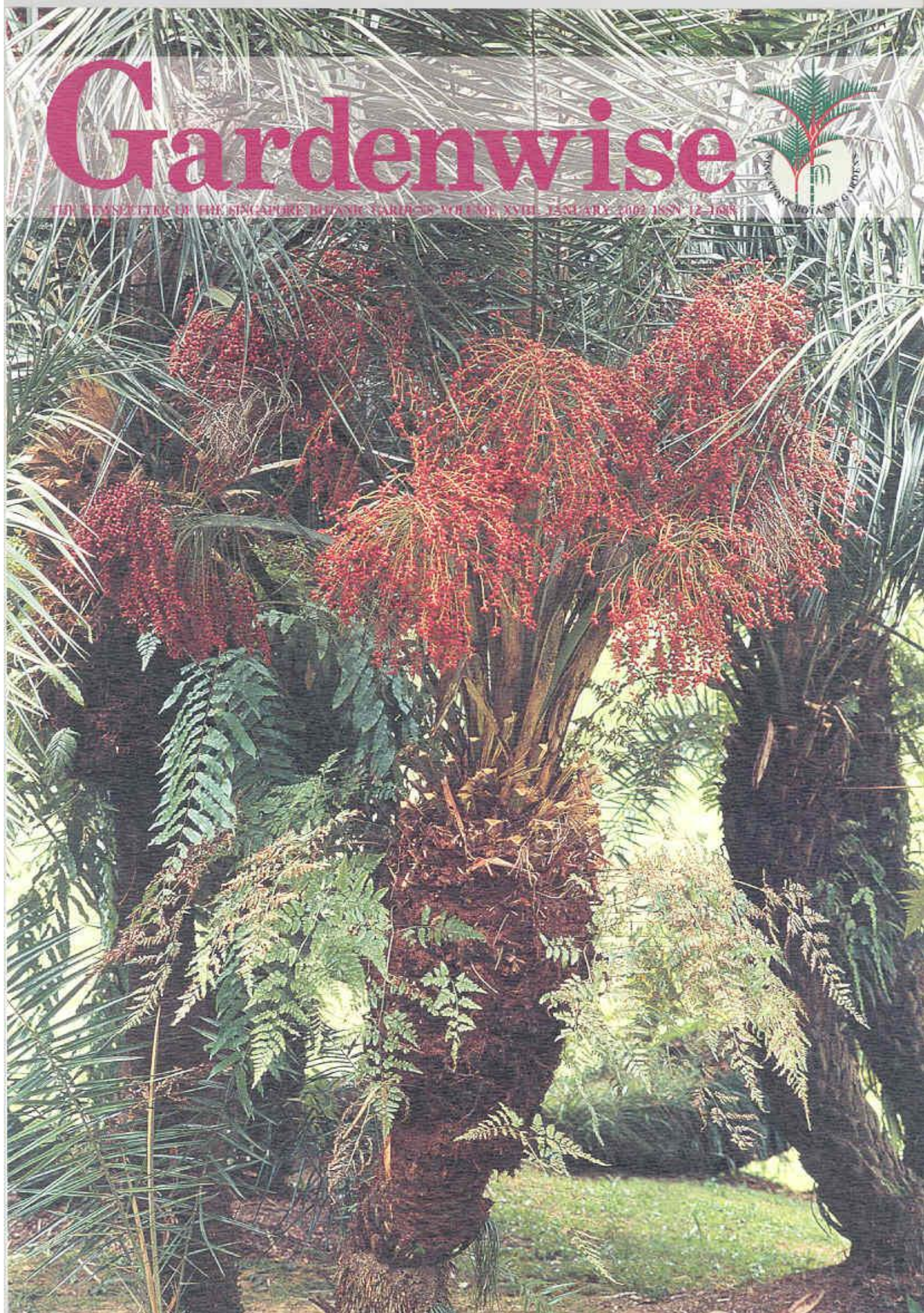


Gardenwise

THE NEWSLETTER OF THE SINGAPORE BOTANICAL GARDENS VOLUME XVIII JANUARY 2002 ISSN 12 1688



Message **DIRECTOR**

Since the last issue, events have come about that are affecting and will continue to affect us profoundly. On the world stage, the September 11th tragedy and its continuing aftermath, triggered a downturn in air travel and worsened an already slowing world economy. The events dealt another blow to the Singapore economy, already in recession.

