Gardenwise

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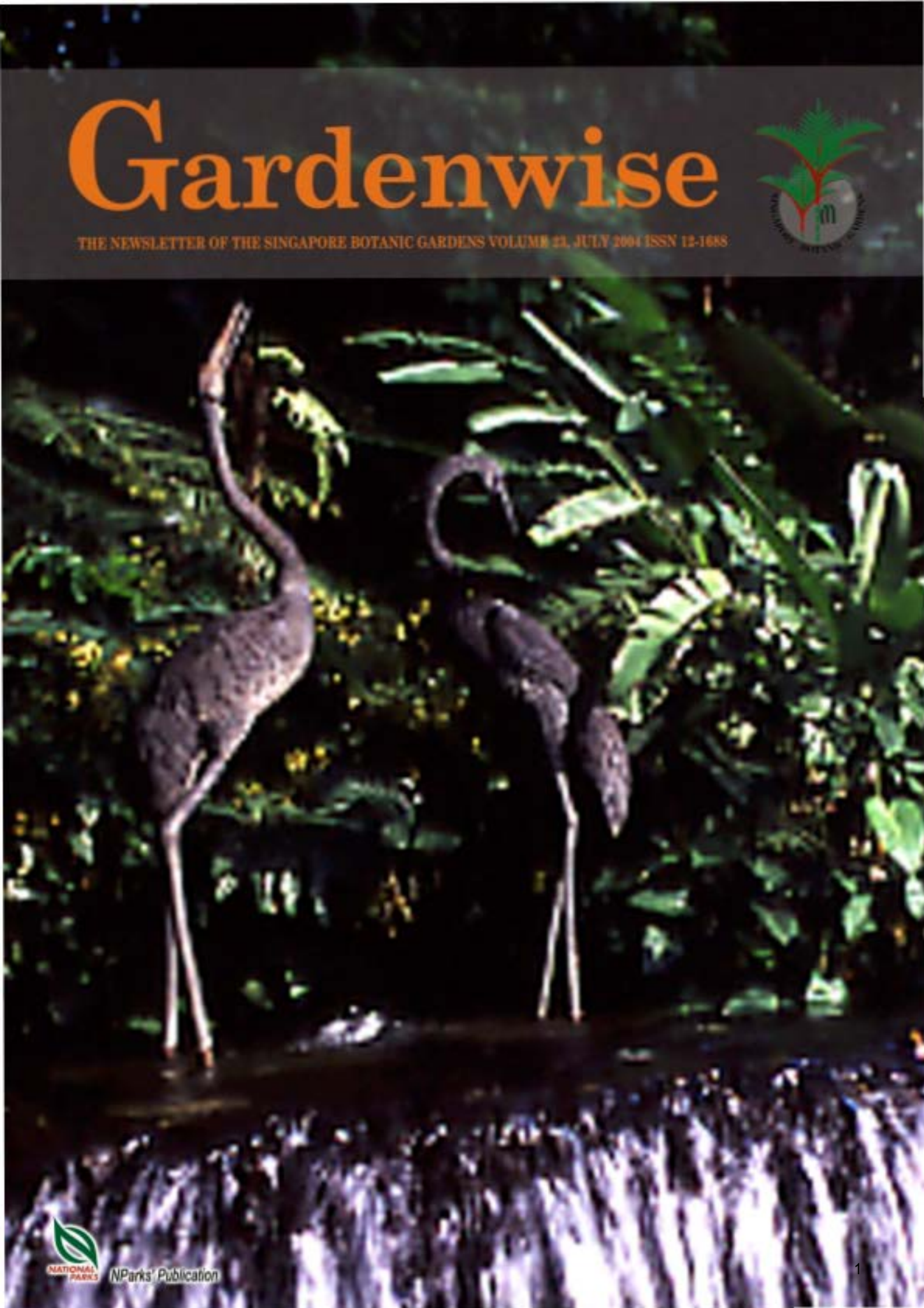

NATIONAL PARKS NParks' Publication

Message from the Director

It has been another year of exciting activities, events, new plant displays and experiences. We continue to enthral our core of repeat visitors and foreign guests and successfully captured a new pool of admirers.

Staff presented papers, lectures and reports at 12 overseas meetings and conferences, and participated in field expeditions. 11 of these were fully sponsored by our foreign partners, underlining the growing international recognition of the Gardens and its staff.

In this issue, major events and activities are outlined. They include the Singapore Orchid Festival, new guided tours, educational programmes and an exciting range of concerts at our outdoor venue.

The Ginger Garden was officially opened and immediately became a favourite visitor destination. It has effectively created a new dimension for local horticulture by its showcase of outstanding exotic plants never seen on display in Singapore before. They stimulated not only the home gardener but also the nursery industry that happily introduced plants to meet the new demand. In January 2004, the landmark Cool House in the National Orchid Garden was officially opened. Beyond its doors, the visitor is transported into the enchanted world of a misty tropical mountain habitat that always surprises with rare blooms. This has certainly added a 'wow' factor to the Orchid Garden (see *Gardenwise* **22**: 14-15).

The display in the Yuen Peng McNeice Bromeliad House, also in the Orchid Garden, has been dramatically improved. A generous donation by Lady McNeice made possible the creation of new landscapes and the purchase of exciting new plants.

In January 2004, the Gardens, working in partnership with BGCI (Botanic Gardens Conservation International) hosted the first ever meeting of South East Asian Botanic Gardens. Representatives from 10 countries attended this historic event and we look forward to future exchange, sharing and collaboration with our fellow institutions from the region.

Another milestone is the announcement of the Gardens' Botanical Research Fellowship. This scheme, made possible by donations, is to encourage and support taxonomic research, on the South East Asian flora, one of the richest in the world. With many habitats threatened, there is an urgent need to explore, document, study and conserve. This Fellowship will facilitate and make possible research visits, particularly by regional botanists, to the Singapore Herbarium to study its extensive holdings.

The redevelopment of the southern Tanglin core of the Gardens that began in 2002 is solidly underway. A major objective is to rejuvenate the Gardens as a botanical institution. It will provide better and more effective functional spaces for the herbarium, library, research laboratories and education, create much needed visitor amenities, improve public interface and merge the Gardens with the external roadscape.

The guiding philosophy behind this project is to integrate the new into the existing living fabric of magical plants, landscapes and historic features. The greatest asset of the Gardens that must be preserved is the ambience and sense of place this fabric provides. Its most precious contributions are the happy memories retained in the hearts and minds of millions of visitors through the generations. We must never lose sight of this even as we build, add and redevelop. And we must do more with creative activities and guided programmes that will help connect the magic of plants to people.

Chin See Chung

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Crane Fountain at the entrance of the National Orchid Garden
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Year in FOCUS

Events

The past year was indeed a bustling one for the Gardens.

The highlight of the Gardens' Calendar of Events had to be the **Singapore Orchid Festival**. Held over 4 days, from 18-21 September 2003, it transformed a third of the Gardens into show grounds for spectacular orchid blooms. Opened by President S R Nathan, the focal point was the Competitive Orchid Show showcasing the best of flowering orchids, cut flowers and landscape display. With over 700 entries with entrants from countries as far afield as the Philippines, Taiwan, United States of America and Japan, the show was a unique opportunity to observe rarely seen orchid species and exotic hybrids. Fringe activities all themed on the ubiquitous orchid, included orchid talks, childrens' workshops, an orchid face mask competition, an orchid art exhibition and orchid plant stalls.

Minister of State for National Development and Trade and Industry Dr Vivian Balakrishnan officially launched the **Ginger Garden** on 18 October 2003. A colourful showcase of over 250 types and varieties of ginger and related plants arranged according to their origin and cultural use, the Ginger Garden, with its souvenir shop Ginger Villa and Halia Restaurant, has become a firm favourite with Gardens' visitors. Held in conjunction with the Ginger Garden launch was the unveiling of the HSBC Care-for-Nature Garden City Stamp Series, a series of postage stamps featuring four major parks in Singapore, including the Singapore Botanic Gardens.

The Gardens' annual **Christmas Fiesta** was once again a favourite event with visitors. The highlight of the Fiesta this year was the Christmas trees displayed at the Visitor Centre decorated by various embassies and the Gardens' key partners with decorations representative of their country or organisation. The Gardening Society of Singapore's tree decorated with little watering cans, gardening tools and butterflies was a major draw for children. The Japanese Embassy's tree was decorated with origami, the Embassy of Myanmar with handmade crafts, the American Embassy with specially made cards featuring American Presidents, and the Orchid Society of South East Asia with handmade orchids, were just a few of the interesting displays. Children's activities were a focal point of the Fiesta. Children's dish gardening workshops, interactive story telling, puppet shows and T-shirt and tile painting kept the little ones occupied while the adults attended demonstrations on Christmas floral arrangements, and table settings with plants and a wine appreciation and sampling session. Specialty gift stalls abounded with imported candles, personalised quilts, handmade floral sandals, and many more unique gift items.

Yap Siow Hong

A young visitor having his face painted at the Christmas Fiesta in the Gardens

Yap Siow Hong

Children listening in rapt attention during the interactive storytelling session

In March 2004, the Gardens launched the **Rainforest Tour in Japanese**. Held every first Saturday of the month at 10 am, the tour is conducted by Japanese volunteers and has been enthusiastically received by the Japanese community. Together with the English and Chinese rainforest tours and the National Orchid Garden tour, the volunteers gave guided walks for over 2000 participants in the past year. Our **Volunteer Gardening Programme** now spans from the EcoGarden to the Bandstand and the upcoming Evolution Garden with volunteers contributing in many aspects of gardening, from preparation of planting beds to planting and transplanting.

The Gardens played host to many visiting dignitaries who had the honour of having outstanding Gardens' orchid hybrids named after them in the Gardens' **VIP Orchid Programme**. First Lady of United States of America Mrs Laura Bush, First Lady of South Korea, Mrs Roh Moo-hyun, the President of the Republic of Poland HE Aleksander Kwasniewski, Governor-General of the Commonwealth of Australia HE Michael Jeffery, President of Chile HE Ricardo Lagos, Prime Minister of the Hashemite Kingdom of Jordan HE Faisal El-

Fayez had *Mokara* Laura Bush, *Dendrobium* Roh Moo-hyun 'Yang-suk', *Ascocenda* Aleksander Kwasniewski, *Dendrobium* Michael Jeffery, *Dendrobium* Ricardo Lagos and *Dendrobium* Faisal El-Fayez named after them, respectively.

Several stellar celebrities also had the privilege of having orchids named after them under the **Celebrity** category. Hundreds of fans thronged the National Orchid Garden to witness the orchid naming ceremony for pop music celebrity Ricky Martin, Bollywood veterans Shah Rukh Khan and Amitabh Bachchan, and popular Korean actor Bae Yong Joon.

To keep the Gardens a vibrant and interesting place for visitors, the Gardens organised a series of activities and programmes for visitors. Photography enthusiasts thoroughly enjoyed the various camera walks and **Shutterbug Safaris** in the Gardens. Led by photographer John Arifin and the Nature Photography Society respectively, photographers were brought to various parts of the Gardens to capture nature at her candid best. Regular public talks were also organised and topics such as Growing Orchids in Apartments attracted capacity crowds. Keen and budding gardeners flocked to the Gardens every first Sunday of the month for the **Monthly Plant Sales** where select nurseries brought their very best plants for sale in the Gardens.

NParks

Korean Superstar Bae Yong Joon with *Dendrobium* Bae Yong Joon

Jimmy Liew

Regular plant sales attract visitors to the Gardens every first Sunday of the month

The Gardens' **Concert Programme** continued to entertain audiences with an impressive line-up of local and international artistes. Local favourites such as the Singapore Symphony Orchestra, Singapore Chinese Orchestra and school bands

Jimmy Liew

Thousands enjoying an outdoor concert at Palm Valley

attracted their loyal following. To enhance the cultural experience, many international artistes with varied performance styles were brought in. From the percussion sounds of Sisay from Ecuador to the rhythmic pulse of traditional Japanese drums by the ShowZui Taiko Group who performed with the Japanese Military Band, visitors were treated to a buffet spread of music. Fusion jazz artistes Grace Nono-Bob Aves Group from the Philippines and Jonas Hellborg and Felix Fan from Sweden and USA introduced their unique blend of modern music. Woodwind quartet The Chambermaids and a cappella group Coco's Lunch from Australia had the audience tapping their feet to the music. The Gardens' diverse yet discerning concert programme has definitely entrenched the Gardens' status as the outdoor amphitheatre of choice.

Camille Foo
Visitor Management & Education

Developments

Redevelopment of Tanglin Core

The Tanglin Core is the southern historical portion where the Gardens was first established in 1859. The redevelopment of this Core has the objective of rejuvenating the Gardens as a botanical institution as well as a recreational park and tourist destination with exceptional landscapes displaying outstanding members of the tropical flora.

This Core previously housed four buildings that had outlived their purpose both in terms of space and facilities for the herbarium with its large heritage botanical collection, the library, research laboratories and classrooms. Parking was inadequate with only 17 lots. In addition, there was no proper visitor centre.

A specific objective of the development is to strengthen the public interface of the Gardens. It will bring the Gardens to the public by improving visibility and openness without the formidable hedge that used to line Cluny Road. This road was realigned away from the Gardens so that the new building could sit where the road was, thus minimizing intrusion into the Gardens. Sufficient space was created so that the Gardens can integrate seamlessly with the specially planted streetscape where the existing Angsana trees were saved (see *Gardenwise* **21**: 5). The complex will have improved visitor amenities including adequate car parking with more than 200 lots, a public reference library of horticulture and botany, and a food centre, as well as a modern herbarium and laboratories, meeting and function rooms.

SBG Archives

The Gardens flow onto Cluny Road. A computer generated view of the entrance pavilion showing its green roof.

Constraints and Opportunities

The protection and conservation of precious historic trees in the Gardens are a key consideration in the design of the building. Giants such as the Bintangor Laut (*Calophyllum inophyllum*) and Kapok (*Ceiba pentandra*), a Merbau Ipil (*Intsia bijuga*) and a very handsome Gapis (*Saraca cauliflora*) were singled out. These trees not only have extensive root systems that pose an invisible hindrance to the locating of underground structures for the building, their crowns can also get in the way of the construction equipments such as piling rigs. Yet, it is the significance given to these trees that provided the inspiration to the building design and the buildings had to be designed around them.

Besides trees, two of the four old buildings were also assessed to be of historical significance. Ridley and Holttum Halls are early style buildings built in 1892 and 1920 respectively, and were used in their time as the offices of the Gardens' directors, Henry Ridley and Eric Holttum. These charming structures posed another set of constraints for the new building design, which had to integrate seamlessly with the two old buildings.

