of a severe hemorrhage to the brain.



On sunny mornings, visitors frequenting the Botanic Gardens may notice a butterfly, dressed in bright yellow and black, flitting among the flowers busy harvesting nectar. This is the Common Birdwing (*Troides helena*). Widespread in countries such as Sri Lanka, India and Peninsular Malaysia, this species is rarely seen in Singapore. The Botanic Gardens is known to be one of the few places where you can spot this beauty.

The restricted distribution is linked to the availability of the caterpillar's food source. In this case, the usual food plant is a climber, *Aristolochia tagala*, of the Dutchman's Pipe family Aristolochiaceae, which can be found in and around the Gardens. This species of plant may have been introduced from Peninsular Malaysia, where it is native, and then naturalised in Singapore. There has been no record of its natural occurrence here.

The “uncommon” birdwing at home in SBG

Various species of Birdwing butterflies are known to be closely associated with members of Aristolochiaceae. The females are capable of seeking out plants of this family from a great distance in order to lay their eggs, thus ensuring the survival of the caterpillars when hatched. In the case of the Common Birdwing *Troides helena*, the female has been observed laying her eggs one at a time not just directly on the underside of a leaf of *Aristolochia tagala* but also on the wooden frame of a pergola used to support the climber. On what basis the female chooses the substrate to lay her eggs is still a mystery. One thing is sure: the food plant is not far from where the egg is laid. Different species of Birdwing butterflies may choose different or more than one member of Aristolochiaceae as food plants. For example, besides *A. tagala*, caterpillars of Common Birdwing may also feed on another species of Aristolochiaceae, *A. elegans*, if it is available.

Many Birdwings are poisonous to their predators. Their striking bright yellow, red, white and black colour combination serve effectively as warning colours. Their distasteful property could be due to the poison accumulated from the food plants they feed on.

The caterpillar of the Common Birdwing *Troides helena* has a muddy brown colour

with a lighter oblique band found around the mid section. Near-black protuberances shaped like horns are found throughout the whole length of the body.

Before pupation sets in, the caterpillar will spin a strong thread of silk around itself and attach the ends of the thread to a twig or a branch, balancing and supporting itself in its cradle. The colour of the pupa can range from light green, yellow to brown.

Just before emerging, the adult butterfly will break open the pupa casing along the suture on the ventral, anterior side, squeezing and clearing itself through the resulting opening.



1 Flowers of the food plant *Aristolochia tagala*.

2 A caterpillar of Common Birdwing.

3 The pupa case of Common Birdwing showing the supporting band and the slit from which the adult butterfly emerged.

Males of the Common Birdwing are slightly smaller in size than the females and have fewer black markings on their hind wings and abdomen.