An immediate impact upon us is declining tourist numbers. In response to the economic situation, Government's grant to us in the new financial year is expected to be reduced. Compounding this, is the need to assist our concessionaires during this poor and uncertain economic climate, with substantial rental rebates.

However, we need to look beyond this cyclical downturn, review our roles and goals and make the necessary changes in order to ensure better long term financial security and to meet changing expectations. Areas identified for change include the need by staff at all levels to develop a more entrepreneurial and service-oriented attitude, and urgency to acquire business expertise. In line with these targets, the challenge to continually improve our cost recovery ratio, will become part of our mission.

Other areas of focus are expanding botanical research, improving horticultural expertise, increasing our educational outreach offerings and activities and contributing towards upgrading the horticultural and landscaping industry in Singapore. The Gardens will also explore ways to better market its brand and manage its public relations.

Our School of Horticulture marked a milestone when the full-time Diploma in Horticulture & Landscape Management, offered jointly with Ngee Ann Polytechnic, graduated its first batch of 38 students in July 2001. The two part-time diplomas (Diploma in Horticulture and Diploma in Landscape Design) offered by the School, now superseded by the joint programme with Ngee Ann, will see their last batches graduate in 2002.

Looking beyond, the School will continue to fulfill its mission to upgrade the standards of the landscaping & horticultural industry by spearheading the setting and development of skills standards under the Singapore Productivity and Standards Board's National Skills Recognition System. This is a national framework for establishing work performance standards, identifying job competencies, providing training and certifying skills. The Industry Skills Standards Committee set up in July 2001 to further this, is chaired by the CEO of the National Parks Board and comprises members from both the public and private sectors.

To date, a detailed Functional Map for the industry has been completed and seven "Units of Competence" have been short-listed to be developed for training, evaluation and certification of individuals working or intending to work in the horticulture and landscape industry. The School will be designated as the training centre for this programme. When successfully implemented, it effectively means that any person who works with plants and landscapes in Singapore must have prior certification.

In January 2002, a new chapter for the Tanglin Core at the southern end of the Gardens will begin with the ground breaking for its re-development. This will be carried out in stages, but by June all facilities and offices here, including the herbarium and library, will be uprooted to our temporary, rented premises located at the Singapore Management University campus (formerly the National Institute of Education), adjoining the northern end of the Gardens, where we will remain fully functional.

We will view the move to a new address not only as a physical re-location, but as a move that symbolises a new beginning for the Gardens. The period here will be a time for change. We will realign our focus to face new economic realities as well as fulfill the goals of a new generation botanic garden with emphasis on entrepreneurship, increased scientific content, greater outreach and positive service orientation. New skills need to be grown or acquired, but more importantly, each and everyone of us will need to make adjustments in how we perceive ourselves and perform our roles.

As stewards of a place very special in the hearts and minds of our visitors we need to provide opportunities for them to intensify their experiences without destroying the magic of the place. The Gardens is a learning environment. Beyond the place, we need to superimpose, gently and unobtrusively, services and amenities, and educational outreach, from passive interpretation of the living collection to active engagement through programmes and activities, so that our clients can enjoy magical moments at a comfort level of their choice.

All staff must rise to these challenges, overcome the short term uncertainties and re-focus for the even more exciting times ahead. 🌿

Chin See Chung
Director

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Front Cover Photo by
SBG



Phoenix paludosa, the Mangrove Date Palm in full fruiting glory at the Palm Valley, Dec 2001



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The ornate fan-palm
Licuala glabra

An insight into the Evolution of a Palm

Over the last three years I had the privilege of "observing" one of nature's exciting phenomena — evolution occurring in a palm species found in the forests of Peninsular Malaysia. Using a wide range of tools, both new and old to science, I was able to study the many changes that were taking place among populations of the species. The project involved a varied diet of working in the herbarium, going on invigorating field trips and donning the lab-coat as well.