The main challenge of the design, therefore, was the harmonious integration of the proposed development and the Gardens with its rolling lawns, tree clusters, serene lakes, and the priceless ambience of this living museum of plants.

Design

Beyond its specific functions, the building was conceptualised as a series of spaces that integrate with and enhance the experiences of the Gardens for its visitors. The main entrance leads visitors into the Gardens through a landscaped plaza with an entrance pavilion greeting them on one side. The pavilion is capped with a pitch roof covered with greenery, creating a visual 'continuation' with the landscape. As one walks along the main corridor, the grand Bintangor Laut comes into sight. The building embraces this tree with its branches extending into the rooftop garden specially designed to accommodate them on the second floor.

The library on the first storey extends into a garden courtyard serving as an outdoor reading area. Ridley Hall with a sunken plaza created in front is next seen when the visitor walks further. Next to the plaza, the two storey library block has a direct view of the majestic Kapok. At the landscaped area outside the food centre, a serpentine stonewall meanders to embrace the Merbau and Gapis and form a courtyard.

The building is kept low to three storeys to ensure that it integrates and does not dominate the Gardens. This also helps to relate the new building to the conserved ones. Similar roof tiles are also used to further harmonise the buildings.

The public elements of the building, such as the drop-off porch, the food centre and visitors' pavilion are placed along Cluny Road towards the junction with the multi-laned Holland Road, since this is where the historic main entrance of the Gardens was. Visitors coming from the bus stops along this main road will also have easy and direct access to this part of the building. Further inwards, the building houses public education elements, laboratories, library, a public reference centre, herbarium, a function room and other public amenities. The new carpark, providing more than 230 lots, will be tucked into the two basements.

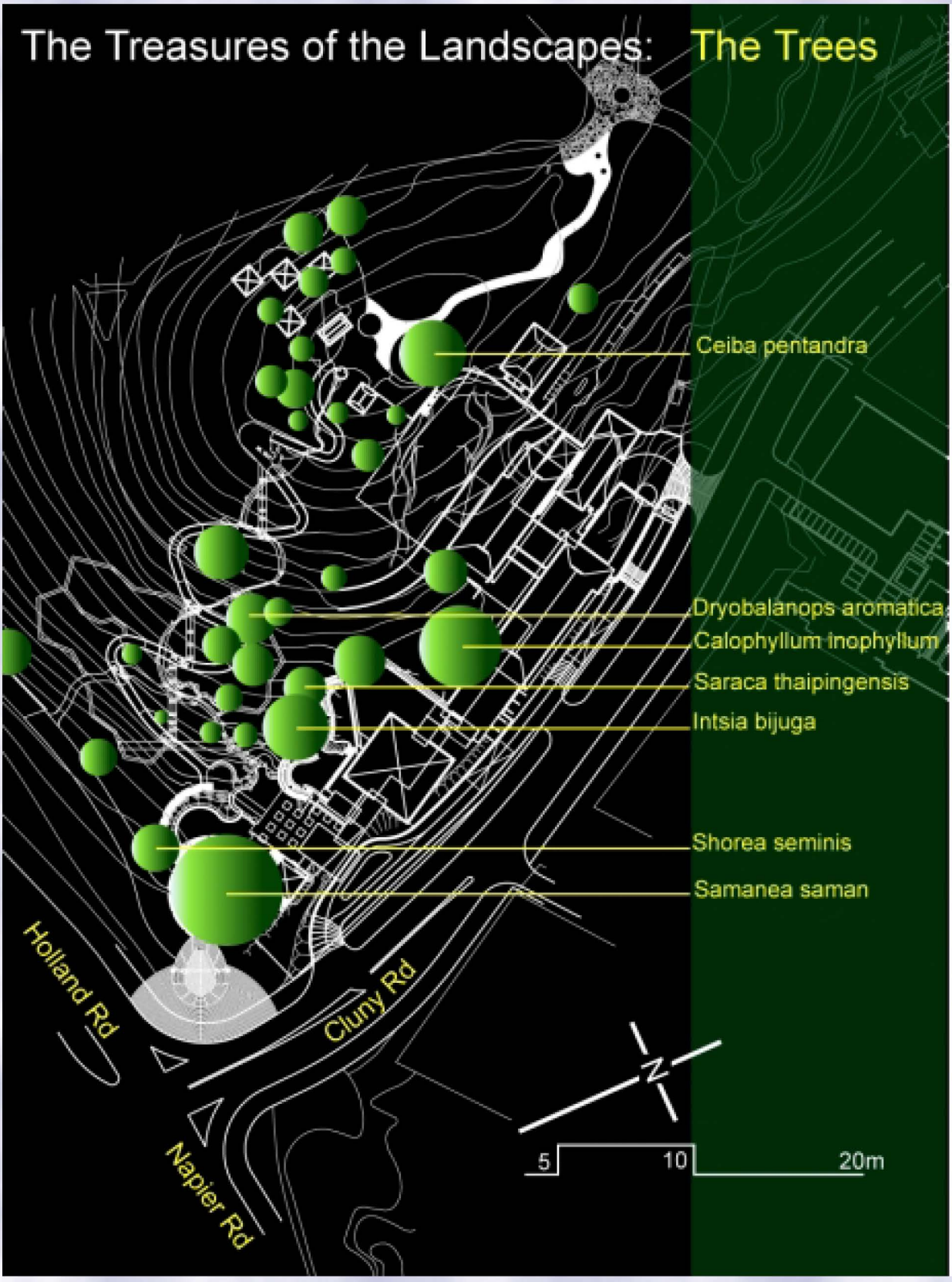
Landscapes

The project is conceived as a showcase of how buildings can be integrated into the landscape and how greenery can be incorporated onto buildings where architectural elements are designed to accommodate plants. The visitors' pavilion with its vegetated roof will create a striking first impression for the visitors. Vertical greenery is also demonstrated on the main building with planter boxes, vertical cables, and horizontal trellises for plants expressed as architectural features on its external façade.

This new development will appear as if it were built within an existing rainforest environment.

To achieve this, a belt of forest is designed to run alongside the linear cluster of buildings. A careful selection of trees, shrubs and herbs will ensure that eventually a stratified forest structure will develop with emergents, canopy trees and understorey layers. Zones will be created where certain plant groups can be highlighted in a naturalistic rainforest setting.

A stream will be created to flow down this belt into a two-tier pond close to the entrance pavilion and main gate. A landscaped footpath, 'stream walk' will lead visitors through this belt providing them a forest experience.



Layout of the Development Site showing the treasures of the landscapes: The trees.

The belt of landscaping will also provide carefully composed vistas and vignettes of the outstanding trees. A full view of the magnificent Kapok tree is, for example, maintained from the Entrance Pavilion but is always partially hidden from view along the stream walk until the path opens into a rest area where the visitor comes literally face to face with its huge trunk.

The Gardens' Project Team

Research

The Diversity and Conservation of the Singapore Flora

Ruth Kiew, Ian Turner, Serena Lee, Samsuri Ahmad, Gwee Aik Teck & Paul K F Leong in collaboration with staff from the Biodiversity Centre and Pulau Ubin

A study on documenting plant species globally endemic to Singapore, i.e. found nowhere else in the world, confirmed that seven species are globally endemic representing 0.3% of the total native flora. Of these, six are now extinct.

The Herbarium team continues to survey areas of botanical importance in Singapore completing a survey of Chek Jawa, a coastal headland on Pulau Ubin (Ubin Island). A total of 245 native species were recorded, which included 11 species that had previously been recorded as regionally extinct (i.e. no longer extant in Singapore), 11 endangered species and 16 vulnerable species. *Elephantopus mollis* (Compositae) proved to be a new record for the Singapore flora.

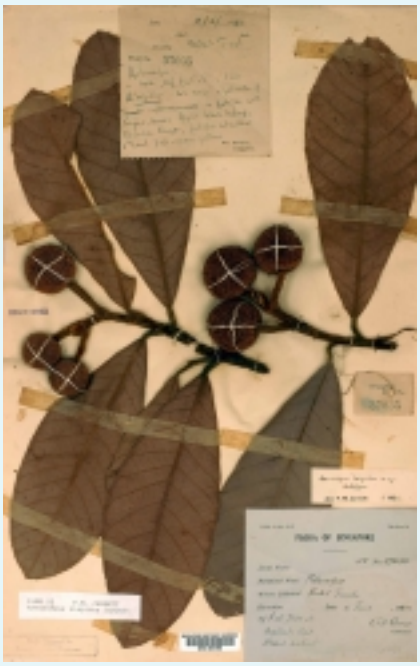
Serena Lee

Survey of Chek Jawa

The Singapore Herbarium Type Project

Ruth Kiew, Hassan Ibrahim & Herbarium staff

The second year saw Hassan Ibrahim come on board as the full-time research officer for the project, which is funded by a grant from the ASEAN Regional Centre for Biodiversity Conservation. The Singapore Herbarium collection includes about 4,500 type specimens. Of these, 4,000 have already been verified and databased. Digital images taken from them, together with the database information, have progressively been placed on to a website. (For further details see page 21). The project is expected to be completed by October 2004 and the website up and running by then.



Hassan Ibrahim

A Type specimen

The Biodiversity of the Understorey Flora of the Kuching Limestone, Sarawak, Malaysia.

Ruth Kiew & The Sarawak Biodiversity Centre

This two-year survey of 20 hills in the Kuching District was completed resulting in a checklist of 287 species (excluding orchids and gingers). The Araceae, Gesneriaceae and Rubiaceae were the most speciose families, each with more than 25 species. About 40 species are restricted to limestone of which 8 species are narrow endemics confined to the Kuching limestone. Among the endemics, a new species, *Begonia lailana* (Begoniaceae), was discovered.

Sarawak Biodiversity Centre

Female flowers of *Begonia lailana*

Revision of the orchid genus *Bulbophyllum*

J J Vermeulen

The revision of the orchid genus *Bulpophyllum* sect. *Sestochilus* has led to the discovery of various new species. Other species that were traditionally regarded as synonyms of frequently cultivated species will need to be re-instated as valid taxa.

Pilot Green Roof Project in Singapore

Tan Puay Yok

Horticulture Research (Urban Greenery) Branch embarked on a joint project with the Housing Development Board to test the applicability of green roofs under our local conditions. Green roofs are lightweight, low-maintenance, and carefully engineered systems that can be installed on existing or new roofs without the need for extensive structural retrofitting. Four distinct green roof systems were installed on a 4000 m^2 multistorey car park in the Punggol housing estate, which are the first installations in Singapore on such a scale. Among others, NParks' contributions to this project were the evaluation of suitable plants for green roofs, the level of maintenance required, and the potential environmental benefits arising from the installations. The information gathered will be useful to support NParks' role to promote rooftop greenery in Singapore. The project is still in progress.

Tan Puay Yok

The completed green roof of a multistorey car park at Punggol has turned an otherwise dull and harsh concrete roof into a living mosaic of colours, and provided numerous benefits to residents living nearby.

Study of Urban Heat Island Effect in Singapore

Tan Puay Yok

Horticulture Research (Urban Greenery) Branch collaborated with National University of Singapore, Building and Construction Authority and the Housing Development Board, of Singapore, to study the severity of the urban heat island effect (UHI) in Singapore, as well as to identify the possible causes of UHI. The study aims to demonstrate for the first time, the significant contributions of greenery in our highly urbanized environment to mitigating the urban heat island effect in Singapore. This will be achieved by studying ambient temperatures in Singapore in relation to the presence of greenery at both the island-wide level and neighbourhood level. Preliminary results demonstrated the importance of greenery in helping to keep Singapore cool, especially when faced with increasing land-use intensification. The study is still in progress.

Re-introduction of Native Orchids

Yam Tim Wing, Aung Thame

During the last two years, two native orchids, *Bulbophyllum vaginatum* and *B. membranaceum* have been successfully propagated and re-introduced. Seeds of these species were collected from plants growing in their natural habitats. The seeds were sown on aseptic media. Seedlings were grown on the media until 2-3 cm tall before being transferred to the nursery. Some 10 seedlings were planted on fern bark measuring 7 by 5 cm. These were grown in the nursery for 6 months until new shoots began to develop, they were then re-introduced. Suitable trees were selected and fern bark with established seedlings was secured to the tree trunk by nails. So far, we have re-introduced some 500 seedlings of *B. vaginatum* and *B. membranaceum* to several locations in Singapore such as Pulau Ubin, Sembawang Park, Kent Ridge Park and Tiong Bahru Park. Over 90% have settled down and are growing well in their new home, producing new shoots and growing onto the bark of the host tree. Several seedlings of *B. vaginatum* planted in Pulau Ubin have flowered.

Yam Tim Wing

Using a crane to reintroduce orchids onto a giant rain tree at Tiong Bahru Park. May 2004

Tissue culture of *Aglaonema rotundum*

Lim-Ho Chee Len, Jassy Phua and Andrea Kee

Aglaonema rotundum (Araceae) is a rare, extremely slow-glowing aroid from Southeast Asia. Its thick, leathery leaves are an attractive, glossy metallic-green with coppery-pink along the midrib and lateral veins. The underside of the leaves is wine-red with rosy-pink veins. Very compact with short stout stems, it is much sought after for indoor pot culture. Filtered light is needed for the development of the best coloration of this plant.

In-vitro multiplication of this tropical beauty was attempted in order to start a collection of this aroid. Initial results showed that, when cultured, the apical bud produces only 1-2 plantlets, whereas axillary buds produced an average of 6-8 plantlets. The growth rates are slow and plantlets only reach about 8 cm after six months. We are now attempting to improve the growth rate of this plant during tissue culture.

Chin Li Li

Tissue cultured plants of *Aglaonema rotundum* potted out in the open

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The non-marine mollusk fauna of the Pu Luong, Cuc Phuong, Phu Ly and Ha Long regions in Northern Vietnam. *A survey for the Vietnam programme of FFI* (Flora and Fauna International).

Regional Network of Botanic Gardens in South East Asia

The first meeting of South East Asia Botanic Gardens (SEABG), was held in the Gardens from 30th to 31st January 2004. This historic event was organised by the Singapore Botanic Gardens and Botanic Gardens Conservation International (BGCI) and supported by HSBC through the Investing in Nature partnership. BGCI is an international non-governmental organisation with over 500 member institutions in 110 countries dedicated to building and maintaining a world network of botanic gardens for plant conservation. www.bgci.org

This inaugural meeting was attended by representatives from Cambodia, China, Indonesia, Lao, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

The **South East Asia Botanic Gardens (SEABG) Statement** was issued at the close of the meeting. A copy of the statement is reproduced below:

Jimmy Liew

South East Asia Botanic Gardens (SEABG) Statement

The participants:

Pointed out that botanic gardens in South East Asia need to be recognised, supported and enhanced at all levels and regions of South East Asia to ensure that they achieve their potential as one of the guardians of the plant diversity and environmental heritage of South East Asia.

