

Gardenwise

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MESSAGE FROM THE CEO

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Front Cover:
Lee Luan Pow watching over the display of Cattleyas in the Mist House (National Orchid Garden)



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When the Singapore Botanic Gardens celebrated its 130th anniversary in 1989, it unveiled an ambitious Master-plan for the re-development of the Gardens to move it to the forefront

as a leading institution in tropical botany and horticulture. A substantial sum was granted by the Government to set the plan in motion. With Phase I of the re-development near completion, it is time to take stock of what has been achieved, so that planning for the next phase can dovetail with the work in the first phase. In the parlance of our bureaucrats, we must now "optimise the gains and capitalise upon the potential."

The most significant physical change to the Gardens is in the re-alignment of Cluny Road which previously transected the Gardens, dividing it into two parcels. Cluny Road now continues northward as Evans Road, while the portion of Cluny linked to Gallup Road has been re-named Cluny Park Road. The Gardens can now be accessed and perceived as a continuous

entity. With the re-alignment, the core concept used in master-planning the Gardens is better realised. The Central Core incorporates the expunged portion of Cluny Road and provides the main vehicular entrance to the Gardens at the new Gateway.

An electrical substation adjacent to the Gateway was completed under Phase I. It serves the needs of the entire vicinity, and has been designed to blend into a neighbourhood of high class bungalows. Motorists drive past a lovely residential home that is but a facade for equipment which lights up the area.

Other completed infrastructural developments include a Plant Resource Centre at the Bukit Timah Core. This major support facility is a holding nursery for the propagation and conditioning of introduced plants as well as a centre for plant records and practical horticultural training. Water for the Plant Resource Centre is provided by a lake which has been developed as the focal point for a garden with a theme of "Plants for the use of Man." When completed, the Bukit Timah Core will accommodate some of the requirements of a new generation botanic garden with emphasis on education and recreation. The landscape will take a number of years to mature, but the rolling terrain with its people friendly layout is fast becoming an important area for group exercise and for leisurely strolling and jogging.

Two historic buildings in the Gardens have been restored. The former Garden Director's House,



named Burkill Hall, is now an important reception and function space in the new National Orchid Garden. The latter amenity had already achieved an international reputation as one of the finest display gardens featuring orchids in the tropics. Fronted by the Orchid Plaza with its shady grove of trees and a leafy fountain, the Orchid Garden has welcomed well over a million visitors since it opened its doors in October 1996.

The other restored building, named EJH Corner House after its former illustrious occupant, is a gem of a classical British Colonial bungalow that was originally built to house the Assistant Curator of the Gardens. Its proposed function is that of a restaurant in the Central Core near the Gateway to the Gardens.

Come 1998, the Gateway at the Central Core will open its doors to visitors to the Gardens. A spreading rain tree standing amidst a grove of Sealing Wax palms defines this central Gateway to the Gardens. Coach and car parking will be provided. The entrance building with its sweeping roofs of wooden shingle and timber posts conveys a regional tone which is at once distinctive and intimate. This building will be fully devoted to visitor services, amenities and orientation. A clock tower, cast in metal to reflect the Sealing Wax palm motif of the Gardens' logo, will show the time at four major cities in four different time zones. Fountains in a plaza of African oil palms complete the tropical decor. The Gateway annexe adjacent to the entrance building will house the

new headquarters of the re-constituted National Parks Board. The many advantages for such a move were covered in the previous message.

To dovetail with Phase I of the Gardens' development programme, NParks will be proposing a Phase II development programme that should complete much needed infrastructural upgrading and create new gardens featuring different plant groups that deserve highlighting in a tropical setting. Some of the proposed developments are outlined below.

The successfully completed Shaw Foundation Symphony Performance Shell on an island in Symphony Lake has become an important venue for musical performances in the Gardens. The regular appearances of the Singapore Symphony Orchestra during its outdoor performance season has made the Symphony Lake a cynosure of attention. Aside from being an important landscape feature, it is the source of water for the National Orchid Garden. Plans now call for it to be re-contoured to improve its capacity and to soften its current hard edge. An on-going project is the Orchid Cool House. Upon completion, the cool house will extend the range of orchid species that can be displayed in the National Orchid Garden.

Evening is a most important time of day for recreation in Singapore. As the heat of the day recedes, people are also freed from the confines of their daily work spaces to be with their families. This is the time when the Gardens can be

put to better use, and the programme to upgrade night lighting is critical to achieving this objective. The first phase for night lighting in the Gardens is near completion. The basic safety and functional lights are in, and decorative lighting to highlight the vegetation will follow. Consultation is currently on-going to create a night-scape in the Gardens that will convert the Gardens into a new venue for the recreation of the Singapore community after the sun sets. Visitors may linger to take advantage of the cooler environment, and to enjoy the displays that will assume a totally different character under light. New benches, shelters and food and beverage outlets will add to their enjoyment.

Each generation of visitors enters the Gardens with different needs and expectations. The Gardens' administration has to stay nimble in catering to new demands while maintaining the integrity and mission of the institution. The ambience of the Gardens has taken more than a century to achieve. Improvements must be made with a minimum of discordance in the process. This necessitates a balancing act in toeing the fine line between expedience and disruption. In implementing Phase II of the re-development of the Gardens, the staff will be tasked to toil under the constraints in order to prepare the Singapore Botanic Gardens to enter the next millennium as an equatorial botanic garden par excellence.

Dr Tan Wee Kiat

colour or group them under lights in any part of your house to brighten the dark corner. These are the traditional ways of displaying African violets indoor. There are also many other possibilities for arranging African violets to suit your personal taste and ingenuity. You can use them effectively in terraria, in hanging baskets, in decorative containers or simply cheerful accents on coffee tables, in entry halls or on well-lighted counters – just to mention a few possibilities. For effective mass displays, try grouping several pots of blooming African violets in large, shallow containers such as metal bowls, or for aesthetic appreciation, grow a few African violets in hanging baskets or suspended pots.