A brief description

The palm *Licuala glabra* Griff. is so-named (*glabra* meaning smooth in Latin) because its inflorescence and flowers lack the dense covering of fine hairs that other *Licuala* species have on the same parts. It is a beautiful understorey fan palm, diminutive in size and elegantly crowned with fan-shaped fronds. It flowers regularly and has small flowers set on the secondary branches of a long pendulous

inflorescence that protrudes from the crown. The fruits, which are ovoid and about 2 cm long, mature from a green to a deep orange colour. The fruits are believed to be dispersed by forest understorey birds.

of the mountain ranges of Peninsular Malaysia. A typical habitat is the ridgeline of familiar places like Fraser's Hill or Genting Highlands. The palm occurs in such numbers that it often dominates the understorey of the forest.

Herbarium specimens

One good source of information about the species came from herbaria in Malaysia, Singapore and Kew Gardens. These are repositories of preserved specimens of the species collected from as far back as the early 1900s. A good herbarium specimen



A typical habitat of *Licuala glabra* in Fraser's Hill, Pahang, Peninsular Malaysia.

Habitat and Populations

This beautiful fan palm is often found in large populations on the ridge tops of hill or montane forests.

consists of diagnostic vegetative and reproductive characters and its label provides important information on habitat, geology, type of forest and locality (accurate geographical co-ordinates can be acquired using hand-held Global Positioning System receivers). Measurements of plant parts and locality information were gleaned from these specimens that represent collections from a wide geographical area within the Malay Peninsula, and lots of statistical tests were made using a computer. The results showed that individuals within a geographic area were more alike morphologically than individuals of another area. The species was showing signs of variation/evolution.



Left — Flowers of *Licuala glabra* set on smooth panicles. Upper Right — a mature flower; lower right — fruits at various stages of maturity

Schematic diagrams describing how DNA fingerprints are obtained.



DNA is extracted from a leaf sample.

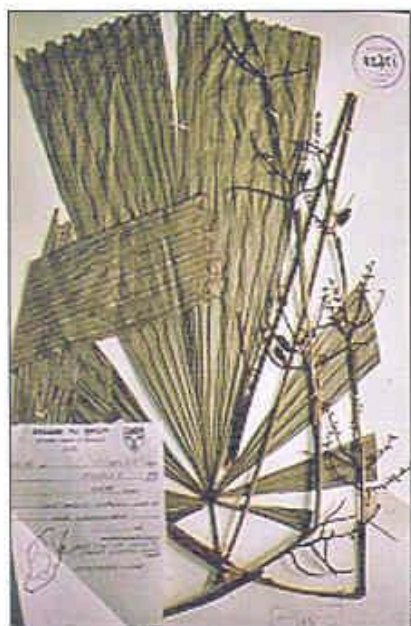
The amplified products are separated by electrophoresis on an agarose gel. The amplified DNA fragments are stained such that they illuminate under ultra-violet light.



The primers detect differences among the DNA of the samples.



Observations made in the field include visits by insects to the flowers



A well-prepared herbarium specimen with vegetative and reproductive characters preserved. A herbarium note with important information makes this specimen even more useful for study

That each population could be distinguished implied that populations of the palm species were isolated from one another to the extent that interbreeding was hindered to some degree. To find out if this isolation from interbreeding was true, the DNA profiles of the plant populations were compared.

DNA fingerprinting

The study I did in the lab was similar to that used in forensic science. DNA fingerprinting was used to investigate the genetic differences/similarities of the discrete populations of these species. The profiles showed that, indeed, each population had its own distinct genetic profile. In addition, populations that were closer geographically were more similar in DNA terms as well. The DNA tests confirmed that there were boundaries of varying degrees to the flow of genes in the species and that, with time, such genetic

isolation would possibly lead to new species or varieties being formed from these populations...that is, if given enough time.