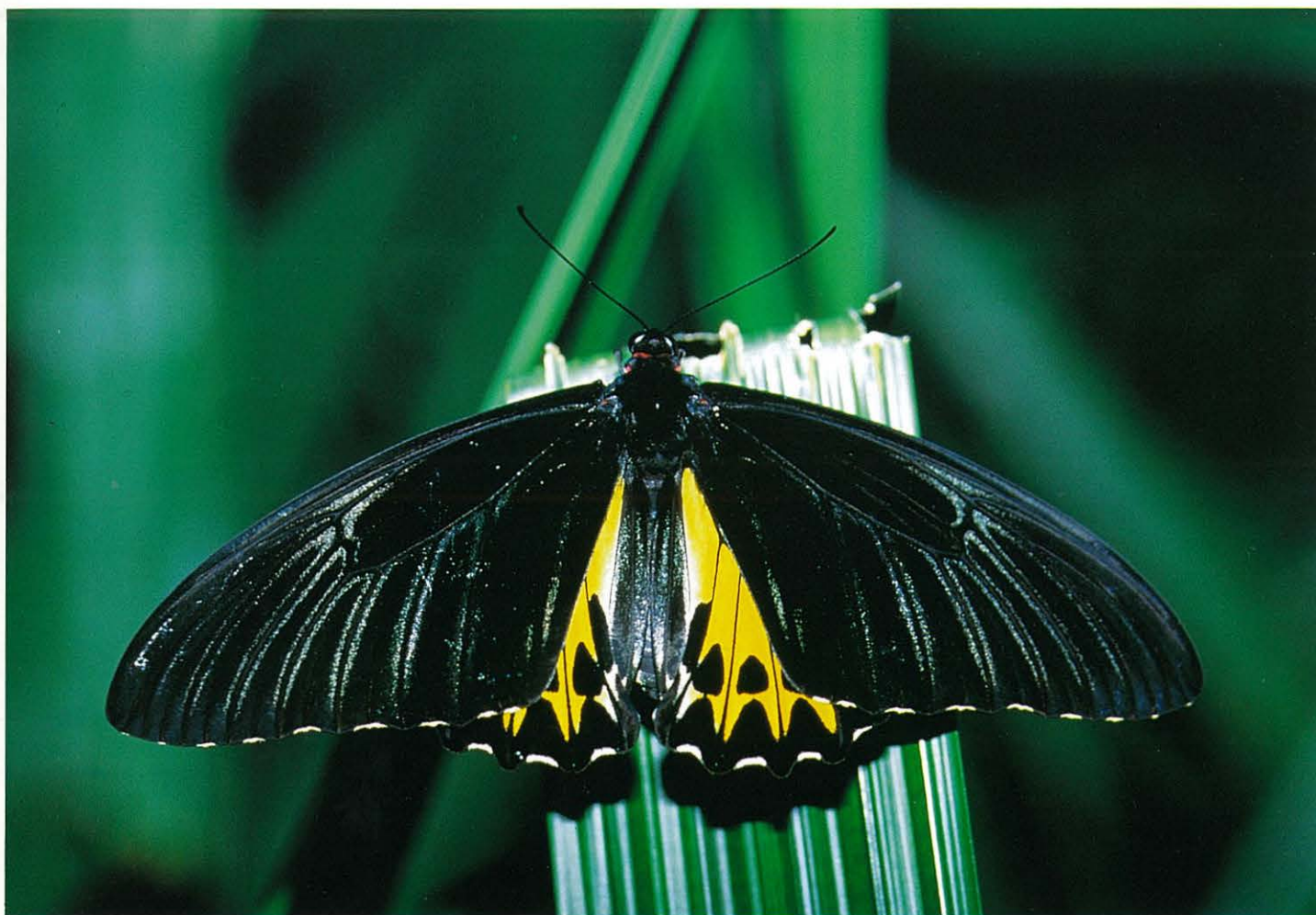
Several hours are required after emerging for the wings to dry and harden before the adult takes its first maiden flight into the new world. The flight pattern of the adult Common Birdwing tends to be a bit clumsy due to its apparent weight. After gaining its height through a series of wing flappings, it may glide along a short distance before losing momentum. Another short burst of flapping then follows.

To ensure a permanent home for the Common Birdwing, Botanic Gardens' staff

Aristolochia tagala

(Malay common name: Akar petola hutan)

This twiner, up to 20 m in length, grows in forests and thickets. It flowers and fruits throughout the whole year. The inconspicuous, tubular flower (c. 1 cm long) has a swollen base and is found at the leaf axil. The young fruit is green and shaped like an elongated pear. When dried, it splits and opens up like a hanging basket or an inverted parachute. Its triangular seeds are brown and laterally flattened.



Newly emerged female adult of Common Birdwing.

actively propagate and grow the food plant. So the next time you come across this little winged wonder on your Gardens round, do think of the intricate relationships between plants and animals. With a little patience and keen observation, you will come to enjoy all the more what Mother Nature has in store for you.

Tay Eng Pin

Senior Research Officer, Taxonomy

Five New Courses and Tours Offered at School of Horticulture



Mensa students on a "Young Botanist" tour of the Plant House Annexe.

The School of Horticulture offers a wide variety of gardening courses and educational tours to members of the public. Our participants range from avid gardeners, fine-tuning their skills or learning new ones, to those who simply appreciate plants and gardens and want to find out more about them. Special programmes have been organised also for pre-schoolers and students. These enable students to enrich their store of knowledge in a 'fun' way, with lots of hands-on experience. Singapore Botanic Gardens is indeed a large enough classroom to cater to all these needs and more!