Below are some ideas for displaying these beautiful and interesting house plants:

Ways to enjoy and display African Violets

African violets also known as Saintpaulias are among the most well-known house plants in the world. Plants are attractive and grow in a variety of sizes and shapes, from miniatures of a few inches high to trailing forms that drape from pots. The flowers of African violets are most appealing. Colours range from single shades of white, red, pink, blue, deep purple and wine to striking combinations. Foliage is lush and multi-shaped in various shades of green. African violets grow well in the temperate region but they also thrive well in the tropics provided the five basic needs, (ie. steady warmth, careful watering, good lighting, high air humidity and regular feeding) are taken care of. There should be no difficulty in producing several flushes of flowers each year.

African violets are an attractive addition to your home decor. You can use them to fill a window sill with

(1) Terraria/Glass containers/ Bottle gardens

One advantage of growing African violets in glass containers is that humidity is increased. Water vapour from the plants condense on the inside surface of the glass, creating a humid, mini-environment, so watering is seldom required. An open container such as an aquarium or glass bowl requires more frequent watering but not as much as a clay pot.

African violets can be combined with small house plants such as dwarf ferns, Ivy, *Episcias*, *Begonias*, mosses and liverworts to create miniature landscapes in candy jars, glass bowls, fish tanks and other glass containers.

To make a fish tank garden, first of all make sure that the tank is clean and dry. Begin by placing a layer of

expanded clay, charcoal, white stones or small granite chips at the bottom of the container. In most cases it is a good idea to landscape the base into hills and valleys. Then add planting mix (i.e. porous and sterilized ready mix for African violets) to $\frac{1}{3}$ of the height of the container. Do not incorporate wood that will rot and which may harbour pests. Firm the planting medium and wet it a little. Now arrange African violets with other house plants before planting them in the container. After all the plants have been planted in the container, firm the planting medium around the roots and wipe the glass clean. Your fish tank garden is now finished and is ready for watering. Use very little water – just enough to moisten the surface. Provide good light but keep well away from direct sunlight.

(2) Hanging African violets

There are some African violets that have a trailing growth habit. These are tailor-made for showing off in hanging pots or baskets. But even if you do not have one of the trailing types, a large multiple-crowned plant of any of the common varieties can put on a spectacular show when suspended at eye level.

Hanging African violets can be grown in a wide assortment of containers. To avoid dripping water, choose either a hanging pot that has a built-in drip tray or put the pot of plant inside a large, water-proof container. To make watering and misting an easier task, place the display at eye level. If there is no more room on the window sill for your African violets, hanging baskets are the best way to display these delightful plants.

(3) Decorative containers/ attractive cachepots

African violets are so pretty and decorative in themselves that decorated containers are not really necessary. But if you have them, you may enjoy showing off a flowering specimen or two in them. Containers come in enchanting colours and wonderful forms. They are also available in a wide variety of material ranging from pottery, porcelain,

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1. Pink and white African violets harmonize well with *Episcia* and Ivy in a hanging basket
- 2, 3, 4, 5, 6 African violets are displayed to their best advantage in cachepots made from natural materials

used extensively for ornamental purposes, they are also critical food and material resources for many communities and some are the source of important industrial raw products, for example **Coconut**, *Cocos nucifera*, **Sago**, *Metroxylon sagu* and **Oil palm**, *Elaeis guineensis*.

The Singapore Botanic Gardens' collection is concentrated in Palm Valley where it is arranged in a herring bone pattern with islands representing the major palm groups. All six sub-families of palms – Coryphoideae, Calamoideae, Ceroxyloideae, Arecoideae, Phytelephantoideae and Nypoideae are represented in the collection.

NYPOIDEAE

This is represented by *Nypa fruticans*, **Nipah palm**, the only



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PALMS IN OUR GARDENS

INTRODUCTION

Palms have fascinated gardeners and landscapers from the very beginning. Today's home gardeners, horticulturists and landscapers are re-discovering palms, realising the potential of their myriad forms and using them more than ever in private homes, parks and public gardens.

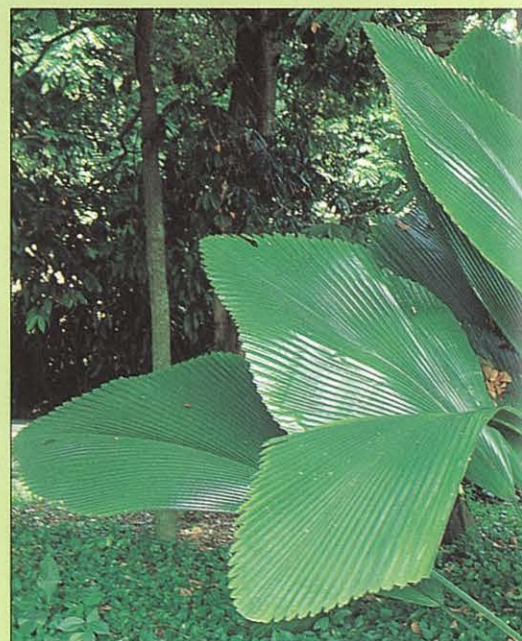
The palm family, Palmae, is represented by 200 genera and about 2600 species found throughout the humid tropics and sub-tropics. Although some representatives are found beyond the Tropics of Cancer and Capricorn, palms are most abundant in the wettest parts of the equatorial tropics. This family is one of the major plant groups well represented in the living collection of the Singapore Botanic Gardens with more than 119 genera and over 250 species.

The important role played by palms in the tropics is not generally realised. While globally palms are



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species in its genus. It is native to mangrove areas in Asia and the western Pacific region and locally important for a range of products, including sugar, vinegar and alcohol from the unopened inflorescence and thatch from its leaves. It is a feather-leaved palm with a prostrate trunk and is rarely cultivated except



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in botanic gardens where it is usually included as a novelty and educational item.

PHYTELEPHANTOIDEAE

A small sub-family consisting 3 genera and 15 species representing a separate and highly evolved group of the arecoid line. One species,

Phytelephas macrocarpa, native to Central and South America is represented in our collection.

ARECOIDEAE

These are the "feather" palms with leaves that are usually pinnate. The stems are either solitary or multiple and are usually smooth, ringed and rarely with spines. There are 124 genera and over 1400 species in this sub-family.

An interesting member is *Butia capitata*, **Jelly palm**. This is distinguished by its rough woody trunk and arching feathery leaves with fine bluish-green leaflets. The fruits are reportedly edible.