Conservation

Many tropical forest species face imminent threat from habitat destruction through logging and development. DNA studies of species' populations or "Conservation local Genetics", as this field of science is known, highlights the fact that individual species as well as the sum of its wider genetic diversity need to be protected. Genes manifest themselves in all the functions and physical appearance of an organism. Thus, the more genetic diversity a species has, the better the chance of its survival in a changing environment as it has a larger pool of functions to draw upon.

Memorable field trips

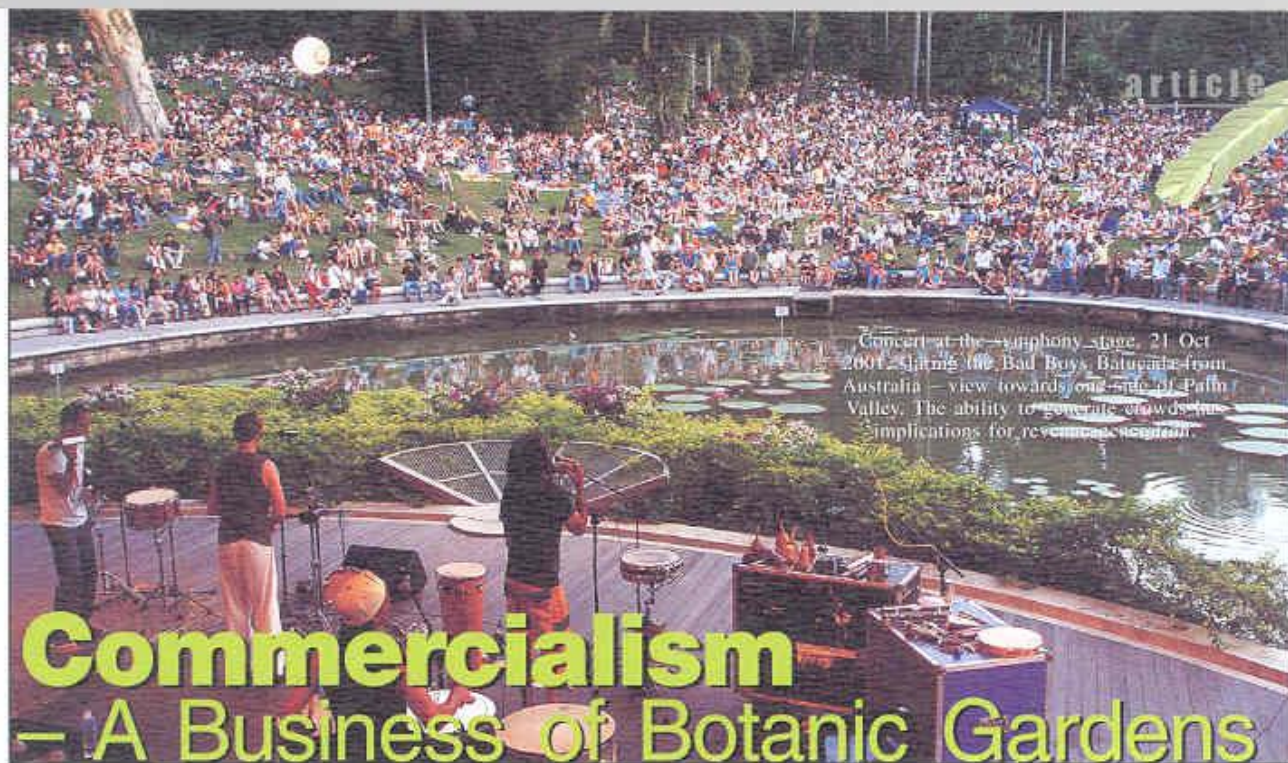
I relished the field opportunities I had with collaborators from the Forest Research Institute of Malaysia. Dungun, Terengganu was one of many field localities that were especially memorable as the forests here are bestowed with an immense diversity of palm and other plant species. Colleagues from FRIM were extremely knowledgeable of the forest plants and names along with detailed local uses of many plants were provided effortlessly as we trekked through the forest. Lunch in the Dungun forest was *pulot* (fragrant sticky rice) with curried tuna (Dungun is a small fishing town), a most pleasurable culinary treat for a botanist in a perfect setting.