The growing public awareness of the need to preserve our natural environment has prompted the introduction of a number of new courses in our public education programmes. The new courses include both gardening courses and educational tours.

The **KITCHEN GARDEN** introduces participants to a number of herbs and spices that are used regularly in our local cuisines. These include underground plant parts such as ginger, garlic, turmeric, onion; spices such as pepper, cardamom, cloves; and aromatic herbs

such as mint, pandan and citrus. Almost all of these have some historical and medicinal significance which are discussed in the classes. Methods of propagating these plants are also demonstrated. In addition, participants learn simple, new herbal recipes for dips and hors d'oeuvres, chutneys and ginger salad and decide their merit with the tasting!

YOUNG BOTANIST WORKSHOPS

have been designed for pre-schoolers and students from the ages of 6 to 16. Indoor programmes consist of designing, creating and maintaining bottle gardens or dish gardens. Outdoor educational programmes take students on tours of discovery; interesting palms, rainforest species or other ornamental plants at the Singapore Botanic Gardens are included in this workshop. The depth of discussion and the number of plants covered in each tour varies with the age of the participants.

In the **RAINFOREST TOUR** of Bukit Timah Nature Reserve (BTNR), participants are conducted through the primary rainforest where they are introduced to the ecology of the plant and animal communities there. This tour also includes a visit to the Nature Reserves Visitor Centre where specimens collected from the rainforest enhance this 'hands-on' learning experience.

The Singapore Botanic Gardens enjoys the reputation of holding one of the most celebrated orchid collections in the world. The walking **ORCHID TOUR** focuses on the varied genera and species found in this wonderful family of plants. Some of the fundamentals on orchid breeding and cultivation are also discussed.

Heliconias, often mistakenly referred to as 'Bird of Paradise', are fast becoming popular for use as cut flowers and landscape plants. With the introduction of several species of this exotic plant into Singapore, there has been a growing interest in cultivating these plants in homes and gardens. Participants in **GROWING HELICONIAS** learn about the various species and varieties of heliconias. Methods of growing and caring for heliconias are demonstrated, and tips are given on the use of heliconias in floral decoration.

Jacintha Ramachandran
Education Officer



On the Orchid Tour, participants are shown the orchid breeding process step by step, beginning with pollination.

Career Development in Horticulture: First Trade Cert Students to Graduate

27 graduates of the School of Horticulture's new course, "Trade Certificate in Horticultural Practice," were honoured on 25th September 1993 in a graduation ceremony.

Mr Yusof Alsagoff, President of the Orchid Society of South East Asia and NParks Board Member, was Guest of Honour and Mrs Jennifer Ng, Assistant Director for Education, officiated at the ceremony at Fort Canning Centre Gallery.

Although the School of Horticulture has been in operation for over 20 years training students for the horticulture industry at its location at Singapore Botanic Gardens, the Trade Certificate Course was introduced only last year to meet the needs of employers in developing skills of horticulturists directly involved in landscape maintenance.

The new Trade Certificate Course in Horticultural Practice offers the opportunity

for gardening technicians to maximise their potential and keep abreast of new employment and technological needs in the horticultural industry. The course is practice-oriented and aimed at upgrading the quality of work and sharpening the skills of gardeners in the government and private sector by introducing the most up-to-date horticultural skills and methods. A total of 10 subjects cover the basics of plant identification, plant nutrition, planting and maintenance, plant protection, nursery practices, fruit tree cultivation, orchid cultivation, plant decoration and arrangement, horticultural machinery and landscape construction.

The course duration is one year. Students can also opt to attend specific modules of their choice and obtain training over a longer period at a more convenient pace to gain the award. A minimum period of three years is given for students to complete the course. Companies can defray up to 70% of their costs of training by applying for grants from the Skills Development Fund (SDF). Ed

For more information about this and other courses at the School of Horticulture, be sure to phone 4709924 or write in to:

**The National Parks Board
School of Horticulture**
Singapore Botanic Gardens
Ridley Hall
Cluny Road
Singapore 1025



Members of the 19th Graduating Class of the School of Horticulture with Assistant Director for Education, Mrs Jennifer Ng, on the first row, second from the left.