Welcomed the establishment of a regional Network of Botanic Gardens in South East Asia called the "South East Asia Botanic Gardens (SEABG)."

Noted that the Network could be in the future broadly based to include a wide range of governmental, university, municipal, community/village, NGO, private and other relevant institutions and organisations.

Agreed that the work of the Network should encompass all aspects of the activities of botanic gardens including, *inter alia*, public education and recreation, research, identification, documentation, giving special attention to conservation of indigenous plant diversity and dissemination of knowledge (including traditional knowledge) about plant diversity in South East Asia.

Supported the goals of the Global Strategy for Plant Conservation[1] and the International Agenda for Botanic Gardens in Conservation[2].

Proposed that the Network will develop the means to ensure that data and information should be widely accessible in electronic and other published forms (website, newsletters, technical manuals and other publications) while at the same time safeguarding the intellectual property rights of data providers.

Committed themselves to work to develop, elaborate and support this important new network for botanic gardens in South East Asia.

Congratulated the conference hosts, Singapore Botanic Gardens, on their organisation and fine hospitality for the 1st SEABG meeting.

Thanked HSBC for its support for the Investing in Nature programme and welcomed the initiative of BGCI in supporting South East Asian botanic garden activities.

31st January 2004, Singapore

[1] The Global Strategy for Plant Conservation was adopted by the Conference of Parties to the Convention on Biological Diversity. Singapore has both signed (10th March 1993) and ratified (21 Dec 1995) the Convention on Biological Diversity.

[2] The International Agenda for Botanic Gardens in Conservation is a global framework for botanic garden policies, programmes and priorities in biodiversity conservation, and has been included as a major contribution to the achievement of the Global Strategy for Plant Conservation. It includes a set of guidelines for botanic gardens worldwide to contribute to biodiversity conservation, particularly as it relates to the implementation of the Convention on Biological Diversity.

Botanical Research Fellowships

The Gardens has a new Fellowship programme made possible by donations. It has been set up to encourage and support taxonomic research on the region's flora that will lead to publications of international standard. They will enable researchers to work in the Singapore Herbarium for four to five weeks (with a grant of up to S$4,500) or for two to three weeks (with a grant of up to S$2,500). Up to four will be awarded annually. Researchers from South East Asian countries are particularly encouraged to apply.

The first two have been awarded to Professor Phang Siew Moi, Institute of Biological Sciences, University of Malaya, Kuala Lumpur, Malaysia, to work on H.M. Burkill's collection of marine algae in the Singapore Herbarium, and to Professor R.J. Johns, The Herbarium, Royal Botanic Gardens, Kew, U.K., to work on C.E. Carr's Papua New Guinea Collection in the Singapore Herbarium.

For further information on the Fellowships please contact:

Director
Singapore Botanic Gardens
1 Cluny Road
Singapore 259569

chin_see_chung@nparks.gov.sg

The Aroids *of* Borneo

What are the aroids?

The Araceae - aroids or *keladi hutan* - is a family of herbaceous monocotyledons with 108 genera and about 3,750 species worldwide. Nowadays, the Lemnaceae (duckweeds) are included in the Araceae. The aroids are predominantly tropical in distribution with 90% of genera and about 95% of species restricted to the tropics. The greatest number of species originate in South America (including the two largest genera, *Anthurium* and *Philodendron* with over 1500 species between them) but the tropics of South East Asia are also very rich, with the large and horticulturally important genera, such as *Alocasia* (photo 1, 2) and *Amorphophallus* (photo 3).

Alocasia chaii, a recently discovered species endemic to central Sarawak.

Alocasia cuprea. Long considered endemic to Sabah, this horticulturally important species has recently been discovered in Sarawak.

Aroids are one the most abundant herb groups in the forests of Borneo but, paradoxically, are among the least well known and studied. As many as 60% of the aroid species of Borneo await formal classification and a universally recognized scientific name, while almost none have received scientific attention with regard their evolutionary relationships,

Amorphophallus eburneus. A species restricted to limestone habitats in Borneo.

their pollination and seed dispersal, their co-existence with other organisms and much else besides.

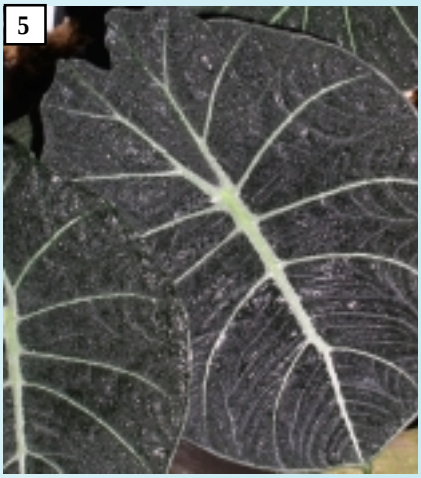
Aroids of Borneo – How many and where do they grow?

As currently understood the aroid flora of Borneo comprises 265 described species in 27 genera, making it the richest and most diverse region in tropical Asia and perhaps second only to that of north western South America (Colombia and Ecuador). Sarawak, particularly the northwest and central regions, is notable for the extreme wealth and diversity of aroid species. However, this number is most certainly well below the actual figure and does not take into account the great number of aroids that are known to exist but have yet to receive a formal name, let alone plants yet to be discovered.

The dominant terrestrial non-climbing aroids encountered in Borneo are *Alocasia*, *Schismatoglottis* and *Homalomena*. *Alocasia* (photo 4, 5) has 31 species described for Borneo of which 29 are endemic. There are a further ten yet to be described.

Alocasia robusta has the honour of having the largest undivided leaf of any land plant. This specimen photographed in Sabah stood over 6 m tall. This remarkable species was described as new to science in the mid 1970s.

Schismatoglottis includes 62 species of which 55 are considered endemic and at least another 20 await description (photo 6, 7, 8). *Homalomena*, for which there has been no revision for over a century, in Borneo appears to have as many as 60 percent that are novel



Alocasia reginula was known in cultivation for over 30 years before it was at last found in the wild in Borneo only a few years ago.

Schismatoglottis viridissima one of many species of *Schismatoglottis* described as new to science in the past few years. This one is restricted to western Sarawak.

Schismatoglottis ciliata is remarkable for the white bristles that cover the petioles and leaf backs. Borneo has several such hairy *Schismatoglottis* – all locally restricted.

(photo 9, 10). The total number of aroid species in Borneo (based on novelties described while revising genera plus the discovery rate of unidentifiable species for genera where a recent revision exists) suggests a total in excess of 400. Indications are that over 95% of all Bornean aroid species are endemic, that is, found nowhere else on Earth.

The aroids are overwhelmingly plants of humid, shaded forest. Species diversity is greatest in gallery forest on steep slopes of stream valleys at low to mid-elevation (up to 850 m a.s.l.). There is a strong correlation between the species and their geological preference (limestone, ultramafic, etc.) and also to altitudinal range. In the genus *Alocasia* there are good examples of species complexes where sister species are separated by favouring lowland or highland habitats (photo 12, 13), limestone or non-limestone habitats (photo 14, 15). Many species favour steep rocky habitats above streams on rock outcrops under mature forest (photo 16, 17).

A group of particular interest in Borneo are the rheophytes, species adapted to the flood zone of forest streams, and which tend to have wide spreading, strong roots and streamlined leaves. Among this group Borneo specialities include the rheophytic genera *Piptospatha grabowskii* (photo 18) and *Bucephalandra motleyana* (photo 19).

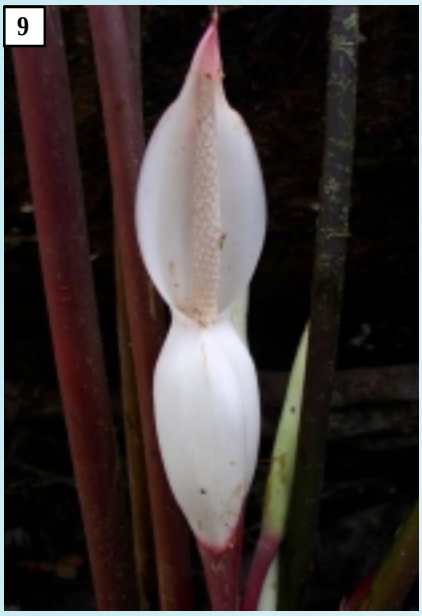
Aroids are highly diverse in life forms and leaf and inflorescence characteristics. Life forms range from submerged or free-floating aquatics to terrestrial (and sometimes tuberous) and to epiphytic or hemi-epiphytic plants or climbers. Leaves range from simple and entire to compound and highly divided, and may be basal or produced from an aerial stem.

What makes an aroid an aroid?

The Araceae is defined by bearing small flowers on a fleshy axis (spadix) subtended by a modified leaf (spathe). There is much variation on this theme. In some genera, the spathe is very conspicuous and brilliantly coloured (e.g., many *Amorphophallus*) while in others the spathe is small and leaf-like (e.g., most *Pothos*). The behaviour of the spathe varies from genus to genus. In some (e.g., *Cryptocoryne*), the spathe completely encloses the spadix, while in others the spathe reflexes to leave the spathe clearly visible (e.g., most *Pothos*). In some genera, the spathe is shed as soon as the inflorescence begins to flower, either falling completely (e.g., *Rhaphidophora*) or partially (e.g., *Schismatoglottis*). The spathe ranges in size


8

Schismatoglottis motleyana is a widespread and very variable carpet-forming species. The leaves range in colour from plain dark green though to the beautiful variegation depicted here.


9

An as-yet undescribed species of *Homalomena*. The large white inflorescences have a strongly aniseed fragrance.


10

Homalomena geniculata was once thought to be restricted to a small area of forest in north Sarawak but has subsequently been shown to be widespread but always scattered and never common.


11

Homalomena humilis is a widespread and common species with stems and leaves that range from clear green to the deep purple-red shown here.


12

Alocasia beccarii is one of several related species each with a particular habitat and altitude preference. *Alocasia beccarii* occurs in lowland mixed dipterocarp forest.


13

Alocasia peltata can be considered as the high-altitude sister species to *A. beccarii*. Both *A. peltata* and *A. beccarii* are endemic to Borneo.


14

Alocasia ridleyi has recently been recognized as a species related to but distinct from *A. scabriuscula* and from which it differs, among other characters, by being restricted to limestone.

Another factor in sister species grouping can be geology. *Alocasia scabriuscula* is a common species in Borneo occurring on a range of soil types but never on limestone.

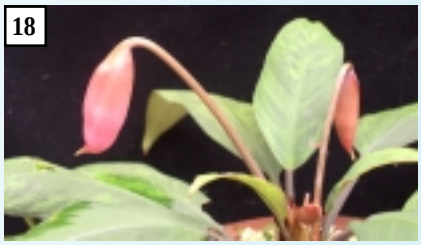
Schismatoglottis bauensis here dominating a limestone cliff in west Sarawak.

Alocasia reversa is a lithophytic *Alocasia* so far only found on limestone in west Sarawak. It is an important horticultural species.

and shape from 5mm long and simple in *Homalomena humilis* (photo 11) to the huge fluted 1m wide vase of *Amorphophallus hewittii*.

The sex of the individual flowers and their arrangement on the spadix are among the characters used to define taxonomic groups. Depending on the genus, the spadix may bear either unisexual or bisexual flowers. If bearing bisexual flowers, these are uniformly arranged over the spadix. Almost without exception bisexual flowers are subtended by reduced tepals termed a perigon. If unisexual, the flowers are usually arranged with the females at the base of the spadix and the males above with the zones occasionally separated by a zone of sterile flowers and the spadix occasionally terminated by a sterile appendix (photo 20).

All Araceae studied to date display insect pollination. Many aroids attract pollinators by odour. Inflorescence odours can smell of dung, carrion, rotting fruit, old socks, semen, bad breath, beer, spearmint, boiled sweets and cinnamon. Many, notably the revoltingly smelly *Amorphophallus*, have evolved to be pollinated by insects attracted to dung or carrion (sapro-entomophily). Many tropical aroids are pollinated by bees, wasps and beetles. Others like *Philodendron* are pollinated by large dynastid scarab beetles. Several genera have inflorescences that heat up considerably during flowering, often by as much 20°C above the ambient temperature and these often produce at the same time a strong, foul odour.



Piptospatha grabowskii is a very attractive rheophytic aroid endemic to Borneo. It often occurs as large colonies but requires clear, swift-moving streams in order to thrive.

Bucephalandra motleyana is one of two species of this Bornean endemic genus. It is an obligate rheophyte.

The complex spadix of *Typhonium trilobatum*, a weedy species in Borneo, has noodle-like structures that are sterile flowers and partially obscure the female flowers. The spadix appendix produces a penetrating smell of rotting meat.

A ripe infructesence of *Amorphophallus eburneus*. Each berry contains a single large seed.

Rhaphidophora lobbii produces yellowish white fruit-scented infructescences that probably attract arboreal or perhaps flying mammals.

Fruits are frequently red fleshy berries (photo 21) suggesting bird dispersal, although the greenish yellow, fruitily perfumed fruits of climbers, such as *Rhaphidophora*, are more probably eaten and dispersed by arboreal mammals or bats (photo 22).

Ornamental species

Many Bornean aroids are prized ornamentals, in particular species of *Alocasia*. Of especial note are forms and cultivars of the widespread and variable *A. longiloba* of which *A. longiloba* 'lowii' and the superb *A. l.* 'watsoniana' are among the most beautiful of all foliage aroids. In recent years a great deal of interest has been directed at the dwarf growing thick leaved *Alocasia* from limestone and ultramafic rocks. Three species, *A. reginula*, *A. melo* and *A. nebula* have particularly attracted attention and are now being produced in the Asian region from tissue culture while others, including several scientific novelties, are showing great horticultural potential. Aside from *Alocasia*, attention is also being given to two further terrestrial genera, *Homalomena* and *Schismatoglottis*. Both contain numerous species with attractive foliage and, in many cases, good-sized inflorescences and a new generation of ornamental pot and garden plants is under development.

Peter Boyce
Malesiana Tropicals
Kuching, Malaysia

Photos by: Peter Boyce

TIMELESS BEAUTIES
- *the Gardens' Sculptures*

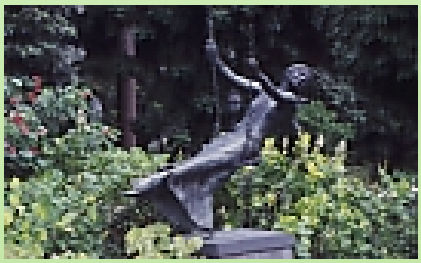
Over the years the Singapore Botanic Gardens has been blessed with thoughtful gifts from friends. Sculptures are gifts that over the years have enhanced the ambience of the Gardens and made a positive impact to visitors' pleasure. While the interpretation of the living collections, educational programmes, research activities and publications reflect the science in a Botanic Garden, the art comes from these *timeless beauties* and the plant displays they complement.