Acknowledgements

The author thanks the Department of Biological Sciences, the National University of Singapore; Forest Research Institute of Malaysia; Singapore Botanic Gardens, and Royal Botanic Gardens, Kew. I acknowledge my PhD supervisors Dr. Saw Leng Guan (FRIM), Assoc. Profs Hugh Tan and Prakash Kumar (NUS). I thank Drs. John Dransfield and Bill Baker for comments on this article.

Adrian Loo

Herbarium
Royal Botanic Gardens, Kew, UK



Concert at the amphitheatre, 21 Oct 2001, during the Bad Boys Balupada from Australia – view towards one side of Palm Valley. The ability to generate crowds has implications for revenue generation.

Chai See Ching

Commercialism – A Business of Botanic Gardens

Botanic gardens are products of the juxtaposition between the arts and the sciences. The immediate impact on visitors is the ambience and aesthetics provided by the particular blend of plants, landforms and structural features. The interpretation, educational programmes, research activities and publications, reflect the science in botanic gardens. These provide depth to the plantscape and to visitors' experiences.

The roles of botanic gardens may be represented by the basic formula of recreation, education, conservation and research. Implicit to the existence of gardens is the part played by their clients, the visitors. Without public support and endorsement, they cannot successfully fulfill their roles, and risk becoming irrelevant.

The curation and interpretation of the living collection, maintenance of the landscapes and facilities, and the successful performance of its research and conservation roles, necessitate the hiring of specialist staff. All these incur costs that continually increase. To meet this expenditure in a climate of decreasing funding from traditional sources, typically city councils or the state, demands a drastic change in the way botanic gardens see themselves and operate.

Firstly, for gardens to remain relevant and sustainable, they must be crafted and planted to become special places in the hearts and

minds of their visitors, and their educational outreach must fill needs, and touch minds in addition to promoting gardening, plants, nature and conservation. Research activities must contribute and be seen to be contributing to the more public elements and activities of botanic gardens. No longer can research be ivory-towered, lest they be seen as indulgences and be the first role to be shed when funds become scarce.

Secondly, cost recovery must become part of the mission of botanic gardens.

Commercialism

The issue of commercialism in botanic gardens, is very often a contentious one. Traditionally, visitors do not expect public nature areas including botanic gardens to be managed as businesses or to display the obvious manifestations of business activities. Members of the community often look at public gardens and parks as social amenities, and free access, a right.

Within botanic gardens themselves, there is always a fear that money making behaviour could be taken to the extreme compromising their traditional roles. This in turn is compounded by the situation where revenue generation behaviour is not the usual administrative culture.

While financial stringency is

forcing botanic gardens to compete for additional support from corporate donors and foundations, the number of other worthy claimants, from the arts, culture, humanitarian and environmental causes, continue to increase.

The reality therefore is that botanic gardens are increasingly finding themselves having to change radically, their traditional ways of doing business. Declining budget appropriations are forcing them to engage in efforts to reinvent and restructure in order to mitigate the impact of cuts in council/state funding.

In addition to growing their endowment and other fundraising efforts, botanic gardens are compelled to turn to direct commercial activities in order to continue balancing their budgets while fulfilling their roles/missions. Concurrently, they also need to grow their business expertise and to change staff mindset to accept that commercial activities are a necessary part of the operation. This is best achieved by having a clear mission and goals with regards to revenue generation and an unambiguous business plan that are well communicated to all staff.