SBG Hosts Nishinippon Students in 2nd Summer Lecture

In September, NParks played host to 85 Japanese students and their faculty advisers from Nishinippon Junior College. These students of Landscape Architecture were visiting Singapore as part of the extracurricular educational programmes organised by their college.

The programme at the Singapore Botanic Gardens consisted of a half-day tour followed by a seminar. The programme began at 9.00 in the morning at Ridley Hall with a welcome by Deputy Executive Director, Dr Leong Chee Chiew, and Director of Planning and Development, Mr Jun-ichi Inada, followed by the screening of a short introductory film on the Gardens.

Guides selected from among our junior staff conducted the Japanese students through key components of SBG including the Herbarium, the Tissue Culture Laboratory, the Gardens' sculpture gardens, the newly established Sun Rockery, the popular Orchid Enclosure and a part of the forest. Officers were positioned at each of these points to brief the students. At each stop the students were provided with explanatory hand-outs with key words translated in Japanese.



After about two hours of walking, the students and staff gathered under the shade of the old Tembusu tree at Lawn E for a well deserved break of home-made local cookies and refreshments.

In the afternoon, the programme continued at New Park Hotel where the students were staying. Four speakers from NParks gave slide presentations covering topics relevant to the Japanese students' curriculum: Redevelopment Masterplan of SBG, Design and Development Concepts of the New Orchid Garden, Tropical Landscape Designs of SBG, and Educational Programmes at the National Parks Board.

Although the students were slightly handicapped by the language, the lectures were well received as Professor Takashi Okamoto remarked in his closing address. Dr Leong presented certificates of participation to the students for their involvement in the programme. The day's activities ended with a sumptuous dinner at the New Park Hotel hosted by Nishinippon.

Jacintha Ramachandran
Education Officer



◁ Nishinippon students examine specimen sheets in the Herbarium.

▷ Planning & Development Officer, Mr Russell Sim, explains the design concept of the Sun Rockery to the Japanese students.

IOSS'93 SPELLS \$\$

FOR FUTURE OF SINGAPORE ORCHID INDUSTRY



A spectacular array of orchids and floriculture products were showcased at the International Orchid Show Singapore 1993 (IOSS'93) held at the World Trade Centre Hall 1, from 26 to 29 August 1993. This was the first major international orchid show held in Singapore since the Fourth World Orchid Conference in 1964.

Organised by the Singapore Trade Development Board (STDB), with supporting public and private-sector organisations of breeders, growers and exporters, the IOSS'93 aimed to promote the international orchid cut-flower trade. The show arrived on the heels of a recent announcement that government would boost the orchid industry by setting aside more than 450 hectares of land for the cultivation of orchids and other ornamental plants.

In his opening remarks, Mr. S. Dhanabalan, the Minister for Trade and Industry and guest of honour for the occasion, urged orchid growers to continue cultivating new varieties of orchids of superior quality to remain competitive with other countries which have more land and labour resources. Since 1985, he said, Singapore's exports of cut orchids have grown significantly, reaching the \$23 million mark last year. It is estimated that by the end of 1995, Singapore will export more than \$70 million worth of orchids annually.

The Hall's 2,150 square metres were occupied by International Displays, a Singapore Display, an International Orchid Competition, a Floral Arrangement Demonstration, and a Trade Exhibition.

Selecting from among 11 participating countries, an international team of judges awarded the trophy for the best **International Display** to Indonesia's majestic landscape design.

The Singapore Florists' Association and the National Parks Board teamed up to create the **Singapore Display**. An "indoor" display included hotel arrangements, home decorations, congratulatory baskets and wedding bouquets. In the "outdoor" landscaped area, lush tropical foliage served as backdrop to the popular VIP orchids of Singapore Botanic Gardens, showing examples of *Dendrobium* Margaret Thatcher and *Dendrobium* Lee Kuan Yew.