The oldest is the 1929 **Sundial** designed by the late Ursula Holttum, wife of Eric Holttum, Director of the Gardens from 1925 to 1949 (see *Gardenwise* **21**: 15-17. Around its concrete pedestal is a seemingly whimsical quote "what thou seekest is a shadow" etched on its faces. The Sundial Garden took its name from this classic beauty.

Jimmy Liew

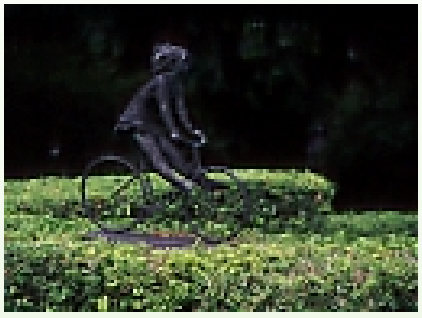
Sundial

The most famous must surely be the Sydney Harpley threesome. These bronze beauties were gifted to the Gardens by the late Mr David Marshall, Singapore's former Ambassador to France, Spain and Portugal. The demure **Girl on a Swing** clad in the local *sarung kebaya* arrived at the Gardens in 1984; the carefree **Girl on a Bicycle** freewheeling down the spiral hedge of *Murraya paniculata* with the wind in her hair, followed in 1987; and the sultry **Lady on a Hammock** took up residence in the Gardens in 1989.



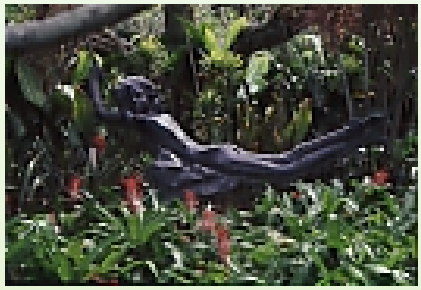
Chin See Chung

Girl on a Swing



Chin See Chung

Girl on a bicycle



Chin See Chung

Lady on a Hammock

The **Swiss Ball Fountain** with its ever revolving stone ball is an interactive sculpture simply irresistible to children. The Swiss Community of Singapore presented the Gardens with this gift as a symbol of friendly relations between Singapore and Switzerland on the occasion of the 700th anniversary of the Swiss Confederation in 1991. The ball is hand-sculpted by Ueli Fausch from granite that originated from the Swiss Alps, specifically from the Maggia Valley in Ticino, southern Switzerland. The weight of the granite ball is 700 kilograms, each kilogram symbolically represents one year of the Confederation.

Jimmy Liew

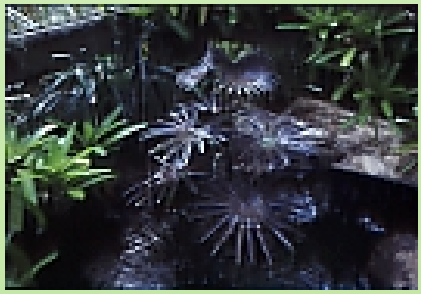
Swiss Ball Fountain

Swing me Mama is a Dominic Benhura creation. This beauty created from a block of springstone, portrays a mother swinging a child in her arms in a direct, fluid and delightful way, bringing exuberant movement to solid Zimbabwe stone. This sculpture is "A Singapore Legacy" donation by the seventeen Rotary Clubs in Singapore to mark the 90th Rotary International Convention held in Singapore in 1999. This sculpture is picturesquely sited next to Swan Lake.

SBG Archives

Swing Me Mama

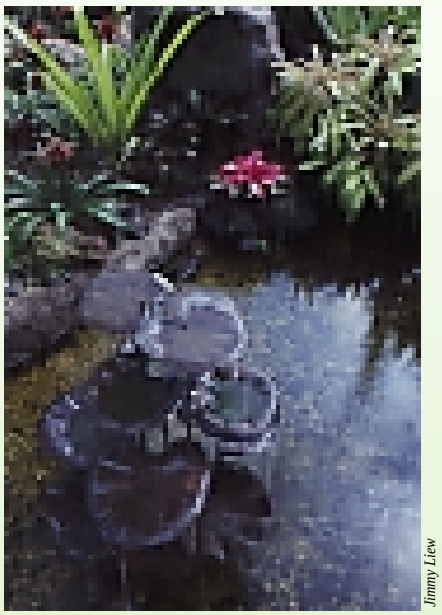
The Yuen Peng McNeice Bromeliad House in the National Orchid Garden houses several unique sculptures through the generous donation of Lady McNeice. Two elegant copper fountains tinkle with enchanting notes as water drips from frond to frond of the **Farfugium Fountain** and the **Fan Palm Fountain**. Sculpted by the father and son team of Dr Humphrey Bowden and Mr Garth Bowden, these musical fountains came to us in 2000. Joining them in 2001 is



Jimmy Liew

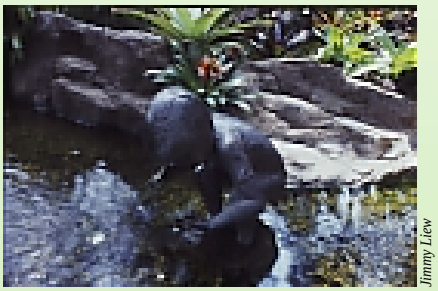
Fan Palm Fountain

the Vanessa Marston's bronze **Little Girl with Shell** which captures a child's rapt curiosity in nature. The latest addition to this delightful family arrived in 2003 in the form of the **Elephant**. This is an original work by sculptor Epnraim Chaurika in serpentine.



Jimmy Liew

Farfugium Fountain



Jimmy Liew

Little Girl with Shell

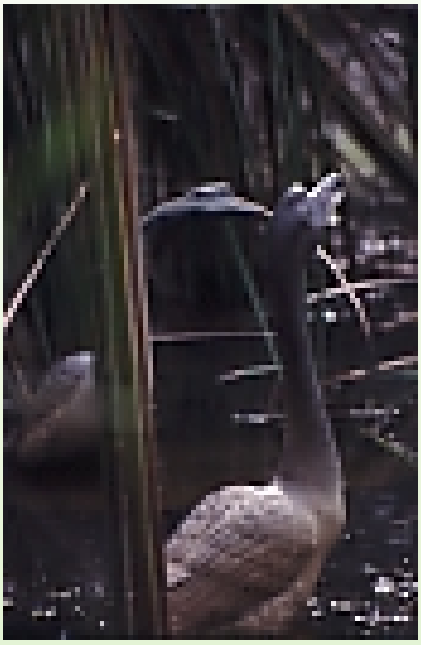
Jimmy Liew

Elephant

The opening of the National Orchid Garden in 1995 brought congratulatory gifts from three wonderful friends of the Gardens. Lady McNeice and Mr Tan Jiew Hoe sent three elegant bronze **Cranes** and six playful **Geese,** respectively while Mrs Gertrude Marsh Looi sent a pair of **Sundials** sculpted by Westwood Dials in Essex, United Kingdom.

Jimmy Liew

Cranes



Yap Siow Hong

Geese

Jimmy Liew

Jimmy Liew

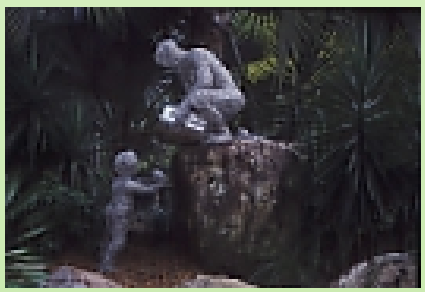
Sundials

To commemorate the opening of the Gardens' Visitor Centre in 1998, Lady McNeice commissioned a **Clock Tower**. Standing 3.5 m in height from a 0.7 m granite base, this majestic mild steel artpiece is designed by NParks staff Mr Eng Siak Loy who took his inspiration from the elegant Sealing Wax Palm, the logo of the Singapore Botanic Gardens.

Jimmy Liew

Clock Tower

The newest member to the Gardens' sculpture collection is local sculptor Victor Tan Wee Tar's **Passing of Knowledge**. A continuous stream of water connects two figures meshed from wire where the water is symbolic of the passing of knowledge from generation to generation. This sculpture was presented to the Gardens by the Rotary Club of Singapore through the generous donation of The Crocodile Foundation. This piece is appropriately sited in the Sun Rockery where it blends harmoniously with the silvery plantscape.



Jimmy Liew

Passing of Knowledge

Explore the Gardens and enjoy these *timeless beauties*.

Wong Wei Har
Deputy Director

The Burkills of BURKILL HALL

SBG Archives

H M Burkill (left), I H Burkill (right)

Burkill Ancestry

A couple of centuries ago, the north-east corner of France and neighbouring Holland and Belgium were in a state of unrest for many years owing to the Hundred Years War and the War of Spanish Succession. Huguenot and other intelligentsia were emigrating, and it is conjectured that the Burkill forebears were within this movement. The family name is thought to come from *berg* (a town), *berger* (a townsman) and *el* (a diminutive implying a middle class town dweller) and on reaching England to have been anglicized to Burkill. The name appears as that of a major land owner/farmer at Winteringham on the Lincolnshire coast of the Humber estuary, and also in a few neighbouring parish registers.

I do not know how many generations ago, perhaps four, the second son of the main establishment, who did not stand to inherit the farmstead, branched out into transport. He put together a fleet of barges operating in the Humber and up the River Trent into the growing heart-land of industrial England, carrying in food and raw materials and outwards with finished products. In the mid-nineteenth century the railways came into being, and this Burkill (I am sorry I do not have his full name) became a leading light in the construction of the Great Northern Railway linking Leeds with Glasgow, and thus to a seaport to further imports and exports. His interest extended to the eastern seaboard of America where he helped organize railways, the principle one being the Pennsylvania Railroad, but there were others. He must undoubtedly have become a particularly wealthy man. He raised a small family in Leeds.

The Morrisons

His eldest daughter, Clara Lydia, married a William Morrison, a Wakefield businessman. They produced a large family, six daughters and two sons. Unfortunately William died leaving his widow with inadequate resources to bring up such a large brood. Her Burkill father took on the responsibility and thus had two families. All the children received top grade education. All the Morrison girls went to Cheltenham Ladies College (CLC), and there is a plaque in the passage outside the college assembly hall inscribed to 'The Six Miss Morrisons'. My wife was also a pupil of CLC and we sent our daughter, Linda, there. The two Morrison boys went to the boys' Cheltenham College.

Isaac Henry Burkill

My father-to-be, Isaac Henry Burkill, after graduating in Natural Science at Cambridge, worked in the University's Botany School Herbarium for five years, then for a few years in the Herbarium of the Royal Botanic Gardens, Kew. From there he obtained appointment at the Calcutta Museum becoming adviser on economic products. At the end of his first tour he came home to England and quite naturally came into family relationship of the Burkill/Morrison clan, and fell in love with Ethel Maud Morrison and married her. They were first cousins, and it was shortly before this that the legislation on consanguity of legal marriage was amended to make such a union permissible. They returned together to Calcutta about 1908, completed this tour and returned home. The directorship of the Botanic Gardens Department of the Straits Settlements fell vacant with the retirement of H.N. Ridley, and he was appointed to it, taking up the office in Singapore and residing in the director's bungalow, now officially known as Burkill Hall.

The Burkills in Singapore

In 1914, his wife, Ethel, became pregnant (with me) and many years later when I was old enough to understand such things I remember my elders discussing and expressing their anxiety at her advanced age for this to happen. Her unmarried sister, Hilda Morrison, came out from England to be present during this time. My mother bore the pregnancy and birth on 8th December 1914 without any problem, and in 1915 her sister returned to England then at war with Germany.

In 1921, my Dad's unmarried sister, Annie Mildred Burkill, familiarly known as Min or Minda set off on a world trip calling in first at Singapore during which she and my mother made the excursion to Toba Lake and Brastagi in north Sumatra. She had stayed with her parents at Thorpe, near Ashborne, Derbyshire, to look after them. They both attained 98 years, dying about 1918. This gave her freedom. Her wealthy father must have taken care in his will to see that she was well provided for. After Singapore, she continued her world travel across the Pacific Ocean to America to see her brother Ernest living in Gainsville, Florida, where he was running an 'Odd Fellows' hostel. Back in England she bought a plot of land next to that bought by my father at Fetcham and built a house on it. This was bequeathed to me and in which I lived on coming home on retirement in 1969.

I.H. Burkill's Retirement

In anticipation of retirement with a contract in prospect to prepare 'A Dictionary of the Economic Products of the Malay Peninsula' and expecting some collaboration from Singapore, my father was able to save the career in Malayan botany of Murray Henderson, botanist with the Federated Malay States Museums, when the Kuala Lumpur government abolished his post. My father got the post of curator in the Singapore herbarium created for him in 1923. On retirement in 1925, my father took up this contract, specified as for three years, but in fact the work occupied him for ten! He told me that the salary from the three years enabled him to build the home he came to live in, and the choice of settling at Fetcham was that it offered convenient access to the Royal Botanic Gardens, Kew. As he churned out manuscript, the initial typescript was prepared by my mother who readily learnt to decipher his poor handwriting. She was paid two pennies per 72 words. The collective payment went towards the purchase of a wireless set for the house, and towards a 'sit-up-and-beg' Armstrong Siddley car with a pre-selector gearbox which my mother learnt to drive. My father did not drive in retirement though I think he did in Singapore.

Humphrey Morrison Burkill's Childhood

I was an only child. I do not remember anything about the Gardens, nor the house. The upstairs sitting room was a sort of balcony with an open handrail around through which one could see the driveway up to the house. By the drive there was a swing on a large tembusu tree from which one day I had tumbled, and this left the recollection I had

of looking through the handrail waiting for the doctor to come and have a look at me. No damage beyond a bruise.

Down the drive the trees were thick and in their litter there were luminous toadstools, which my mother used to take me to see, and to touch them when their light would go out – an exciting mystery for a small child. I am told that one of the first words I spoke was 'mungus'.

The war was over in 1918, and my father was due for home leave, so he, my mother and I came home to England. He was, of course, due to return to Singapore for his next tour of duty, and thought had to be given as to what to do about me. It was generally held that white babies should not be left in the tropics above the age of four. Luck played its role again. There was a Pearson family living in Goole not far removed from Beverley. One of the girls was a horsewoman. She rode with the Beverley Hunt. The hounds were kenneled at Etton, and the hunt often met at the big house in Etton.