Commercialism is a double-edged sword. Uncontrolled and excessive, it can compromise the integrity and ambience of a botanic institution. On the other hand commercialism that is

appropriate, both in intensity and kind, can generate a sustainable income for programmes, facilities, research activities and services to meet the needs of the community while fulfilling the role of the institution and ensuring its continuity.

Commercialism is part of the business of running a botanic garden. The challenge therefore, is to manage it. The line between "crass" commercialism and "sensitive" commercialism can be fine, but walking the tightrope is possible with sensitive planning and implementation.

The first consideration must be the nature of the commercial activities that botanic gardens embark on. The choices need to be sensitive to their basic functional roles and ambience, as special places of beauty, contemplation and inspiration. We feel that food and beverage outlets are acceptable commercial activities as these are amenities and services that meet visitors' needs, providing places to rest as well as refreshment. Other compatible activities include the provision of outlets dealing with garden and gardening related materials, books and gifts or general merchandise with a nature theme. Most would find the availability of these, conveniences that value-add their experiences in visiting gardens.

Secondly the provision of commercial outlets must be part and parcel of the overall plan for botanic gardens, taking into consideration the functions of specific areas within, kinds and location of horticultural attractions, and visitor flow. While each outlet must be specified to meet the needs of the particular business, it also needs to be carefully sited, designed and landscaped to blend in with the ambience of its general location.

SINGAPORE BOTANIC GARDENS

Background

The Singapore Botanic Gardens has had a chequered history from its beginnings at the present site in 1859.



The Gardens has a special place in the hearts and minds of many who visit – a view from the Swiss Ball Fountain looking across Lawn E towards our best known Tembusu tree. In shifting into a more entrepreneurial mode, its unique ambience as a place of inspiration, contemplation, relaxation and memories, must be maintained.

Its main focus has evolved from that of a pleasure garden in its early years, to research on potential economic crops, floristics and taxonomy research, and in the immediate past, to that of playing a leading role in the greening of Singapore.

In 1990 the Gardens again redefined its roles and goals, and forged a new vision to be a premier tropical botanic garden. To this end, the Gardens embarked upon an ambitious masterplan to re-develop the its entire estate and build up its botanical, horticultural and management expertise.

Planning

Under the masterplan, a triple activity-core strategy for re-developing the Gardens was adopted. The Gardens, aligned north-south, is uniquely long and narrow. It stretches 1.7 km north to south, and ranges from 55 m to 530 m wide.

The Tanglin Core (southern end) is the historical footprint of the Gardens. A four hectare remnant of the rain forests that once covered the island of Singapore, the herbarium, library, educational facilities and laboratories, are located here. In the middle, the Central Core is where the Gardens focuses its efforts to meet the needs of, especially, foreign visitors to Singapore. This is the home of the National Orchid Garden with its mass floral displays. The Bukit Timah Core (northern end) is where the Gardens focuses its efforts to create plant displays for visitors, especially the young, to discover the wonders and evolution of the plant kingdom, and

the uses and importance of plants to life and human society. The proposed children's garden will be sited here.

The rationale for the three-core concept is to allow visitors, within the limited time they have, to maximise their experience of the Gardens with a choice of three distinct activity cores with different emphasis to meet personal preferences.

This also allows the Gardens' administrators to adopt the most entrepreneurial management approach for the Central Core while focusing its "classic" roles in education, research and conservation to the north and south.

Implementation and Discussions

In 1995 the Gardens completed its first ticketed attraction. Located in the Central Core, the National Orchid Garden, with its extensive and comprehensive permanent exposition of orchid culture, is a major tourist attraction for Singapore and the Gardens. It receives about 700,000 visitors yearly (686,800 in 2000), of which about 95% are tourists.

Situated at the highest point of the National Orchid Garden is Burkill Hall. Built in 1866, this colonial house commands a panoramic view of the magnificent Orchid Garden. It has been sensitively restored and now offers good value for private functions.