Some 130 participants were involved in the **International Orchid Competition**. One of the most unique aspects of the IOSS was this first-time-ever inclusion of a section specially allocated to cut-flower orchids and plants for cut-flower production.

At last year's 14th World Orchid Conference in Glasgow, one of the key points under discussion in the forum on judging was the lack of standard and proper procedures for



judging orchids produced for mass markets. The IOSS'93 became a pioneer in this area by being the first International Orchid Show to set standards for assessments of hybrids developed for cut-flowers and plants for cut-flower production. That, we hope, will provide valuable input for all future international orchid shows.

Entries for the competition were classified into 65 classes. After several hours of judging by some 70 international judges, four Divisional Champions and a Champion Plant of the Show were selected. The best hobbyist plant of the Show was *Vandaenopsis* Laycock Child; the best cut flower of the show was *Mokara* Willie How; the best plant for cut flower production was *Dendrobium* Light Pink; and the Flower Arrangement Divisional Champion was won by Flowering Point.



△ Mr Dhanabalan takes a lesson on use of the 'Orchid Database', N Parks' computer-based storehouse of information on every orchid hybrid registered internationally.

▽ The Show's up! N Parks' staff with smiles for the camera are from left, Lee Guek Choon, Wong Wei Har, Wilson Chua, Russell Sim, Peter Ang, Lim Kar Yee, Camelia Marican.



As part of the festivities, internationally renowned flower arrangers were invited to participate in **Floral Arrangement Demonstrations**. Mrs. Yasuko Manako, Mrs. Carol Keiller, Mrs. Yuki Ikenobo, Mr. Thomas Lim, Mr. Peter Cheong, and Mr. Royston Low demonstrated many innovative means of using cut-flowers to enthusiastic audiences.

Some 40 overseas and local companies participated in the **Trade Exhibitions**. Altogether, the Show attracted more than 1,500 trade visitors from different parts of the world. Many of them managed to see some of Singapore's products for the first time, and some even made on-the-spot orders!

The **Seminar** covered a broad spectrum of interesting topics ranging from recent

findings in tissue culture, genetic engineering, and disease control, to marketing and use of orchids for floral arrangements. Participants were taken on **Technical Visits** to local orchid exporters as well as the Primary Production Department's (PPD) Field Experimental Station.

Overall the IOSS'93 was a tremendous success not only in show-casing Singapore's orchids, but also in bringing together hobbyists, growers, exporters, florists, dealers, retailers, landscape architects, and researchers from all over the world to meet, exchange ideas, and make fresh contacts for the future.

Once again, it showed that Singapore is capable of producing some of the best quality orchids for world-wide markets.

△ The Singapore Display lights up the International Orchid Show Singapore at the World Trade Centre.

Yam Tim Wing
Research Officer, Orchidology

spotlight on staff

Clifton is a meat eater (no vegetarian restaurants, please!), and says his mother makes a great chicken mushroom dish. He's been busy so far with a visitor survey, building a database of tour operators and guides, inventory of NParks' publications and is tuning up the marketing strategy for the new orchid garden.

Sarah Bte Assan has worked previously as Personal Assistant to a Director of the National Productivity Board and Secretary to the MD of a training and seminar production company after schooling at Tun Seri Lanang. She is now CO/Finance for the Board. Sarah has enjoyed vacations in Malaysia, with a



△ From left, NParks' new staff members Ayop Bin Ninggal, Clifton Lee, Lim Koon Wee, Abdullah Bin Leboh, Sarah Bte Assan, Ann Teo, Tang Mun Yeng.

▷ Opposite, Joan Ong, and Wong Wei Har

The Singapore Botanic Gardens now has a manager! **Ms Wong Wei Har** has joined the Board in this challenging position, which she sees as a mixture of coordination, innovation and implementation. Wei Har received an NUS Science degree and an MBA from NTU and has been a bank officer and convention manager. She sees this as being the most opportune time to join the Board, as the present stage of growth is intense and exciting.

Wei Har says that the Gardens' staff exhibits such a high degree of responsibility in their areas that coordination will be key in the role she plays. She feels her success will be measured by how well she enhances their effectiveness and builds their confidence in her ability to back them up with any needed resources.