Next door was the village rectory occupied by the rector, Rev. Jack Cholomondley (pronounced Chumley!) and his wife, Evie. The rector's stipend for such a small parish (large in area but small in population) must have been embarrassingly limited, and Evie took in vicarious 'colonial orphans' to give them a home, and to augment the household income. A sister of the Pearson horse woman married Stanley Morrison, brother of my mother, and the information must have trickled down the line quite fortuitously for I cannot imagine that my parents had any capacity for looking out for such a place. Thus I was taken in. Evie ran a very efficient and loving home, and

Burkill Hall

This fine colonial bungalow was built on land acquired by the Agri-Horticultural Society in 1866. The house was intended for the Superintendent of their grounds. It was completed in 1868, one year before Government House (now the Istana). After the land was taken over by the Government as the Botanic Gardens, the house was occupied from 1875 by the first two superintendents and then from H.N. Ridley's time until 1969 by a succession of six directors.

The house was built to suit the tropical climate in days before air-conditioning. Its high roof with overhanging eaves, high ceilings and cross ventilation through the open verandahs front and back provided a cool and airy living environment. The projecting front verandah provided a porch where people could alight from carriages and later on from motorcars sheltered from tropical downpours.

SBG Archives

Burkill Hall before today's lush plantings dominate the scene

The elegant aspect of the house is afforded by the high, red-tiled roof, white plastered walls and the slender columns - two white plastered brick columns support the verandahs and two-storey high, slender wooden pillars support the eaves. These wooden pillars are each made from a single trunk of *tempinis*, a local timber (*Streblus elongatus*, Moraceae) that was common in Singapore in those days. (The Tampines district is named after this timber tree).

As was customary in colonial houses, the living area was on the first floor with a central hall with open verandahs projecting at the front and back and bedrooms, dressing rooms and a nursery to the sides. The bathrooms were on the ground floor reached by a back staircase. The kitchen, servants quarters and stables were separate one-storey buildings at the back joined to the house by a covered walkway.

Besides the elegance of its architecture, the house was most salubriously placed looking across the valley, now called Palm Valley, to the majestic backdrop of the Gardens' primeval Rain Forest.

During the Japanese invasion of Singapore, the director's house suffered minor shell damage with one corner of the roof and the ceiling beneath being fractured. Throughout the Japanese Occupation, the house was occupied by the Japanese military and from December 1944, R.E. Holttum (Director) and E.J.H. Corner (Assistant Director) were interned in the small room on the ground floor on the right of the entrance.

From 1969 to 1971, the house was closed until it was converted for use by the Gardens' School of Ornamental Horticulture. The downstairs was used as the laboratory with benches being put in around the sides and the centre. Upstairs the two bedrooms and back verandah were converted into classrooms and the nursery became the Principal's Office. Only one classroom and the Principal's Office were air-conditioned. After six months' conversion work, the School opened in October 1972.

In 1991, the School moved and major restoration work was undertaken. The roof and some of its timbers were replaced as were four of the *tempinis* pillars that were decayed at the base. Unfortunately, *tempinis* trunks of such dimension were no longer available and they were replaced by *balau* (*Shorea* sp., Dipterocarpaceae) pillars. The original wooden floors of the first storey were in good condition and were retained. Unfortunately, the flooring of the upstairs sitting room, which had very clearly shown the adze marks from the days when timber was handhewn (H.M. Burkill, personal communication), was sanded smooth – loss of a unique historical detail. Downstairs, the laboratory fixtures were removed and the floor relaid with Malacca tile paving.

In view of its historical connection with I.H. Burkill, who as Director lived in the house from 1912 to 1925, and H.M. Burkill, who was not only born in the house on the 8th December 1914 but also lived there when he was Director between 1957 and 1969, the house was named Burkill Hall. On 1st October 1992, H.M. and Mrs Burkill returned to the Director's House for the naming ceremony of Burkill Hall.

Also in 1992, Burkill Hall was designated 'A Preservation of Monuments Board Historical Landmark'.

Major landscaping around Burkill Hall for the National Orchid Garden that opened in 1995 necessitated the upgrading of the servants quarters to provide toilet facilities for the public. For the opening of the National Orchid Garden in 1995, the main hall was air-conditioned and became a place where VIP dinners could be held.

Burkill Hall is now used for VIP receptions and the open area downstairs serves as an Exhibition Hall. Rental for receptions and events is an important source of revenue for the Gardens. Early this year, the floor of the first level was strengthened by the addition of wrap-around steel cladding along the length of the joists allowing it to be used for events without fear of overloading.

Today, Burkill Hall is one of the few outstanding examples of early residences in Singapore with an elegance not matched by the later mock tudor black-and-white houses that became popular later in the nineteenth century.

The Curator's Cottage

On the slope below Burkill Hall was a modest black-and-white house where the Curator lived. It was officially called the Assistant Director's Bungalow, although no Assistant Director lived there but the Gardens curators did. John W. Ewart stayed there from 1946 to 1957 and during his time nurtured prize introductions around his bungalow like the Jade Vine and the New Guinea creeper. He was succeeded by George Alphonso. After the Singapore Government changed the policy of providing housing for civil servants, the house fell vacant. It was then converted for use by the School of Ornamental Horticulture as The Studio and drafting tables were set up in its main hall. In the 1990s it was used for the convocation ceremonies of the School. In 1994, it was demolished during the landscaping for the National Orchid Garden.

Ruth Kiew
Herbarium

Acknowledgement: I am much indebted to Mrs Ng Siew Yin and Mrs Peggy Chong for help in sourcing material for this article.

I was definitely happy there. The 'orphans' were a mixed intake of eight or so boys and girls. We bonded together forming a happy group. In fact when my parents returned home from Singapore for home leave, and came to Etton to collect me, I did not want to go to meet them, and definitely I was sad at leaving. But it had to be so. I was turning eight years old and it was time for prep school.

St Hugh's School

As was for my placement at Etton, I cannot envisage that my father had scope for selecting a prep school for me to be sent to. The chief medical officer in Singapore, Dr Hunter, had placed his son, Patrick, at St Hugh's School, Bickley, Kent, and I suspect that my father learning of this took it as guidance for that is where I was sent in September 1923. My maternal Granny had settled in a delightful house at Paignton, Devon, with her unmarried daughters and son, Percy. Daughter, Hilda became substitute mother and I spent happy holidays there. Uncle Percy in a house dominated by women was my hero.

As for St Hugh's School, it undoubtedly ranked high in some official lists. There was a boy called Gordon at the school at my time who was a nephew of Queen Mary. Occasionally Her Majesty would come by to visit someone in the vicinity and the school, some 50 or so boys would be paraded on the road where the royal barouch would stop and Gordon would be produced to greet his aunt.

Another boy was Romanov, a youngster of the Russian czar family. When the Bolchevics raided the Czar's palace wreaking murder, this boy's nurse wrapped him up in a blanket and fled down to the basement, thus saving his life. The British and Russian royal families were closely related, and the British Government offered refuge to any Russian royalty who could reach Britain. This boy made the arduous journey, and whoever it was that had charge over him sent him to St Hugh's School. I remember seeing plain-clothes policemen wandering around the premises.

A couple of Indian boys, sons of a minor rajah of Southern India, Rajah Kumaramangalam, were contemporary with me. The elder one, Paramasiva (known as Para for short) was a strong athlete. He played a robust game of football. His boots were very formidable, and could well have been prototype of the modern bover boots. He gained an athletics blue at Oxford, and returned to India into the Indian army becoming Chief-of-Staff of the Indian army on partition.

There also was an oddity, a boy named Disher who was the model for Richmal Crompton's 'William'. I never saw the parents, who seemingly had abandoned him, but his aunt Richmal regularly visited him. I gleefully got copies of her books as soon as they were published till about the fourth when my mother forbad me buying more as she said they made my behaviour bad!

The school building was a large country mansion (originally Widmore Court) with extensive surrounding land large enough for a large cricket field and three football pitches. There was a short rifle range for firing .22 calibre rifles where I acquired my first of many subsequent shooting honours. Alas the building stopped a doodle bug (flying bomb) during the Nazi blitz on SE England. Luckily it was holiday time and no one was in the house. The school moved to near Oxford.

Alfred and Frederick Johnson were owners and headmasters of St Hugh's. They had a competent staff and ran a very good and successful school gaining many scholarships and exhibitions at top grade schools. Happily they got me through the Common Entrance Exam for Repton School.

Repton School

The village of Repton lies in the Trent valley between Derby and Burton surrounded by beautiful agricultural green fields and woods. Many wealthy persons owned impressive buildings in the area, and one, Sir John Port, with no heir made provision for a grammar school which with his death in 1557 came into being. Thereon the school has grown to become one of the oldest and largest public schools in Britain.

I went there in 1928 when there were some 500 boys in residence in eight houses. My passage through school was not particularly eventful. I won the school entomology prize in 1933 with a collection of lepidoptera, and in that year went with the school rifle team to the National Rifle Association Imperial Meeting at Bisley.

Cambridge University

I took the Cambridge University 'Little-go' Latin examination for university entrance, and Gonville and Caius College accepted me for matriculation in 1933 to take a degree in natural sciences, botany, zoology and chemistry. I faithfully attended all lectures, practical classes and field work. Though my lecturers and supervisors were top men, I was not turned on. They were teaching me philosophy with no obvious end product, which is what I wanted to have in sight. I diverted my time to shooting, eventually being on the ranges six afternoons or evenings a week achieving undoubtedly major success – a half-blue, a valuable succession of money prizes at Bisley meetings, and selection for the County of Surrey and the English National teams in 1936 and 1937. Had I not gone to Cambridge, these achievements would never have happened.

Looking for Employment

I took the natural science degree in 1936. I had hopes of finding an appointment that would offer access to more rifle shooting, and had a hope of a post in the Colonial Agricultural Service. Competition was strong and I was not successful.

With my shooting interest, I had given attention to a study of forensic ballistics, identification of firearms from fired cartridges and bullets. I set up a photomicrographic unit using my father's old Zeiss laboratory microscope and a second-hand box camera. The photographs I got were perfectly adequate. At this time the Metropolitan Police were advertising for candidates with higher education for prospective promotion to Hendon Police College. I went for interview and was offered appointment – three years on the beat and with successful completion prospect for a place at Hendon. My conscience disturbed me as my father had borne the expense of putting me through the natural sciences degree at Cambridge. Further investigation as to the career structure of the higher police did not seem promising. So I cried off. But guidance at Cambridge turned my attention to taking a post-graduate course in Crop Husbandry at the School of Agriculture. This indeed offered the end product I wanted. My father, during his Calcutta days had a colleague, Fred Ascoli, who at this time was head of Dunlop Malayan Estates office in London. My father wrote to him and I went for interview. My crop husbandry course at Cambridge intrigued him, and I was offered, and accepted, an appointment as Assistant (understudy to Field Research Officer).

Malaya

In early 1938, Dunlops sent me to Ladang Geddes Estate near Bahau in central Malaya. This was their newest and largest estate (13,000 acres), and had been planted up with many experimental blocks, and many in conjunction with the Rubber Research Institute (RRI) in Kuala Lumpur. I duly arrived in Ladang Geddes where I had first and foremost to learn the trade of rubber planter in order to understand the significance of the experimental plots – not difficult and very interesting, including the acquisition of fluency in Malay and in Tamil. As a half of the Indian labourers at Ladang Geddes were Telugu, I learnt their language as well, and reading and writing both.

I had become a member of the Federated Malay States (FMS) Volunteer Force which ran a platoon at the nearby Bahau Estate Club. Its training was primitive 1918 stuff which to me with Certificate A from Repton Officer Training Corp (OTC) and certificate B from Cambridge University OTC was futile. When I won both FMS and Singapore rifle championships in 1939, I was promoted to Lance Corporal, the meanest rank in the army structure!

The War

When the Japanese invaded Malaya that was the rank with which I entered the war! But the Volunteers were not by any stretch of the imagination an effective military unit. On withdrawal to Singapore, my commanding officer thrust two officer pips into my hands, told me to put them on, collect my gear, and I was sent off on secondment to the newly arrived 287 Field Company, Royal Engineers of the 18th Division. to show these basically agricultural workers from

East Anglia the difference between forest and rubber estate, and Chinese from Malay and Indian, etc. Thus I was commissioned! The end came and incarceration for six months in Changi followed by three years in Thailand, mostly on the notorious Burma-Thailand railway. The end eventually came, and I returned home.

My parents' house at Leatherhead is relatively near to London. At that time London was 'Swinging London', not a particularly polite description with 'swinging' implying giving short change. I was a member of the Royal Overseas League whose premises were off Piccadilly where with sundry goings-on I met up with Joan Bloomer, the girl who was to become my wife. She was a pharmaceutical chemist at St George's Hospital. Dunlops offered me re-engagement and a token bounty of 500 GBP on which we got married.

Return to Malaya

On return to Malaya in 1946, Dunlops sent me to a remote and completely run down estate at Tenang, near Segamat, which, bit by bit, was got back into production. After a year and a half, I learnt on the bush-telegraph that Dunlops had appointed a biologist to take up supervision of the abandoned research work. It seemed to me that I was being by-passed, and I went to Malacca for an interview with Mr Carey, the managing director. He was very understanding of my concern but argued that as I had proved myself as a trained planter I was more value as such to the company than putting together an unproductive research schedule. He offered me promotion as an estate manager.

The area of the estate I was on had become bandit territory. My wife had no near-by friends. She was lonely and in poor health. I resisted Carey's blandishments, and I am sure it was he who did the honourable thing as a member of the board of the Rubber Research Institute in furthering the Institute to offer me an appointment to the Botany Division, which I accepted.

The Emergency

A few days before moving, the police at Tenang had warned me that I should get out within the next two weeks. The main trunk road between Singapore and Kuala Lumpur skirted the garden attached to the bungalow, and passing that way a couple of years later I saw that the bungalow had been burnt down!

The move to Kuala Lumpur in 1948 was indeed an event, but the head of the Botanical Division put me in charge of supervising all their experimental plantings throughout the length and breadth of Malaya. So indeed I was in and out of trouble spots. Wherever I went I had an armoured vehicle and an armed police escort, or to some large but remote estates by a small Beaver aircraft if there was a landing strip there. Such plane flights were fun and interesting hopping low over the forested hilltops. Praise be, but I never ran into trouble, but there was plenty of evidence of its existence to see.