Cyrtostachys renda, **Sealing Wax palm**, is a most attractive native palm with a striking reddish crownshaft. It was chosen to be represented on the logo of the Singapore Botanic Gardens and is a symbol of the Gardens.

Unlike the leaves of other palms which are either simple pinnate or palmate, the genus *Caryota* has

palm is the source of nuts, slices of which are chewed with a leaf of the betel plant and lime, as a stimulant and in social and religious rituals. This custom of "betel-nut chewing" is of great antiquity in South and Southeast Asia and was an important aspect of cultural life of the region.

Other exciting and exotic species of the Arecoideae include *Arenga pinnata*, **Sugar palm**; *Wodyetia bifurcata*, **Foxtail palm** and *Normanbya normanbyi*, **Black palm**.

CORYPHOIDEAE

This sub-family is represented by 39 genera and about 400 species. With few exceptions, members of Coryphoideae are characterised by their large fan-shaped leaves. The most massive of all fan palms is *Corypha umbraculifera*, **Talipot palm**. This palm flowers and fruits once, at the end of a life-span of thirty to eighty years. The stored-up energy is expended in the spectacular production of a massive terminal inflorescence bearing millions of flowers.

Another showcase in the gardens is *Lodoicea maldivica*, nicknamed **Double Coconut** because its fruit resembles a twin-packed coconut. This palm was highlighted in the July 1997 issue of Gardenwise.

Fine clumps of *Acoelorrhaphe wrightii*, whose native habitats are the damp forests or swamps from Florida to the Caribbean coast of Central America, are found on the island in the Eco-lake of the Gardens. Their shiny compact crowns are distinctive.

Some other beautiful and tall fan palms include *Pritchardia pacifica*, **Fiji Fan palm** and *Livistona chinensis*, **Chinese Fan palm**. The **Petticoat palm**, *Washingtonia filifera* is a striking robust fan palm with a thick solitary trunk covered in a dense petticoat of old dead leaves.

In addition, our collection includes the magnificent *Johannesteijsmannia magnifica* and *Johannesteijsmannia altifrons*, species with large undivided leaves.

The only genus in this sub-family with pinnate leaves is *Phoenix*. The **Date palm**, *Phoenix dactylifera* is a tall suckering species with a patterned trunk growing to about 20 m. It has been cultivated for its fruits since pre-historic times in the Middle Eastern countries and Western India. This genus is one of the most widely used group of palms in landscape planting.

CALAMOIDEAE

This sub-family of 22 genera and about 650 species is mainly distributed in the eastern tropics. *Calamus*, with about 370 species, is the largest in this group and also the largest palm genus. Members of this genus are climbing feather palms of the rain forest with slender stems which when young are covered in leaf sheaths which are often very prickly. The stems of certain *Calamus* and closely related genera are the rattans of commerce, possibly the most important non-timber resource from the forests of

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- 1 *Cyrtostachys renda* (Sealing Wax palm), an outstanding native species
- 2 *Wodyetia bifurcata* (Foxtail palm), a splendid specimen in heavy fruit
- 3 *Johannesteijsmannia altifrons*, an outstanding understorey palm from the forests of Southeast Asia
- 4 *Corypha umbraculifera* (Talipot palm), this plant in the Gardens flowered at the age of 71 in 1996

leaves which are bipinnate, that is each of the primary leaflet is further divided. These final segments are more or less triangular with the outer corners elongated and the apical side toothed, in a fishtail shape, hence the common name, **Fishtail palm**. A plant of great cultural significance is *Areca catechu*, **Areca nut**. This

The National Orchid Garden is located on the highest hill in the Singapore Botanic Gardens. Here, three hectares of carefully landscaped slopes provide a setting for 60,000 orchid plants comprising 400 species and more than 2000 hybrids.

The National Orchid Garden was opened on 20 October 1995 and it received its millionth visitor after 15 months of operation.

Have you been to the National Orchid Garden? Whether you are a "first time" visitor or a "repeat" visitor, we invite you on an armchair tour of this floral paradise.

Armchair tour of National Orchid Garden

Let us enter the Garden from the Ticketing Pavilion. Two bronze cranes, perched on top of a cascading fountain, greet you as you enter. You have arrived at the "spring" zone of the Garden. Here, the prevailing colours are bright and lively shades of gold, yellow and creams. Important orchids here include *Oncidium Goldiana* 'Golden Shower', *Arachnis Maggie Oei*, *Mokara Kelvin*, *Aranthera Beatrice Ng*, *Mokara Khaw Phaik Suan* and *Aranda Iskandar* of Johor. Major landscape plants are *Pisonia grandis*, variegated *Duranta* and *Melaleuca* 'Golden Gem.'

Adjacent to this zone is the vibrant "summer" zone where the major tones are the various shades of strong reds and pinks. Important orchids here include *Mokara Chark Kuan*, *Kagawara Christie Low* and *Renantanda Charlie Mason*. Major

- | | | | |
|----|---|-----|---|
| 1 | <i>Oncidium Goldiana</i> 'Golden Shower' set amidst landscaping plants like <i>Melaleuca</i> 'Golden Gem' | 9 | <i>Lewisara</i> Fatimah Alsagoff |
| 2 | <i>Dendrobium</i> Chanel | 10 | <i>Vanda</i> Poepoe 'Diana' |
| 3 | Tiger Orchid Fountain | 11 | <i>Aranda</i> Wong Bee Yeok |
| 4 | <i>Arachnis</i> Maggie Oei | 12 | Tan Hoon Siang Misthouse |
| 5 | Waterfall with Burkill Hall in the background | 13 | Yuen-Peng McNeice Bromeliad House |
| 6 | <i>Vanda</i> Miss Joaquim | 14 | Orchidarium |
| 7 | <i>Vanda</i> Miss Joaquim var 'Douglas' | 14a | Orchidarium waterfall with <i>Arundina graminifolia</i> in the foreground |
| 8 | <i>Dendrobium</i> hybrids | 14b | <i>Arundina graminifolia</i> |
| 8a | <i>Dendrobium</i> White Fairy | 14c | Rats' Tail Orchid |
| 8b | <i>Dendrobium</i> Genting Blue | 14d | <i>Epidendrum cinnabarinum</i> |