Her mother's Hakka delicacies are favourites at Sunday dinners, and spending time with her husband and lovely eight-month-old daughter is her favourite after-office activity.

Our Marketing Department is fortunate to have **Clifton Lee** on board. Clifton has an NUS Business Administration degree and is currently pursuing a Graduate Diploma in Marketing in what spare time he can find between spending time with his lady friend and hunting for antique watches for his collection (dating from 1914).

favourite location being Genting Highlands for the natural beauty, cool weather and thrilling cable car ride, and spends her days off creating delicious Kampong dishes which she enjoys serving to her family. (Sarah, we have knowledge of a cadre of taste-testers if you ever need some help with left-overs!).

NParks' Human Resource Department has added Administrative Officer **Joan Ong**. A former Librarian, Joan joined us from the National Library, HR Dept, after enjoying introducing children to the pleasures of reading. A serious NUS degree in Economics contrasts with her preference for comedy movies, bowling (preferably after a chili crab dinner—here's a hint, guys!), and badminton. Travelling has been rewarding. Destinations? "It's not so important where you are," says Joan, "it's the group of friends you're travelling with."

Challenges for Joan have included the implementation of a new Medical Benefits programme and the recent Civil Service salary review.

The Finance Department has added Administration Officer **Lim Koon Wee** to its ranks. Experience in cost control and a degree in Accountancy from NTU will serve him well in his position at NParks.

European traveller Koon Wee advises: Italy has the best food (he likes pasta); France

has the best museums; and Switzerland (where he played in the snow for the first time), has the best scenery. During his National Service he was an instructor for Basic Military Training, teaching everything from rifle skills to First Aid, and now he dedicates many of his off days to The Boys' Brigade, where he is 2nd Officer in Charge of the Junior Section. He swims, jogs, cycles and says that Cuppage Plaza has the best Hawker fare in Singapore.

Our Gardens is not new to **Tang Mun Yeng**. Mun Yeng says she was accustomed to walking in the Gardens and viewing its beauty from the highest point at NIE, her former



place of employment. Hoping as she did to one day work in the Gardens, she feels that her present position is a wish come true. A new member of NParks' Horticultural team, Mun Yeng concentrates her efforts at the Eco-lake development, Bukit Timah Core, and is pursuing her Diploma in Horticulture. During her spare time, she is an avid gardener (no surprise) and enjoys nature, loves mountain climbing and trekking.

NParks' Park Ranger force welcomes **Abdullah Bin Leboh and Ayop Bin Ninggal**. Abdullah has done a stint at Changi Prison — as a guard, of course — and worked at CISCO for several years before joining NParks at Fort Canning. Abdullah finds time for fishing and travelling and loves visiting places in the region to discover different living patterns and cultures. He is married with 3 sons & 3 daughters — just nice to organise his own basketball team.

Ayop Bin Ninggal was a familiar face in SBG when the Gardens was under the Parks and Recreation Dept. He worked as a Park Ranger at SBG for 20 years, before being posted to East Coast Park for 10 years. Ayop is back now to ensure proper security in our Gardens. He mentions that he has observed a lot of progress and development in SBG and feels that supervision is even more important with all the new developments. Ayop is married, has 2 sons, and does lots of jogging and cycling before he tucks into his favourite curry beef.

Ann Teo is a graceful 21-year-old who danced her way through her 1st interview and into her 1st job with the Board, just after achieving a Diploma in Bio-technology at Singapore Polytechnic. As Assistant Project Officer/Horticulture, she supervises contractual works in the new Orchid Garden, which means she has to get tough sometimes where quality control is concerned. Her only hang-up? She cannot eat ikan bilis since her diploma project: DNA fingerprinting of *Poecilia reticulata* (a small guppy), which involved a lot of dissection of the little creatures to find their colour genes.

We would also like to report that, with the implementation of NParks' product-based organisation, Mr Koh Poo Kiong has been appointed Manager of Fort Canning Park, and Mr Robert Teo is now Manager, Nature Reserves. Good luck, guys. Singapore's History Park and Conservation Areas rest in your able hands.