The Government called the situation an 'Emergency', a weasel-word with which semantically it deluded itself, if not the public, that it had no responsibility for bearing the cost of defence measures, security fencing, special constables, etc. The rubber industry was paying a cess on production from which the Government financed the Rubber Research Institute. Saddled with the cost of self-defence, the rubber industry withheld cess, and Government responded by not financing the RRI. In 1953, I was coming to the end of a tour and applied, expecting approval, for a new tour. The Director told me that since the RRI had no income, he could not offer me a renewal. He said I should go on leave and by the end of it he hoped that the matter would be resolved to give me a renewal of contract. This is what happened during the 1930 slump – planters went on leave at the end of a tour, but never to return.

Singapore Botanic Gardens

I had been in touch with Murray Henderson, who has risen by promotion to become the Director of the Singapore Botanic Gardens (SBG), where he himself was soon due to retire, and where the Assistant Director's post and a post in the herbarium were empty. He got on to the Malayan Establishment Office, which contacted me, and in an interview explained that I might be offered the post of Assistant Director with expectation of promotion in due course to the directorship. I accepted the assistant directorship. Thus Murray Henderson's debt to my father who saved his career in Malaysian botany in 1923 was requited 30 years later on me.

On returning to Singapore in 1954 to take up the SBG post, I lodged at the Ocean Park Hotel pending allotment of a government bungalow. There was a rubber industry conference in session at the hotel, and I met with great surprise to both of us my erstwhile RRI director who offered me re-engagement! Too late as I was already committed and, I may add, with great pleasure and satisfaction.

With Henderson's coming retirement, the Colonial Office had ear-marked John Purseglove, an agricultural officer with some years of service in Uganda, for the post of director. With the end of colonial status coming, and of Malayanisation of the service, it was determined that there was no appropriately qualified local person available to take over either post. So we were each nominated for full career service, but with the option to take the abolition offer. Purseglove took his very generous payment, and after a bit of juggling administratively I was confirmed Acting Director, then in 1957 Director in which post I served a further 12 years.

During this time a competent Singaporean, Chew Wee Lek, came forward with a degree in botany, and I was able to get him a grant to go to Cambridge to take a PhD in botany. On his return, I groomed him in the administration of the Gardens in expectation of his eventual promotion to the directorship on my retirement. This fell foul of staff in-fighting and ministerial intrigue. I retired in mid-1969. The Gardens became a sort of Roman circus, saved eventually by becoming a quango body under a competent board of trustees with academically qualified staff.

The Third Generation

Both my children were born in Kuala Lumpur – Peter in 1950 and Linda in 1953. Later they both had spells in residence in Burkill Hall during school holidays. The Overseas Service Aid Scheme under which I qualified was generous in providing two ('lollipop') holiday air passages per year. In the fullness of time both children passed through university, Peter in London and Linda in Sheffield to take degrees in zoology. Peter moved on to take a PhD in marine science in Southampton where he has now become Professor of Ocean Science at the Southampton Oceanography Centre with specialisation in plankton. Linda had an appointment under the British Medical Research Council working on pain blockers. She met up with Ross Upfill, an Australian, to whom she is now married, and with whom they are now running an extensive museum rose garden near Perth, West Australia.

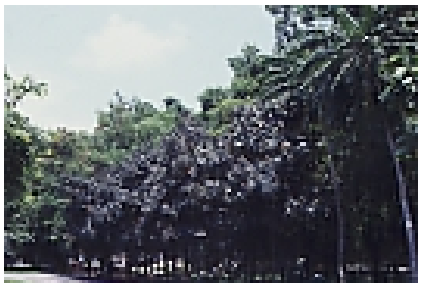
Retirement

At home on 1st January 1970 I was awarded the OBE by the UK Government. Shortly before this, Sir George Taylor, Director, Royal Botanic Gardens, Kew, got me an appointment under the Overseas Service Aid Scheme to prepare a revision of Dalziel's *Useful Plants of West Tropical Africa*. I received salary for eight years by which time the UK Government withdrew further support. By then I had put together such an extensive quantity of notes and records, which I could not reasonably abandon. So I continued to work voluntarily for the next 20 years to bring the project to some semblance of completion. I was given the rank of Honorary Research Fellow and was awarded in 1998 The Kew Medal 'for excellence'. This work has such extensive ramifications, and so many sources of information (and more could be found) that it is the sort of job a team should undertake. My 30 years did but scratch the surface. The work lists some 5,300 species in six volumes. The interpretation of 'usefulness' is of the widest, some sensible and practical, and some absurd or magical, but nevertheless for which the plant is used.

H M Burkill
Leatherhead, Surrey, UK

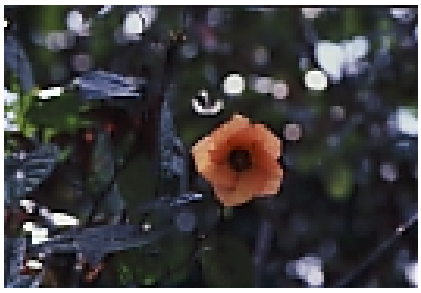
Taliparitiliaceum
– a New Name for the Sea Hibiscus

The Sea Hibiscus, *Hibiscus tiliaceus*, is one of the relatively few pantropical plants, found on shorelines on all the equatorial continents and many of the islands in between. It is a tree growing to about 15 metres tall, with slightly glaucous, broad heart-shaped leaves (similar to the temperate lime or linden trees of the genus *Tilia*, hence the specific name) and yellow flowers usually with a dark maroon centre.



Ian Turner

A row of young trees of the purple form of Sea Hibiscus.



Ian Turner

A flower from a tree of the purple form.

The genus *Hibiscus* is a large one, possibly with more than 300 species, and quite variable. There have been various attempts to subdivide the genus or break off certain groups to form clearer entities. Recently, the American botanist Paul Fryxell has proposed that the Sea Hibscus and related species do not belong in *Hibiscus* and he has described a new genus for them with the name *Taliparitii*. A number of characters in combination including the tree habit, the fruit type and the tendency to have large stipules define the species as distinct from the other *Hibiscus* species. Fryxell's genus has been accepted in the *Families and Genera of Vascular Plants* series, indicating that there is support for this rearrangement and the accompanying name changes for twenty species.

Sea Hibiscus therefore becomes *Taliparitii tiliaceum*. The name *Taliparitii* is derived

Ian Turner

Leaves of the different forms of Sea Hibiscus. Bottom left: the wild type; top right: the purple form; centre and bottom right: the young and mature leaves of the tricoloured form; top centre: the variegated, wavy-leaved form.

from a name used for the Sea Hibiscus in the important botanical work *Hortus Malabaricus*, a description of the plants of India's Malabar Coast. Authored by the Dutchman Hendrik Adriaan van Rheede tot Drakenstein, the twelve volumes of *Hortus Malabaricus*, appeared over the period 1678-1693. Taliparitii is probably derived from a Malayalam name 'Thali Pariti', literally meaning 'slimy hibiscus'. The bark of Sea Hibiscus is mucilaginous, hence the allusion to sliminess.

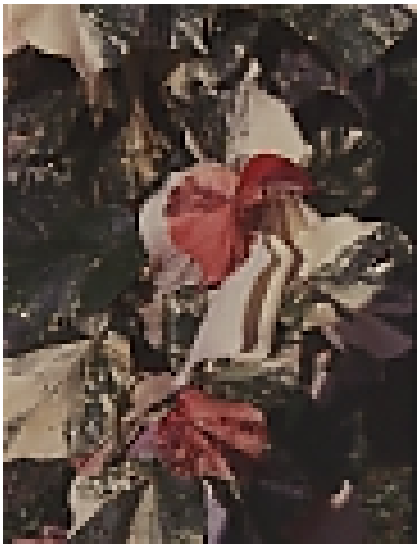
As is quite common with widespread species, a number of different forms of the plant have been selected for their unusual appearance and grown in gardens and parks for interest or ornament. The Gardens currently has three ornamental varieties in the living collection besides the typical local wild form growing on the edge of the Eco-Lake.

There is a purple-bronze form that is otherwise very similar to the wild tree. The leaves are a dark purple and the flowers an orangey-brown rather than yellow. Presumably this is a form with excessive red pigment in the tissues. Fryxell refers to *Hibiscus tiliaceus* var. *purpurascens* as a form with purple foliage otherwise identical to the wild form and this may be what we are growing in the Gardens. Our plants originate from a collection made in New Caledonia.

Then there is a plant with beautifully variegated foliage that has bright crimson young leaves making a beautiful three-coloured display of red, white and green. It is referred to in horticultural circles as Tricolor or Variegata, but these seem to be trade names, not valid cultivar names. The plant seems to be a neotenic (perpetual juvenile) form, perhaps an aberrant stem sprout maintained by vegetative propagation. It maintains a shrubby form and rarely flowers. It provides a colourful and quite hardy screen and can be grown as a hedge (though not suitable for clipping to a very regular shape).

Ian Turner

A plant of the tricoloured Sea Hibiscus growing by the Eco-Lake.



Ian Turner

Close-up of the strikingly marked foliage of the tricoloured Sea Hibiscus.

The third form in our collection is another variegation, though less marked (pale green not white) and less marbled than the tricoloured form. In this one, the leaves are more elongated than normal and the margins tend to be wavy. It is shown in Whistler's *Tropical Ornamentals*, but no formal name is given.

Ian Turner
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Snapping Away for the Web - The Type Project in the Singapore Herbarium

What are type specimens? And why are they important? In a nutshell, a type specimen is THE ONE herbarium specimen that an author cites as a 'type specimen' in his publication when describing a new plant species for the first time. This fixes the scientific name to a particular plant specimen. For any future queries about the identity of the species, the original plant specimen can be re-examined. Type specimens are therefore of paramount importance in the correct naming of plants. Also, when botanists are revising a particular group of plants, they need to examine all the types in that group to be certain that the scientific names are correctly applied.

The Singapore Herbarium houses about **650,000** herbarium specimens from Singapore and the region. As the Singapore Herbarium is a large and historic one (founded in 1875) and, because many leading botanists (like H.N. Ridley) were involved in collecting and describing plant species (Ridley is said to have described over a thousand new species!), the herbarium collection includes many types. Our type collection is estimated at about **4,500** specimens. These are filed in special red covers to prevent bits from falling off the specimen and stored separately from the general collection.

Hassan Ibrahim

A type specimen kept in its type cover. Note the cover is folded over at the top and bottom to prevent pieces falling off the specimen and getting lost.

Several sorts of type specimens are recognised. The type specimen selected by the author in his publication and deposited in a designated herbarium is known as the **Holotype**. Duplicates of the holotype are known as **Isotypes** (as it is possible to cut several twigs off the same tree, for example). A type that is selected by a botanist who was not the original author is known as a **Lectotype**. This comes about as in former times (prior to 1930), it was not necessary to designate a holotype when describing a new species, so instead authors would provide a list of specimens (these are now called **Syntypes).** It is from among the syntypes that the lectotype is chosen. In the same way, duplicates of the lectotype are called **Isolectotypes**.

The Type Project

For some time, there had been grave concern about our type collection. For one thing, it was not databased so we did not know exactly what we had in our collection. For another, we were in a dilemma when botanists requested a loan of type specimens. On the one hand, we understood their need to examine the specimen, on the other hand we could not afford the specimen getting lost or damaged in the post. A final concern was that we had no pictorial documentation of the type collection. If a specimen was lost or damaged – and there are the hair-raising examples of the herbaria in Berlin, Manila, Port Moresby and Sandakan having gone up in flames – we would have no record of what our type specimens looked like. Something had to be done, but it would be a major task beyond the capacity of our staff to take it on in addition to their other duties.

We therefore applied to the Asean Regional Centre for Biodiversity and Conservation (**ARCBC**) for a grant to provide equipment and personnel to take images of each type specimen and put them on the web. This would have the added advantage that at the touch of a button, botanists and even members of the public throughout the world could view and examine the details of the type specimen they were interested in.

It sounds simple. You enter the relevant data from the specimen label into the database, take a digital image, and ….. Bob's your uncle! Unfortunately that's far from the truth. Over the years, a wide variety of specimens had been put into the type collection. A check of the original published description showed that many were not types, and if it were a type, was it a holotype, isotype, syntype or lectotype? Hence, it was imperative that the information placed on the web was as accurate as possible so we would not confuse and mislead users. What was needed was a verification exercise – and that was the time consuming part!

Verification – and what that entails!

To verify the type status, first the specimen is physically retrieved. Then the original publication is sourced. Fortunately, we have an excellent library with a wide range of old and historic books and journals. From the publication, the specimen(s) listed by the original author can be identified. If our specimen does not tally with the literature source, then off it goes back into the general collection. If it does, then, wherever possible we would check with the latest revision or monograph that includes that species. Once its status is verified - i.e. it really is a type and we know what sort of type it is - the literature source is recorded on the front of the red type cover. Is that the end of the story? No! Plant names change! So, if the type specimen is currently known by a different scientific name, this will be updated on the front of the cover.

Hassan Ibrahim

A verified type specimen in its red type cover with its literature citation, updated with its current accepted name, and barcoded.

We are very fortunate that friends and colleagues in the botanical network around the world are unfailing in their help with providing obscure literature and giving us advice on the type status of species in their speciality groups.

Barcoding and Data-capture

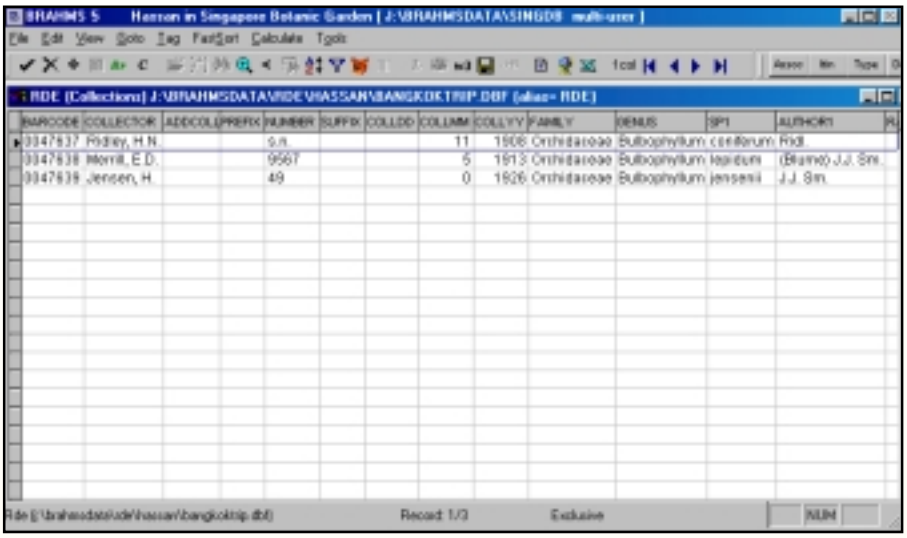
Only when the verification is done can databasing and barcoding begin with our specially modified **BRAHMS**[1] rapid data entry (RDE) system with special fields for the type status, the original publication and the current name. The barcodes are the vital link to the image database, where all images of the types are stored.