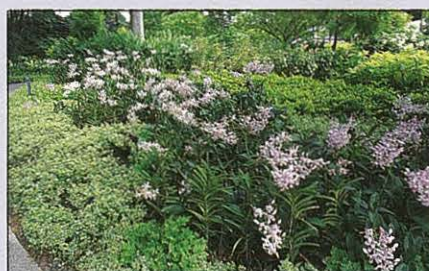
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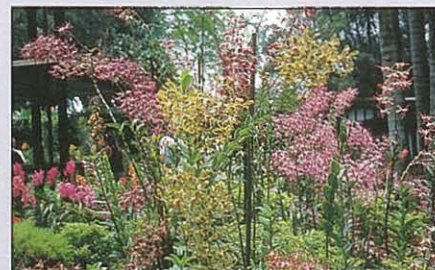
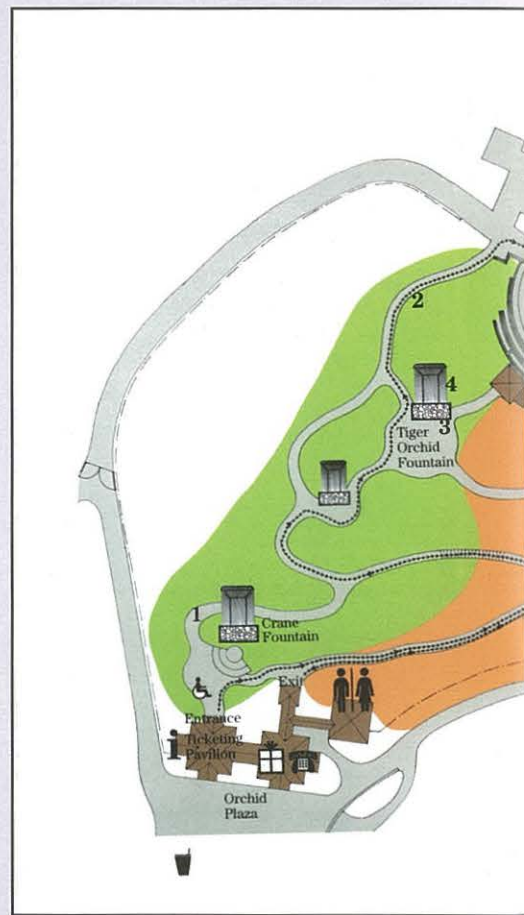
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14a



14c



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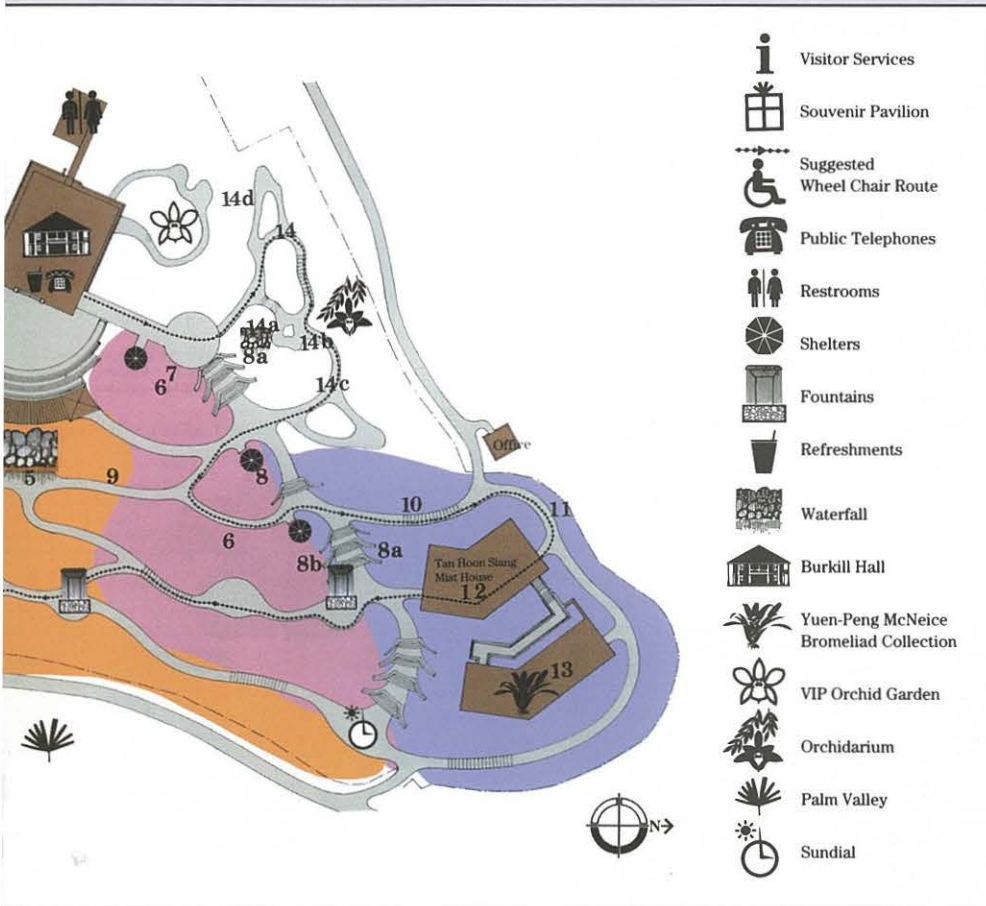
14b



14d



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8a



8b

landscape plants are
Pritchardia pacifica and
Licuala grandis.

Then the matured "autumn" shades of *Vanda Miss Joaquim*, *Stamariaara Noel* and *Bokchoonara Khaw Bian Huat* beckon. Major landscape plants are *Chrysophyllum cainito*, *Cordyline* sp. and *Heliconia indica*.

Finally the "winter" garden of white *Vanda Poepoe 'Diana'* and cool blue *Aranda Wong Bee Yeok*. Major landscape plants are *Podocarpus macrophyllus*, *Araucaria* sp. and *Pinus caribaea*.

By now you would have probably realised that a distinctive feature of the National Orchid Garden is its design concept which presents the display of plants in four separate colour zones over most of its area. This is achieved by a careful blend of selected trees, shrubs, herbs and orchids (mostly hybrids) with matching foliage and floral colours.