Peyton Coffin

Assistant Director, Marketing

ANNOUNCEMENT: NSTB AWARDS

The National Science & Technology Board is seeking nominations for three types of awards. The National Science Award (NSA) gives recognition to research scientists and engineers in Singapore who have made outstanding contributions in basic research in the fields of science, engineering and medicine. The nominee's contribution should result in the discovery of important scientific knowledge, and/or the pioneering development of important scientific/engineering techniques. Recipients are awarded a monetary prize of S\$15,000.

The National Technology Award (NTA) gives recognition to research scientists and engineers in Singapore who have made outstanding contributions in basic research and development resulting in industrial applications. The nominee's contribution should result in the development of new products employing innovative technology with potential for commercialisation and/or the pioneering development of important industrial processes. Recipients are awarded a monetary prize of S\$15,000.

The National Science & Technology Medal (NSTM) recognises individuals who have made distinguished contributions to Singapore's development through the promotion of management of R&D. Such individuals may be in administration, management and education.

Nominees for these awards need not be Singapore citizens or permanent residents. However, all R&D work by nominees should have been largely carried out in Singapore. Nomination forms are available at NSTB by contacting Ms Lim See Susan at 7705825 or Mr Bennet Tan at 7797066. Closing date is 15 May 1994.

Note: Gardenwise welcomes announcements which are relevant to the interests of its readership. Placement of announcements will depend on the space available in any given volume.

What's blooming

***Saraca thaipingensis* (Yellow Saraca, Gapis), the Golden Wonder of Malaya**

This magnificent flowering tree was first described by Nathaniel Cantley, the second superintendent of the Singapore Botanic Gardens (1880–1887), and named after the town Taiping near which some of the first specimens were collected by him. (Taiping, meaning “great-peace”, a town in Perak, Peninsular Malaysia.)

The yellow to orange, lightly scented flowers are in eye-catching clusters that sometimes form strong globular masses to 40 cm across. The wonderful colours, textures and scent are matched by the peculiar arrangement of the inflorescences on the tree.



A Yellow Saraca in bloom.



The flower clusters are very evidently borne on old-wood.

This species is strictly cauliflorous, a phenomenon found in some tropical trees where the flowers are borne on the main branches and trunk. In *Saraca thaipingensis*, masses of flowers are sometimes found even at the base of the trunk.

Unlike most legume flowers, these do not have petals. At the top of the floral tube, the four bright lobes are the sepals. And from the deep-red eye spread four or five thread-like stamens. However the fruits which are enormous, flat leathery beans of a rich purple colour growing to 45 cm long by 10 cm across, betray its leguminous pedigree.

Even without the brilliant flowers and spectacular fruits, the large droopy leaves growing to almost a meter long are distinctive, and the trees are decidedly attractive when periodic new growth appears. Then they are festooned with the limp new leaves in cream, pink and purple tassles.

What is even better is to see the Yellow Saraca in its native habitat. It grows along streams in the hills and foothills of Peninsular Malaysia from Malacca northwards. It so dominates the headwaters of all rivers up to about 1000 m elevation that these waterways, named “Saraca-streams” are a characteristic feature of the vegetation.

The typical Saraca-stream is crystal-clear rushing waters and strewn with boulders. At the margins, the Yellow Saraca grow, arching over and often meeting above forming leafy tunnels; its roots hold the banks while fine rootlets reach out like so many bristles into the water. And if you are lucky, there will be blossoms everywhere and memories for a lifetime.

Away from its tranquil, moist streamside habitat, and in cultivation, the Yellow Saraca is surprisingly hardy and regularly obliges with leaf flushes and flowers. A small to medium sized tree, usually 5–7 m tall, but reaching 20 m in its native habitat, it is easily



These flat leathery pods will eventually split to reveal large dark seeds.

propagated by seeds. There are a number of matured trees in the Singapore Botanic Gardens and a new avenue has just been planted along Main Gate Road.

Chin See Chung

Keeper of Herbarium/
Senior Research Officer,
Plant Introduction Unit