Once the mini photo studio was set up, taking an image was quick and easy. Loose parts of the specimen (e.g. fruits and flowers) kept in small pockets mounted on the specimen sheet are also opened up for image capture too. The ensuing images are named according to the barcodes on the specimens. Image storage in a computer is made instantaneous as the digital camera is auto-linked to the computer.

Hassan Ibrahim

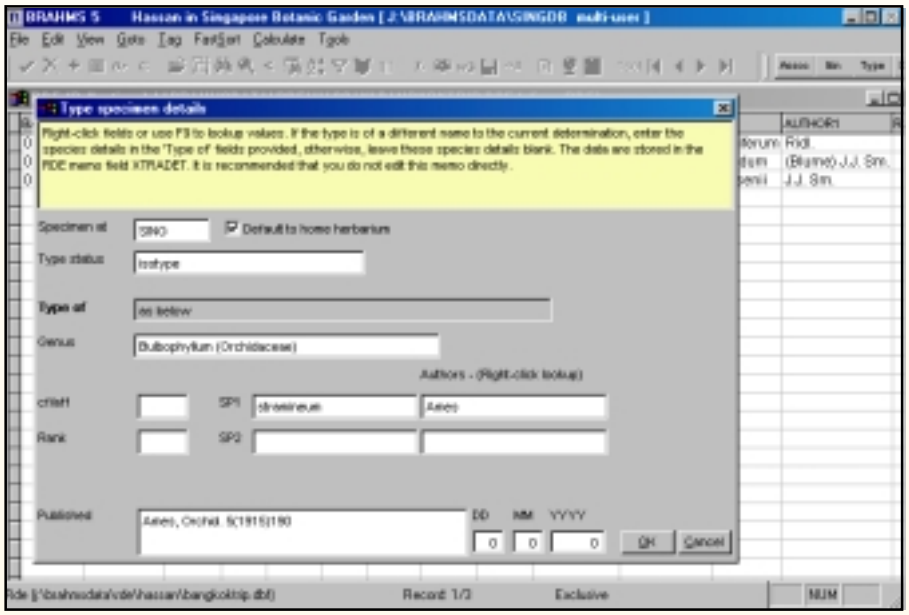
An image of the type specimen with fruit and floral parts. Note the ruler to show the scale.

Each image (JPEG image) is captured at a very high resolution, resulting to a large file size of about 4 MB per image. However, all the images are later downsized to about 250 KB and placed in a separate image database to allow for a quick download or retrieval on the internet. Duplicates of the images are kept at their original high resolution and stored in compact discs (CDs).



Hassan Ibrahim

An example of a RDE entry screen in the BRAHMS database showing the essential information captured (species name, collector's name, date collected, locality, field notes, etc.)



Hassan Ibrahim

A modified format of the RDE files for capturing type specimen information.

Hassan Ibrahim

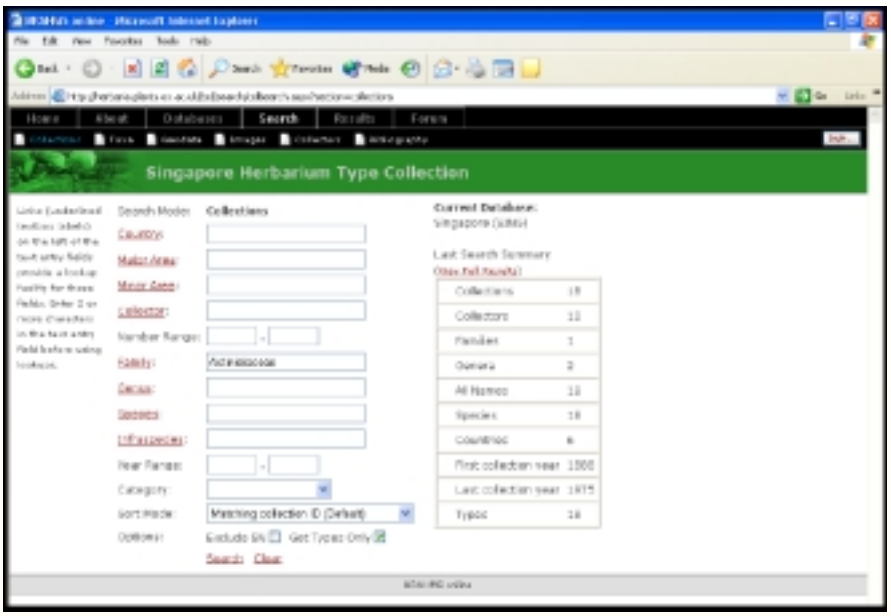
Hassan preparing the specimen for image capture using the Nikon D100 SLR digital camera.

Linkage of Data – Getting Ready for the Web

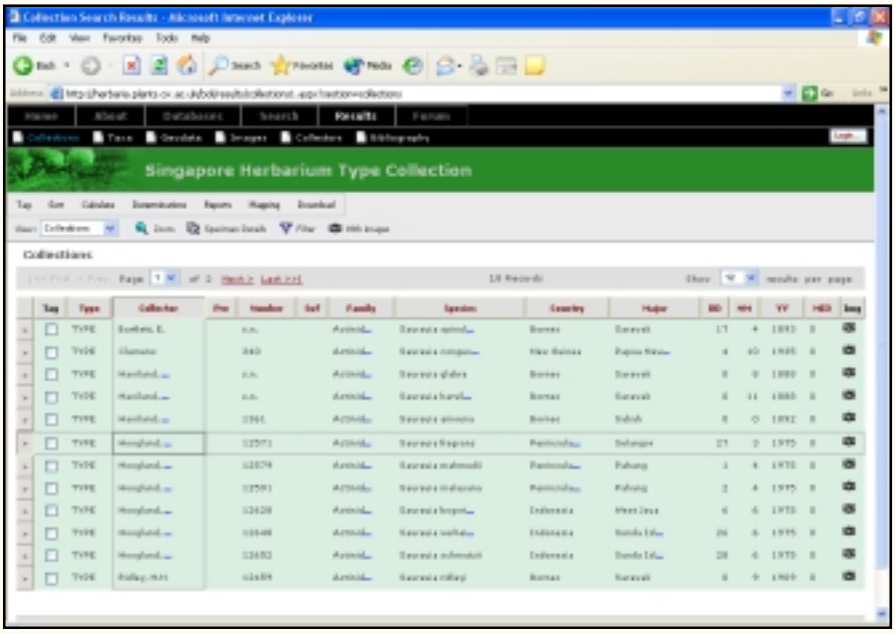
The final phase is to link the image to the database and put it on the web. Here we needed the advice and collaboration of the BRAHMS whiz at the University of Oxford, Denis Filer, who has now set up the system. The data can be viewed at NParks and SBG websites.

So, the type project involves four stages, namely:

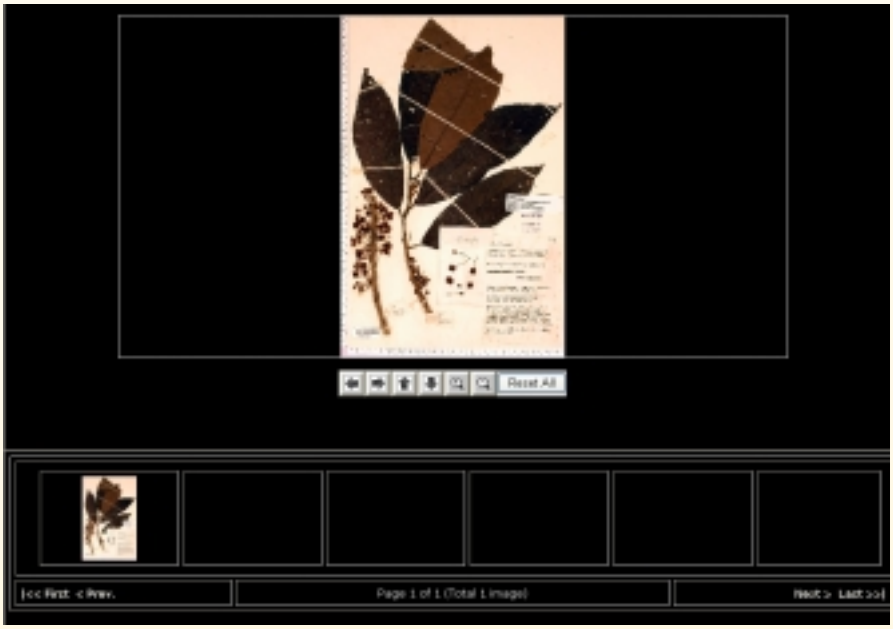
- Verification of the type status and citation of the relevant publication
- Barcoding and data-capture into BRAHMS database
- Image-capture
- Linkage of data to corresponding image for the website



Hassan Ibrahim



Hassan Ibrahim



Hassan Ibrahim

A draft version of the data and image to be found in the website

And…are we done?

Well, we haven't quite finished – we have verified and captured the images of 4000 types with another estimated 500 to go. Although many specimens in our type collection proved not to be types, this was counterbalanced by the considerable number of previously unrecognized types found in the general collection - many of which were pointed out by helpful visiting botanists. We hope to complete the whole project by October 2004 and have the entire type collection up on the web. Subsequently, we will continue to update as new publications appear listing the types or as genera and families in the general collection are curated.

An unforeseen spin-off has been our ability to provide a high quality image of any requested specimen almost instantaneously (usually within 4 hours of receiving an email request) as an email attachment. Such good quality images also enable the recipient to zoom and pan the images. This service has proved to be very popular with botanists overseas providing an almost instant gratification for the requestor. This also saves our staff time in packing and posting specimens as loans – not to mention the potential damage or loss by post. In fact, in many cases, the image of the specimen is sufficient for research purposes and so the types do not need to be sent as loans.

We have achieved our aim of making the types widely available and accessible. Of utmost importance, we now also have a permanent record of the types in a database and as images. And guess what, the Singapore Herbarium is the first in Asia to provide images of types for internet access.

Hassan Ibrahim & Ruth Kiew
Herbarium

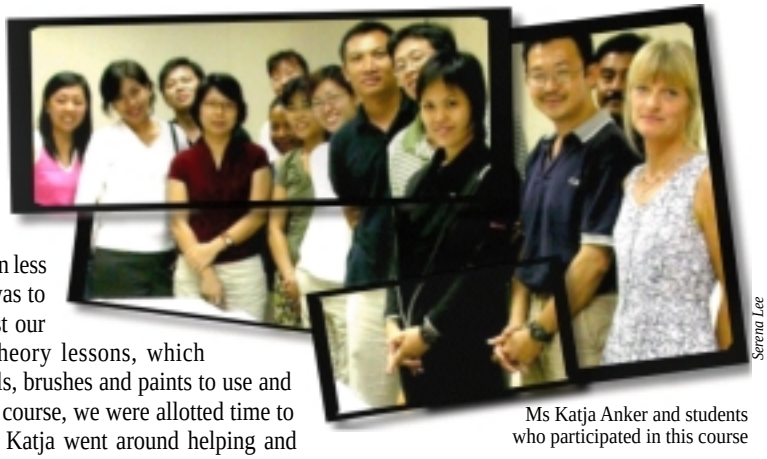
Acknowledgement: The Singapore Herbarium is deeply grateful to the ARCBC for the grant that enabled this project to be carried out.

[1] For more about **BRAHMS** (Botanical Research and Herbarium Management System) see *Gardenwise* **16**: 15-17.

AROUND THE GARDENS

Botanical Watercolour Painting Course

A Botanical Watercolour Painting Course conducted by Katja Anker was held between the 17th and 20th Feb 2004 in the Gardens.



Serena Lee

Ms Katja Anker and students who participated in this course

The course started off with a fast sketching exercise, in which a series of plant items were passed around. For each round we were given less and less time to draw. The motive was to loosen our wrists as well as to boost our confidence. Katja then gave us theory lessons, which included what kinds of paper, pencils, brushes and paints to use and what was available. For most of the course, we were allotted time to do our drawing and painting while Katja went around helping and correcting us on our techniques. These were techniques that she had acquired over 12 years working as an illustrator and private teacher.

In botanical illustration, it is essential that plants be accurately depicted. Size and proportion is of the utmost importance. The most challenging aspect in this whole course I felt was not to use white paint! All the white bits on the paintings had to come from the white paper showing up beneath the paint. In watercolour painting, colour is painted layer upon layer, starting from the lightest parts of the plants first.

On the left, is a medley of watercolor painting made by students during the course. Her advice to all budding botanical artists is to practise hard. Katja lives in Denmark with her husband and three lovely daughters. If you ever require a course, she can be contacted at Katjaa@bot.ku.dk.

Serena Lee
Herbarium

NEW AND EXCITING

Scented Daphne, *Phaleria clerodendron*

Phaleria clerodendron (Thymelaeaceae) is a lowland, rainforest treelet from northern Queensland, Australia. *Phaleria* is a genus with more than 40 species.

Andrea Kee

The white fragrant flowers

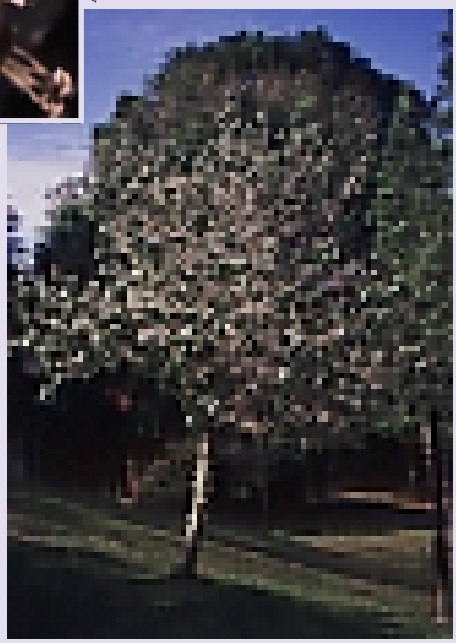
Scented Daphne has attractive dark green foliage and is a small tree eventually reaching 5–6 m tall. The tree is spectacular when heavy flowering fills the air with a sweet aroma. The flowers are borne in clusters with 5 to 7 flowers each. The 3 cm-long, tubular, fragrant flowers are white and sweetly perfumed. Clusters are sometimes produced in dense masses on the branches and trunk. Fruits are glossy red berries about 2.5 cm long but are only sparsely produced by our plants. Though relished by birds, the fruit is reputed to be poisonous to humans. Plants can be raised from seeds, although in our experience they take several months to germinate.