Are you ready to see more of the Garden?

Do you want to see the Rich and Famous? They are in the VIP Orchid Garden. We are talking about "Very Important Plants." These are outstanding orchid hybrids from the Singapore Botanic Gardens named after State Visitors and VIPs from within and outside Singapore. In the VIP Orchid Garden, you will see famed orchids including *Dendrobium Margaret Thatcher*, *Dendrobium Masako Kotaishi Hidenka*, *Dendrobium Tien Soeharto*.....

Move along the meandering path and you will find two misthouses. The Tan Hoon Siang Misthouse features orchids displayed against a backdrop of cultural decor and the Yuen-Peng McNeice Bromeliad collection presents a display of over 20,000 plants representing over 800 types in the Pineapple family.

Tired? Then let us round off our visit with a stop at the top of the hill. Here, Burkill Hall opens its doors into a classic British colonial home of the 19th Century. Completed in

1866, the former home of the directors of the Singapore Botanic Gardens has been carefully restored to serve as a reception centre.

Thank you for joining us on the armchair tour. Come over for a visit if you want to see more!

Orchids you can see along the way

1. *Oncidium Goldiana* 'Golden Shower'

This is an early hybrid from the Singapore Botanic Gardens. It has earned the name "Dancing Lady" because of the beautiful and elegant yellow flowers. The overall impression is that of a ball-room dancer in a voluminous skirt.

2. *Dendrobium Chanel*

This Singapore hybrid with pastel coloured flowers is very popular with our Japanese visitors. This vigorous hybrid is easy to grow and it blooms all year round, making it very popular as a cut-flower.

3. Tiger Orchid Fountain

Growing on top of this fountain is the Tiger Orchid, *Grammatophyllum speciosum*, so named because markings on the flowers resemble patterns on the skin of the tiger.

The largest of orchids, a good specimen can weigh over one ton. A flowering spray can reach 2m in length and a plant may bear thousands of flowers.

4. *Arachnis Maggie Oei*

This hybrid is commonly known as the Scorpion Orchid. It is extremely vigorous and free-flowering and is ideal as a cut-flower. It was one of the earliest cut-flowers to be exported from Singapore, being popular in the 1950s and 60s.

5. Waterfall

This is one of two waterfalls in the Gardens. It is made of volcanic

rocks and the landscaped display shows off the brilliantly coloured *Renanthera* and *Kagawara*. Also featured here are the invaluable *Cycads*.

6. *Vanda Miss Joaquim*

7. *Vanda Miss Joaquim* var 'Douglas'

Vanda Miss Joaquim is the oldest natural hybrid of Singapore and Malaysia and is the first *Vanda* hybrid to be registered in the world.

It was found in 1893 by Miss Agnes Joaquim, an Armenian lady, in her garden in Tanjong Pagar. This new hybrid was then named after her.

On 15 April 1981, *Vanda Miss Joaquim* was made the National Flower of Singapore. It was selected because of its beauty, resilience and year-round blooming quality.

Vanda Miss Joaquim var 'Douglas' is the brother of *Vanda Miss Joaquim*. It is very similar to *Vanda Miss Joaquim* but its flowers are bigger with darker and brighter coloured petals. However, it is not as free flowering.

8. *Dendrobium* Hybrids

Dendrobium is one of the largest plant genera in the world. It is also the single genus with the most hybrids bred by the Singapore Botanic Gardens. The first *Dendrobium* hybrid, *Dendrobium Helen Park*, was registered in the 1940s. Since then, the Orchid Breeding Programme has produced more than 145 registered hybrids in this genus.

8a. *Dendrobium* White Fairy

A white, free flowering orchid widely grown for the cut-flower trade. This is also one of the commonest cultivated orchid.

8b. *Dendrobium* Genting Blue

A purplish orchid popular in the cut-flower trade. The plant is free flowering.

New & Exciting

Calathea loeseneri (MARANTACEAE)

Calatheas belong to the family Marantaceae which is represented by about 300 species of perennials. They are rhizomatous or tuberous herbs and some are with brightly coloured and patterned leaves. Native to Tropical America, they occur on damp and swampy forest floors or in areas subject to periodic flooding.

Calathea loeseneri is from Brazil. It has a dense habit with long lanceolate leaves on stiff petioles. The leaf blades are olive green with a greyish tinge. The inflorescence has a stalk 20 to 50 cm long which bears

showy heads of pointed lavender bracts which resemble mini-lotus flowers. Well grown plants will flower profusely. They prefer light well drained soil (soil, leaf mold, cocopeat and sand in equal proportions). They can be propagated by division of crowns. Give a dilute fertiliser weekly and repot them when they are root bound. Water plentifully during dry periods.

Ohn Set
Research Officer
Plant Introduction Unit
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Calathea loeseneri



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Southeast Asia. Rattans and other parts of these palms play a major role in the cultural life of forest dwellers. And rattans of course are the raw material for the ubiquitous "cane" furniture. See *Calamus* in the Gardens, but be wary of its thorns.

Other related species include *Metroxylon sagu*, **Sago palm** which is a large clump forming palm with a trunk 8 to 10 m tall. This is the major source of sago starch and the species is increasingly cultivated for this product. Sago is obtained from the pith of the trunk and is harvested just before flowering, when the tree is felled, the pith rasped and the starch washed out.

As you move along, you will come across the spiny *Pigafetta filaris* also known as **Wanga palm** and *Salacca zalacca*, **Salak**, a palm often cultivated for its edible fruit.

CEROXYLOIDEAE

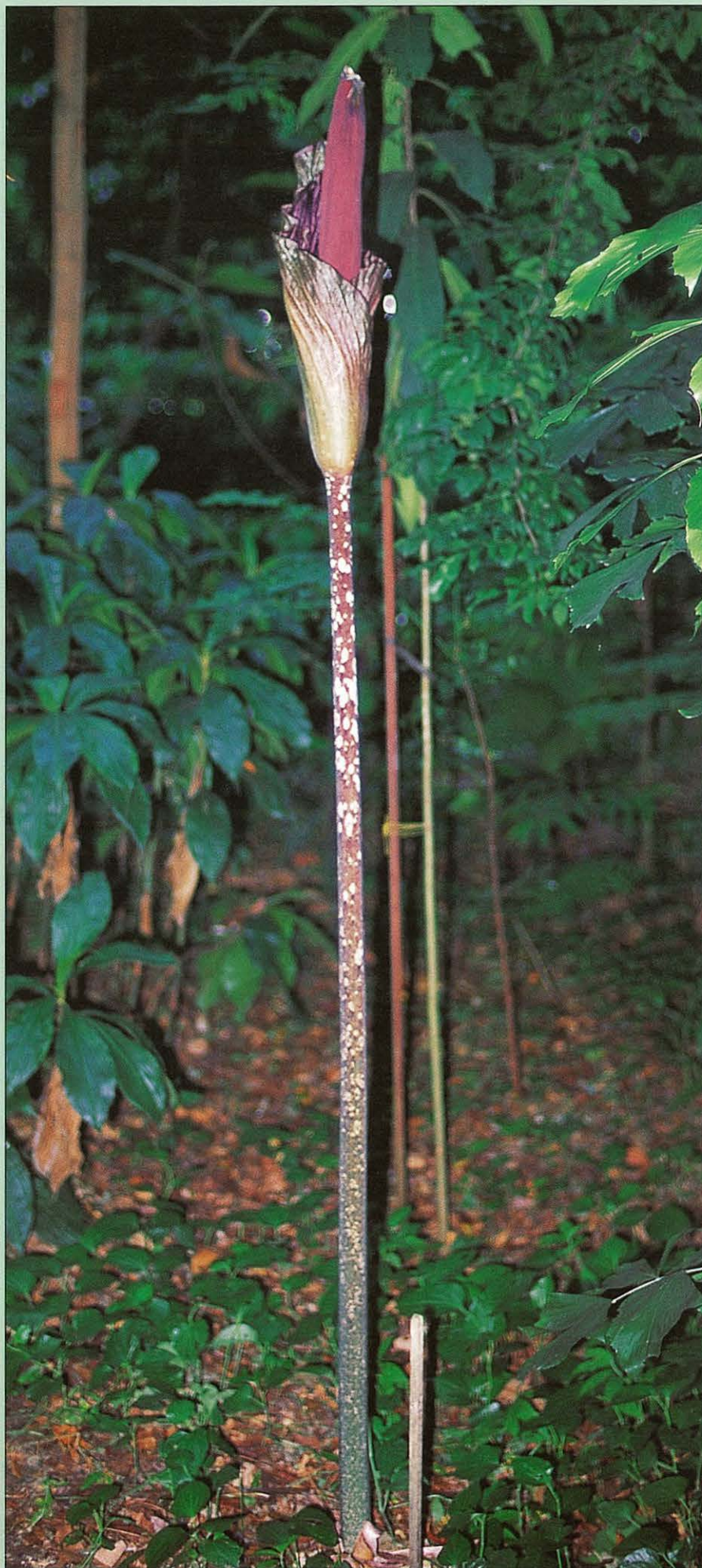
This is a sub-family of 11 genera and 30 species. Members are mainly dioecious feather palms, often very tall with solitary, smooth ringed trunks.

A magnificent member of this group is *Ravenea rivularis*, **Majestic palm**, a native to Madagascar where it grows in moist areas near streams and swamps. This will reach 30 m tall with a tapered pale trunk and a large crown of bright green drooping fronds.

Others in this sub-family include *Chamaedorea elegans*, **Good Luck palm** and *Hyophorbe lagenicaulis*, **Bottle palm**.

Only a few palms can be highlighted here, the rest have to be discovered on our lawns. We invite you to stroll along Palm Valley and other parts of the Gardens to experience the wonderful world of palms.

Camelia Marican
Assistant Manager
Singapore Botanic Gardens Management



Rare Aroids in Bloom

Two spectacular and peculiar plants, *Amorphophallus paeoniifolius* and *Amorphophallus gigas* in our Aroid Collection flowered in the Gardens recently. These are herbaceous monocotyledonous plants with tuberous roots belonging to the family Araceae.

Amorphophallus is a genus of about one hundred species distributed in the Old World tropics and sub-tropics. "*Amorphophallus*" is derived from the Greek word meaning shapeless or deformed phallus and as a genus well-known for its unusual and foul-smelling

inflorescences. *A. paeoniifolius* is native to tropical Asia and Africa while *A. gigas* is endemic to Sumatra.

Plants of this genus are stemless herbs with a single very large and divided leaf with an upright stalk to 2 m or more. The corms are often large and those from several species are edible. Unique to this genus is the often enormous inflorescence with tiny flowers borne on an enlarged spadix subtended by the fleshy funnel-shaped spathe. It is an architecturally floral wonder so unlike any ordinary plant one could



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associate with. You will either be intrigued by its extraordinary leaves and bizarre inflorescence or you may be put off by its ugliness.

A. gigas is exceptionally rare as compared to *A. paeoniifolius*. The height of the inflorescence in the picture is 2.5 m but it has been recorded to be as tall as 4 m in Sumatra and the corm can weigh up to 70 kg. The matured inflorescence will last 4 to 5 days. *A. gigas* prefers loose, well-drained but fertile soil. The inflorescence of this species qualifies as being the tallest in the genus which *A. titanum* is normally credited as being the largest.

A. paeoniifolius, also known as Elephant Yam has a very long history

of cultivation in the Asian and Indo-Pacific region and its natural distribution is obscure because specimens found in the wild are probably escapes from cultivation.

The species should be grown in moist, fertile soil. In Peninsular Malaysia, it sometimes occurs at the edge of forests. The inflorescence of *A. paeoniifolius* in our Aroid House was 0.5 m tall and 0.4 m wide. It lasted for about 3 to 4 days and emitted a light odour. It has been recorded that the tuber of this species grows to 20 kg.

Calcium-oxalate crystals are present in the tissues of both wild and cultivated tubers, although cultivated varieties have less of these irritant needle-like crystals. In India, the tubers and seeds are used medicinally as external irritants to relieve rheumatic swellings. Throughout the region the corm of this species is used as food prepared in numerous ways, boiled like potatoes, cooked in curries or cut into slices, boiled with tamarind leaves and made into pickles. The tender petiole before the leaf is fully opened is eaten as a vegetable and considered a delicacy in the Philippines. The corms and leaves are also used as fodder.