Andrea Kee

Glossy ripe fruits

This small tree adapts well to both sunny or semi-shaded conditions. In the Gardens, our three specimens produce some flowers almost every month with less frequent heavy blooming. Scented Daphne makes a lovely, small ornamental tree that will grace any garden.

Our plants were purchased from a specialist nursery in Cairns, Australia, in Feb 1995. The mature plants can be viewed on the lawn adjacent to the gate along Cluny Park Road (opposite the Jalan Kembang Melati junction).



Andrea Kee

A mature plant

Andrea Kee
Plant Resource Centre

FROM THE ORCHID SPECIES COLLECTION

Bulbophyllum annandalei

J J Vermeulen

Bulbophyllum annandalei was described by Ridley in 1924 from a herbarium specimen collected by the zoologists T.N. Annandale and H.C. Robinson in Peninsular Thailand. Apparently the species is rare. It was not found again until commercial collectors discovered a population in northern Malaysia more recently. As so often happens with orchids, this population is now severely depleted or even extinct because of over-collecting. Plants from the latter population are highly valued, because of the large size and the rich coloration of the flowers.

Meanwhile, another population has been found in southern Thailand. From a horticultural point of view, however, these plants are inferior to the Malaysian ones with smaller flowers of a pale orange yellow.

A photograph of the Malaysian form of the species will appear in the Gardens Calendar 2005, together with photographs of a selection of other South East Asian orchid species. Watch out for this calendar.

J J Vermeulen & Paul Leong
Herbarium

EDUCATION OUTREACH

School Holiday Workshops and Walk-in Tours

Lim Swee Cheng

Children learning about a *Bauhinia* flower in the "Flowers @ Work" workshop.

Danny Wong

Yeo Kar Hoon teaching a little one how to take care of an Indian Borage plant in the "Herbs & Spices" workshop.

Janice Yau

Children examining a sponge specimen under the microscope in the "Micro Detective" workshop.

Winnie Wong

Hassan Ibrahim showing a Bottle Palm to children and parents in the "Palm Walk".

Seri Hayuni Hadi

Margaret Ang explaining the features of the Peacock flower in the "Flower Trail".

The school holidays, 29 May to 27 June 2004, are here again! Three special **school holiday workshops**, "Flowers @ Work", "The Micro Detective," and "Herbs & Spices", were offered to children from kindergarten to upper primary levels.

Children on the "Flowers @ Work" workshop toured the EcoGarden, studying flower structures and functions. This was followed by arts & craft (using flowers) and planting of container gardens using several types of flowering plants (*Wedelia*, *Aster* and *Portulaca*).

In "The Micro Detective" workshop, children had a sneak preview of the Evolution Garden (due to open at the end of 2004), where they collected small specimens. Indoors, they learnt how to use the compound and stereozoom microscopes, made observations and drawings of the 'micro' things they could see. The workshop ended with the children making a terrarium (an "enclosed" self-sustaining garden with plants and ornaments in a bottle).

The "Herbs & Spices" workshop had the children touring the Kitchen Garden at the EcoGarden. The children then made herb container gardens to take home.

Towards the last two weeks of the school holidays two **walk-in tours,** Palm Walk and Flower Trail, (where participants can just walk up to the Visitor Service info desk 15 minutes before tour commencement and sign up on the spot) were offered to children and their accompanying parents. Overheard from a Cantonese-speaking grandparent who initially hesitated to join the tour, "If I had not come on this tour, I wouldn't have known this is called the Triangle Palm!" He was referring to the *Dypsis decaryi*. Generally, participants had an enjoyable hour in the Gardens on each of the morning the tours were offered and participating children obtained tips and information to supplement their assignments for school.

Interested children and parents can look forward to the "Palm Walk" and "Flower Trail" which will be offered again during the September 2004 school break. Also look out for our School Holiday Workshops with brand new themes during the November/December 2004 holidays!

Janice Yau
Winnie Wong
Seri Hayuni Hadi
Education

TAXONOMY CORNER

Why plants change their names

Nothing is more annoying than when a scientific name of a well-known plant changes its name. We all know the sea hibiscus, but do we know its new name, *Talipariti tiliaceum*?

Why does this happen? There are various reasons for name changes and one is that as botanists learn more about plants they find that plants in one group actually belong to two or more groups. That is what has happened in the case of the sea hibiscus (see page 20).

Another example is the casuarinas so easily recognised by their string-like green twigs. In 1980, a detailed study of this group showed that actually they belong to several different groups. One group has twigs that are round in cross section and have 5-18 scales leaves (seen as teeth) around each joint. This group retains the name *Casuarina* because the common ru, *Casuarina equisetifolia* is the type species for the genus. The mountain ru, *C. junghuhniana*, also belongs in *Casuarina*. The rest of the ornamental casuarinas all have twigs that are square in cross section and have only 4 teeth at each joint. These are put in to a separate genus called *Gymnostoma*. This group includes the Bornean ru *Gymnostoma nobile*, the weeping ru *G. rumphianum*, and the Sumatran ru *G. sumatranum*.

Serena Lee

Casuarina (above) with rounded, ridged twigs and many leaves (teeth) and *Gymnostoma* (below) with squared twigs and few leaves (teeth).

We can still use casuarina as the common name for species of both *Casuarina* and *Gymnostoma*, just as we continue to use chrysanthemum (*Dendranthema*), coleus (*Plectranthus*), croton (*Codiaeum*), geranium (*Pelargonium*), and gloxinia (*Sinningia*) long after their scientific names have changed.

Ruth Kiew
Herbarium

STAFF NEWS

New Staff

Yap Siow Hong

On 31st July 2004, Hassan Ibrahim (left) changed hats and ceased working full-time on the Singapore Herbarium's type project sponsored by ARCBC (see page 21), and started in the new post of developing the new Public Reference Centre. Hassan holds a masters degree in horticultural sciences from the Technical University of Munich, Germany. His contract post is made possible by a donation to the Centre.

Mark Han (right), joined the Garden in June 2004 as Manager, Marketing & Commercial Activities. He previously worked in NTUC Link (National Trade Union Congress Link). NTUC Link owns and administers an NTUC Link loyalty card program and provides consumers insights to NTUC and participating organisations. Mark graduated with a degree in Commerce from Curtin University of Technology.

Jennifer Lee joined the Visitor Services team as a Visitor Services Executive in November 2003. She has a degree in Marketing from Royal Melbourne Institute of Technology and previous work experience from the Singapore Science Centre.

Service Excellence

Jimmy Liew, Visitor Services Coordinator, made Singapore Botanic Gardens proud when he received the prestigious **Shining Star Service Award**. A national level award to honour the best in the public service, Jimmy was one of 69 public officers recognized for providing consistent superior quality service. Having a series of written compliments and laudatory comments to his name, Jimmy Liew is indeed a shining star in the service industry. We are proud to have Jimmy's efforts recognized and rewarded.

KEY VISITORS TO THE GARDENS *(Jan- Jun 2004)*

NAME	FROM
Dr Achara Thammathaworn	Department of Biology, Khon Kaen University, Thailand
Mr Ahmet Yazici	Dept of Land Development And Real Estate/ Expropriation Division for the Greater City Municipality of Ankara, Turkey
HE Aleksander Kwasniewski	President of the Republic of Poland
Mr Allen Walters	Honorary Consul to Belize
Mr Alvin Tee	University Putra Malaysia, Malaysia
Mr Amitabh Bachchan	Film Star, India
Ms Angie Liow	University Putra Malaysia, Malaysia
HE Antanas Valionis	Minister of Foreign Affairs, Republic of Lithuania
Dr. Axel Poulsen	National Herbarium of The Netherlands
Mr Bae Yong Joon	Actor, Korea
Mr Claude Allen	Deputy Secretary, Health and Human Services Department, USA
Dr David McLaughin	University of Minnesota, USA
Dr de Wilde, WJJO	National Herbarium of The Netherlands
Dr Duyfjes, B	National Herbarium of The Netherlands
Hon Eamon Courtenay	Attorney General and Minister of Foreign Trade, Belize
Dr Ed de Vogel	National Herbarium of The Netherlands
Mr Esaka Testuma	Member of the House of Representatives, the former Vice-Minister of Foreign Affairs, Japan
HE Fahmi bin Ali AL Jodaer	Minister of Works and Housing, Kingdom of Bahrain
HE Faisal El-Fayez	Prime Minister, Hashemite Kingdom of Jordan
Mrs Gloria Penayo de Duarte	First Lady of the Republic of Paraguay
Mr Han Teiru	World Health Representative for Singapore, Brunei and Malaysia
Mr Haun Ezer	Dept of Land Development and Real Estate/ Expropriation Division for the Greater City Municipality of Ankara, Turkey
Mr He Rucheng	Foreign Economic Corporation Bureau, Guangzhou, PRC
Mr Hu Shuguang	Vice Mayor, Wuhan Municipal People's Government, PRC
Mr Huang Litian	Ningbo Hi-Tech Park, General Office from China Embassy, Singapore
Ms Huang Yun Ju	University Putra Malaysia, Malaysia
Mr Ir. Osman S Ichwan	Association of Architects and Landscape Profession, Indonesia
Mr Ishida Katsuyuki	Member of the House of Representatives, Japan
Ms Jayne Salmon	Geelong Botanic Gardens, Melbourne, Australia
Mr John Arnott	Geelong Botanic Gardens, Melbourne, Australia
Mr John Holtum	Nephew of late Mr R.E. Holtum, former director of the Gardens, UK
Ms Julia Sang	Forest Research Centre, Sarawak, Malaysia
Dr Kessler, P	National Herbarium of The Netherlands
Mr Ke Zhujun	Guangzhou Nansha Development Zone, Guangzhou, PRC

NAME	FROM
Dr La-orsri Sanoamuang	Department of Biology, Khon Kaen University, Thailand
Dr Lee Jong-Wook	Director-General of World Health Organisation
Mr Li Yaosong	Jingang Town Industrial Park for Private Economy Zhangjiang City, PRC
Mr Li Zhennan	Planning and Construction Bureau, Suzhou, PRC
Mrs Lucia de Bergen	Spouse of HE Ernst Bergen, Minister of Industry and Commerce, Republic Of Paraguay
Mr Masaru Kawaguchi	Vice President of Osaka City, Japan
HE Major-General (Retd) Michael Jeffery	Governor-General of the Commonwealth of Australia
Mr Mitsutoshi Kajikawa	Second Secretary, Embassy of Japan in Singapore
Dr M Sanjappa	Botanical Survey of India, India
Dr Nanovfszky Gyorgy	Ambassador of Hungary in Singapore
HE Nigel Moore	The High Commissioner of New Zealand in Singapore
Dr Peter Boyce	Malesiana Tropicals, Malaysia
Dr Piyada Teerakulpisut	Department of Biology, Khon Kaen University, Thailand
Dr Pranom Chantaranothai	Department of Biology, Khon Kaen University, Thailand
Mdm Puan Noor Aishah	Spouse of First President of Singapore
Mr Raymond Hollis	Speaker of Queensland Parliament, Australia
HE Ricardo Lagos	President of the Republic of Chile
Dr Rusea Go	University Putra Malaysia, Malaysia
HE Hon Said W Musa	Prime Minister and Minister for National Development, Belize
Mr Santi Watthana	Copenhagen University, Denmark
Mr Shigeki Kimura	Office of the Vice Minister for International Affairs, Ministry of Finance, Japan
Mr Soh Wuu Kuang	Forest Research Institute Malaysia, Malaysia
HE Stuart Leslie	Ambassador Extraordinary and Plenipotentiary Permanent Representative of Belize to the United Nations
Dr Sydney Brenner	Chairman of Biomedical Research Council, Agency for Science, Technology and Research , Singapore
Ms Szili Katalin	Speaker of Hungarian Parliament
Ms Wanatabe Kozo	Member of the House Of Representatives, the former Minister of Welfare, Minister of Home Affairs, Minister of International Trade and Industry, Japan
Datuk Wira Poh Ah Tiam	Chairman of States Committee on Housing, Local Government, Environment and Transportation, Malacca, Malaysia
Mr Xu Jianbo	Chairman of Zhangjiagang Jinfeng Township Agriculture, Industry and Trade Company Suzhou, PRC
Mr Yahud Hj Wat	Forest Research Centre, Sarawak, Malaysia
Mr Zembei Mizoguchi	Vice Minister for International Affairs, Ministry of Finance, Japan

An orchid was named for Major-General (Retd) Michael Jeffery, Governor-General of the Commonwealth of Australia when he visited the National Orchid Garden on the 10th of March with his wife. On his right is Mr Mah Bow Tan, Minister of National Development, Singapore.

HE Ricardo Lagos, President of the Republic of Chile visited the VIP Garden, National Orchid Garden on the 1st of May. On his left is Dr Tan Wee Kiat, CEO, National Parks Board.

A new *Dendrobium* hybrid was named for HE Faisal El-Fayez, Prime Minister of the Hashemite Kingdom of Jordan, during his visit to the National Orchid Garden on the 19th of June. On his left is Dr Tan Wee Kiat.

Photos by: NParks

Paintings as Types

Our historic collection of drawings and watercolour paintings are valued not only for their beauty but also for their scientific value because the majority are portraits of wild plants. Some indeed are of unique scientific importance because they are types, i.e. the drawing or painting is the ultimate reference for a particular species' scientific name. This is very unusual as most types are herbarium specimens (see page 21).

These four species of gingers are examples where their type is an illustration. They were all described by H. N. Ridley, the first Director of the Gardens, as new species based on plants collected from the wild and grown in the Botanic Gardens, where when they flowered a drawing was made. For some reason, no herbarium specimen was made and so the drawing or painting becomes the type.

Ruth Kiew
Herbarium

Hassan Ibrahim

Globba insectifera Ridl. was accidentally introduced into the Gardens together with a slipper orchid from Shan State in China. It was painted by Charles de Alwis in 1905. Type: Illustration 00783.

Hassan Ibrahim

Gastrochilus luridus Ridl. was originally collected from Pulau Langkawi, Malaysia, and drawn and painted by Mahomad Hussain in 1902. This species is now known as *Boesenbergia plicata* (Ridl.) Holttum var. *lurida* (Ridl.) Holttum. Type: Illustration 00761

Hassan Ibrahim

The drawing of ***Gastrochilus ochroleucus*** Ridl. represents a Thai species collected from the Kasum area in November 1896. Its current name is *Boesenbergia ochroleuca* (Ridl.) Schltr. Type: Illustration 00764.

Hassan Ibrahim

Of ***Zingiber kunstleri*** King *ex* Ridl., Ridley wrote in 1899: "I have never seen this plant and take the description from a drawing and notes by Kunstler." The drawing is by D.N. Choudhury. Type: Illustration 00828.

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