The health of an *Amorphophallus* is measured by the increase in the size of the corm over each season. The periodically produced inflorescence becomes bigger as the plant grows older and the corm correspondingly larger. As ornamentals or specimen pot plants, *A. paeoniifolius* and *A. gigas* offer striking foliage and dramatic inflorescences.

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- 1 *Amorphophallus gigas*; the peduncle is greatly elongated; the cylindrical spadix protrudes beyond a spathe that does not fully open.
- 2 The stout inflorescence of *Amorphophallus paeoniifolius* with a spreading spathe and an enlarged spadix.

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plastic, metal and glass to organics like wood, rattan, reed and gunny.

Cachepots made from organics associate especially well with African violet displays. A cachepot that is too deep can be filled with pebbles, wire-mesh netting, wooden blocks or marbles to elevate the plant. The colours and shapes of plant and container must harmonize.

(4) African violets in shows and exhibitions

African violets can be grouped using different criteria, such as bloom colour, bloom shape, leaf colour and leaf shape to make a more charming display. African violets can be outstanding in miniature arrangements as they can be the focal point in a general horticultural show. Their dainty blooms also are well suited for complementing miniature flowers, grassy foliages, small fern fronds or tiny seed pods. When arranging African violets with other plant displays especially in a show, keep in mind how small their flowers are. Grouping the African violets has several other advantages; air humidity will be raised, effect of draught will be lowered and finally, damaged parts of a plant can be hidden.

The virtues of African violets as indoor decorative plants lie in their combination of beauty and versatility. Truly, they come close to being all-purpose decoration items. You may pick up ideas from magazines, shows, or plant shops, but most important of all, create a display that pleases you.

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Fancy seeing a plant that looks like a palm but is not a palm! This is none other than the *Carludovica palmata* or commonly known as Panama Hat palm or Toquilla. It is actually a shrub with large, palm-like leaves very similar to those of a Fan palm. The leaves have a softer texture than that of a palm. It is well-known and common in Central America where the fibre is used in the manufacture of hats and other artifacts. This genus is named after King Charles IV (1748 - 1819) and Queen Luisa (1751 - 1819) of Spain and it belongs to the family Cyclanthaceae.

A PALM OR A LOOK-A-LIKE!



This terrestrial plant has creeping rhizomes with short, upright stems or is sometimes almost stemless. The leaves are fan-shaped with stalks measuring from 0.5 m to 4 m long and the leaf blade is 3 to 5-parted nearly to the base with drooping tips. The flowers are small and unisexual with the male and female flowers arranged spirally on an elongated and cylindrical spadix resembling that of aroids. The fruiting spadix is about 20 cm long.

Carludovica palmata is native to the humid forests of Southern Mexico and Peru. It was first introduced into the Singapore Botanic Gardens in the early 1900s. A clump of this Panama Hat Palm can still be found next to a footpath abutting the Potting Yard.

The highly acclaimed Panama hats are made from the leaves of this plant. Despite the name "Panama Hat," these are not exclusively nor even mainly produced in Panama. The largest Panama hat industry is found in Ecuador where over 4 million hats are made and 1,500,000 hats are exported annually. It is also extensively cultivated in Colombia and Peru.

The plant takes 3 years to reach the stage when young leaves can be harvested for production. The young leaves are collected once a month before they are fully opened. The stalk is cut at about 20-25 cm below the leaf-blade to allow easy handling. A sharp, thin knife is used to remove the larger veins of the leaf and if this is done skillfully, the intermediate parts of the leaf blade are left attached to the upper portion of the stalk. Each leaf is carefully cut into strips or ribbons about 1.25 cm wide. When the stalk is held in the hand, the strips should be quite free from each other. The leaves are boiled for 10 to 15 minutes. They are then dried in the sun and subsequently bleached in a sulphur chamber for a day. The straws gradually become inrolled and form fine cylindrical strands known as *jipijapa*. It is the Spanish term for straw and also the name of a town in Ecuador. The hats are woven by hand from these straws.

Panama hats are fine, lightweight and usually of a natural straw colour. A good hat will last for years. It takes about six leaves to produce an ordinary sized hat. A coarse hat from broader straws can be made in a day while one from very fine straws may take 18 days. For the making of the top quality hats, the finer veins on either side of the straws have to be meticulously removed by a needle. After the hats are made, they are hung in an airtight box and subjected to sulphur fumes again, to bleach them even whiter. Plaiting is a difficult process and requires careful and intensive training. A craftsman requires six months' training to be proficient in this job. And, for successful weaving, it is pertinent that the air should be

◀ Panama Hat palm in the Gardens

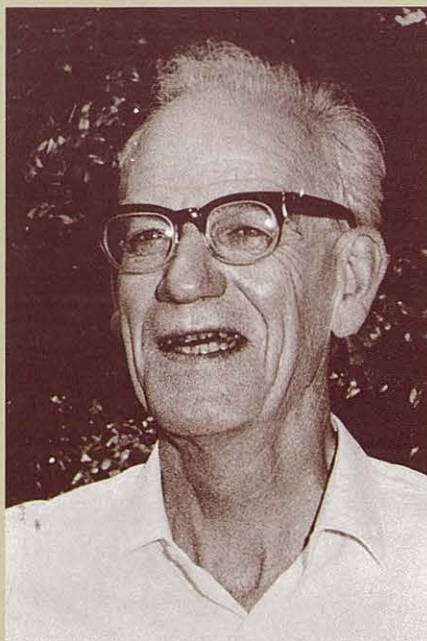
of the correct humidity to produce these remarkable hats. The finest and superior quality ones are highly priced and regarded as the best standard hats for summer wear.

Nothing is allowed to go to waste. Leaves not suitable for hat-making are used to make mats, baskets and other artifacts. Elsewhere, the leaves are also used for curtains, roofing, fly swatters and even straw purses. The stalks after being divided into strips are made into brooms, especially in Honduras.

The qualities of these Panama hats are distinguished by their uniformity and fineness of texture, their strength, durability, elasticity and resistance to water. Due to the high prices these hats can command, many countries in central America and even the Philippines and Indonesia have joined the bandwagon to set up this hat industry. But not all of these have been successful. It is apparent that only a certain area in Ecuador has that distinct atmospheric conditions suitable and necessary for the handling of these straws enabling the production of these true-blue Panama hats.

Apart from being grown for the hat-making industry in central American countries, the Panama Hat palm has also naturalised itself in most parts of that region up to an elevation of 1500 m. *Carludovicas* are handsome foliage ornamentals that grow well in humid, tropical environment. It should be taken care like that of a tropical palm. This plant can be grown in huge pots or in the ground. It thrives better on moist, well-drained soil and in areas with diffused light. Propagation can be done by division or seed. When established, it forms a large, handsome clump. Although it looks great as an ornamental, it has yet to become popular in the gardens of Singapore even though introduced almost a century ago.

Andrea Kee
Research Officer
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Singapore Botanic Gardens



E.J.H. Corner, a photograph taken in 1972.

OBITUARY EDRED JOHN HENRY CORNER

12 Jan 1906 - 14 Sep 1996

EJ.H. Corner came out East as a young man in 1929 and served as Assistant Director of the Singapore Botanic Gardens, under Professor R.E. Holttum till 1946. His research duties were mainly concerned with the fungi, a great diversity of which are found in the tropics. Through his wanderings in the forests of Singapore and the Malay Peninsula he amassed a great collection of fungi and he also gradually built up an extensive knowledge of trees and palms of the region.

In 1940 Corner published his first book, *Wayside Trees of Malaya*, in two volumes. This work written in his lucid and friendly style is full of detail that reveals a personal familiarity with the subject matter. Now in its third edition, this is still the best book on the common (and many not so common) trees of the area covered. To solve the problem of collecting botanical specimens from tall trees Corner developed an idea inspired by watching monkeys

trained to pick coconuts. Acquiring some of these animals, he had them retrained as botanical specimen collectors – the first apes in the civil service.

During the Japanese occupation Corner remained in the Gardens where he was allowed to continue with his research. He left the Gardens in 1946, and after a short interlude with UNESCO in Brazil, took up a teaching position at Cambridge University where he remained until he retired in 1973 as Professor of Tropical Botany. Reputed to be an eloquent and persuasive teacher, he attracted to tropical botany a steady stream of outstanding students, some of whom remain as leaders in the field.

Corner published in a range of topics. Books include the following: *A Monograph of Clavaria* (1950), *The Life of Plants* (1964), *The Natural History of Palms* (1966), *Seeds of Dicotyledons* (2 volumes, 1976), *The Freshwater Swamp Forests of South Johore and Singapore* (1978), *Ad Polyporaceas* (7 volumes, 1983-1991) and *Botanical Monkeys* (1992).

To the Singapore Botanic Gardens, Corner left behind a legacy of research and scholarship; as part of the rich history and tradition of the Gardens he will continue to inspire new generations of botanists. The colonial bungalow in the Gardens where he lived as Assistant Director has been named E.J.H. Corner House in his honour.

Singapore Botanic Gardens

A NOTE OF THANKS...

A set of the "Flowering Plants of Africa," volume 1-49 (1921-1987), has been donated to the Library by Mr Tan Jiew Hoe. These 49 volumes are sturdily bound in library cloth with leather backing and corners. The publication is an illustrated serial with 20 plates to each part and two parts to a volume. Each beautifully coloured illustration is accompanied by a detailed description of the plant.

This set will not only convey to the reader the beauty, variety and form of the African flora but is a botanical database of the flora of the region. It is a valuable addition to the library's reference collection of botanical and horticultural books and we would like to express our thanks and appreciation to Mr Tan for his thoughtful and generous donation.

Chin See Chung
Director
Singapore Botanic Gardens



Euclinea longiflora, an African species blooming in the Gardens

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9. *Lewisara* Fatimah Alsagoff

This is a semi-shade loving epiphytic plant. The flowers are a very attractive violet blue colour.

10. *Vanda* Poepoe 'Diana'

This hardy growing plant is closely related to the national flower *Vanda Miss Joaquim*. It usually flowers best in full sun.

11. *Aranda* Wong Bee Yeok

This free flowering plant produces one of the largest *Aranda* flowers.

12. Tan Hoon Siang Misthouse

In the Tan Hoon Siang Misthouse you will see *Cymbidium* hybrids from Holland, *Epidendrum* hybrids from South America (Mexico), Pansy orchids from Australia, *Dendrobium nobile* types from Japan, Antelope Dendrobiums from Papua New Guinea, *Vanda* and *Ascocenda* hybrids from Thailand, *Trichoglottis* and *Renanthera* species from Philippines, and *Dendrobium* hybrids from Singapore.

13. Yuen-Peng McNeice Bromeliad House

To complement the display of orchids, the Yuen Peng McNeice Bromeliad Collection is featured in the National Orchid Garden. Propagations from this collection of 20,000 air plants representing 800 types in the Pineapple family have also been incorporated in the landscaping of the Gardens.

14. Orchidarium

The Orchidarium is landscaped to provide the natural orchid habitats of tropical rainforests. There are about 400 species in 97 genera growing in the Orchidarium.

14a. Orchidarium waterfall

The waterfall in the orchidarium helps to create the humid micro-climate that these orchids need. Those planted here include *Grammatophyllum speciosum*, *Epidendrum radicans*, *Doritis pulcherrima*, *Spathoglottis plicata* and *Phalaenopsis violacea*.

14b. *Arundina graminifolia*

This orchid is widespread in Southeast Asia. It is also known as the "bamboo orchid" because of its bamboo-like habit. The flowers have large lips and superficially look like a *Cattleya*.

14c. Rats' Tail Orchid

These *Paraphalaenopsis* species are so named because their long cylindrical leaves resemble the form of rats' tails.

14d. *Epidendrum cinnabarinum*

Commonly known as "reed orchid." This orchid was introduced into Singapore from South America. A sun loving orchid that is easy to grow and is free-flowering.

Wong Wei Har
Assistant Director

Whang Lay Keng
Assistant Manager
Singapore Botanic Gardens Management