Adjacent to the entrance of the National Orchid Garden, another attraction, a Ginger Garden, is being developed. At its top end, bordering

the leafy entrance plaza to both gardens, a family restaurant and a retail outlet were opened in August 2001.

Also in the Central Core, facing the Palm Valley which doubles up as an amphitheatre, is the Shaw Foundation Symphony Stage completed in 1995. This facility allows the Gardens to push ahead with plans to take a stake in the arts scene of Singapore. Between 2000 to 5000 visitors are drawn to the Central Core during the weekends when performances are staged. Such performances are presented to the public without charge, as an attraction of the Gardens.

The completion and opening of another attraction in the Central Core, the Visitor Centre in 1998, further enhanced the Gardens' value as one of Singapore's key visitor attractions. Located midway along the length of

Gardens on a SIA Hop-On Trolley bus; bringing visitors as well as tourist dollars.

As part of the strategy to balance between commercialism and other responsibilities, we have for instance created the charged attraction (National Orchid Garden) within the Gardens, to avoid a blanket admission charge for the Gardens. This allows the 142 years old Gardens to maintain free access to all, but for value-added products and services, a premium is extracted to help defray the increased cost of operating a modern botanic garden. Additional visitorship brought about by such a policy of course, also translates into increased business opportunities for existing commercial outlets.

While the triple-activity core strategy allows the physical segregation of commercial activities largely in the Central Core, there is still a need to meet the needs of visitors for rest and refreshment in the other two Cores in this 1.7 km long Gardens. We have plans for a theme food and beverage outlet for children at the proposed Children's Garden in the Bukit Timah Core to the north and a Garden-

style food court at the Tanglin Core in the south. The latter will provide local favourites, as this Core which adjoins a major public road, is the most popular with visitors arriving by public transport.

The business mix of retail and food and beverage concessions, venue rentals and ticketed attraction within the Tourist Core enabled the Gardens to generate, in 2000, S\$2.3 million or about 26% of its total budget (operational and staff costs).

We target to continually improve our earned income to offset our annual operating costs. The present income is from entrance charges to

the National Orchid Garden, rentals, commissions and trademark license fees for products bearing the Gardens brand. We will need to plan for ticketed events, new charged attractions and charged car parking and to develop new products and explore more innovative ways to generate revenue. We will need to make changes to our organisational structure and reassign resources and to quickly acquire business and marketing expertise. The depressed economic environment, and imminent reduction in state funding spell urgency for such tasks. However, we also need to see beyond the current cyclical downturn and make changes that will ensure a stronger organisation that remains relevant and with a firm financial footing in the future.

Conclusion

While the trend in most botanic gardens is towards cost recovery, if not profitability, administrators and marketers have to exercise sensitivity in their pursuit of alternative sources of funds and in the provision of additional amenities for visitors.

Commercialism complementing the roles and goals of botanic gardens, is very much a part of their business and revenue generation should be properly seen as a powerful means to ensure sustainability of botanic gardens.

In the Gardens, commercial activities are carefully and sensitively packaged in the three Cores. We are also making a conscious and concerted effort to ensure that the range of products and services provided cater to the widest possible spectrum of visitors, including children, we receive. In addition, we would like to continue to provide free access to the Gardens. Through such means, the Gardens aims to pursue commercialism and integrate it into its fabric.

Wong Wei Har
SBS Management

Chin See Chung



A view of the interior of the Botanic Garden Shop.

the Gardens, with easy access by car and coach, the 1,200 sq m Visitor Centre is set amidst an oasis of palm trees and other exotic foliage. Located at the Visitor Centre are an up-market French Restaurant, a family-oriented Café, the Botanic Garden Shop as well as ample coach and car parking facilities.

The opening of the Visitor Centre with its coach park, also allowed the Gardens to forge a strategic alliance with the national carrier, Singapore Airlines (SIA) in the SIA Stopover Programme. This programme allows transit passengers flying on SIA flights to tour the National Orchid Garden and the Singapore Botanic

Urban Invaders or Dwellers?

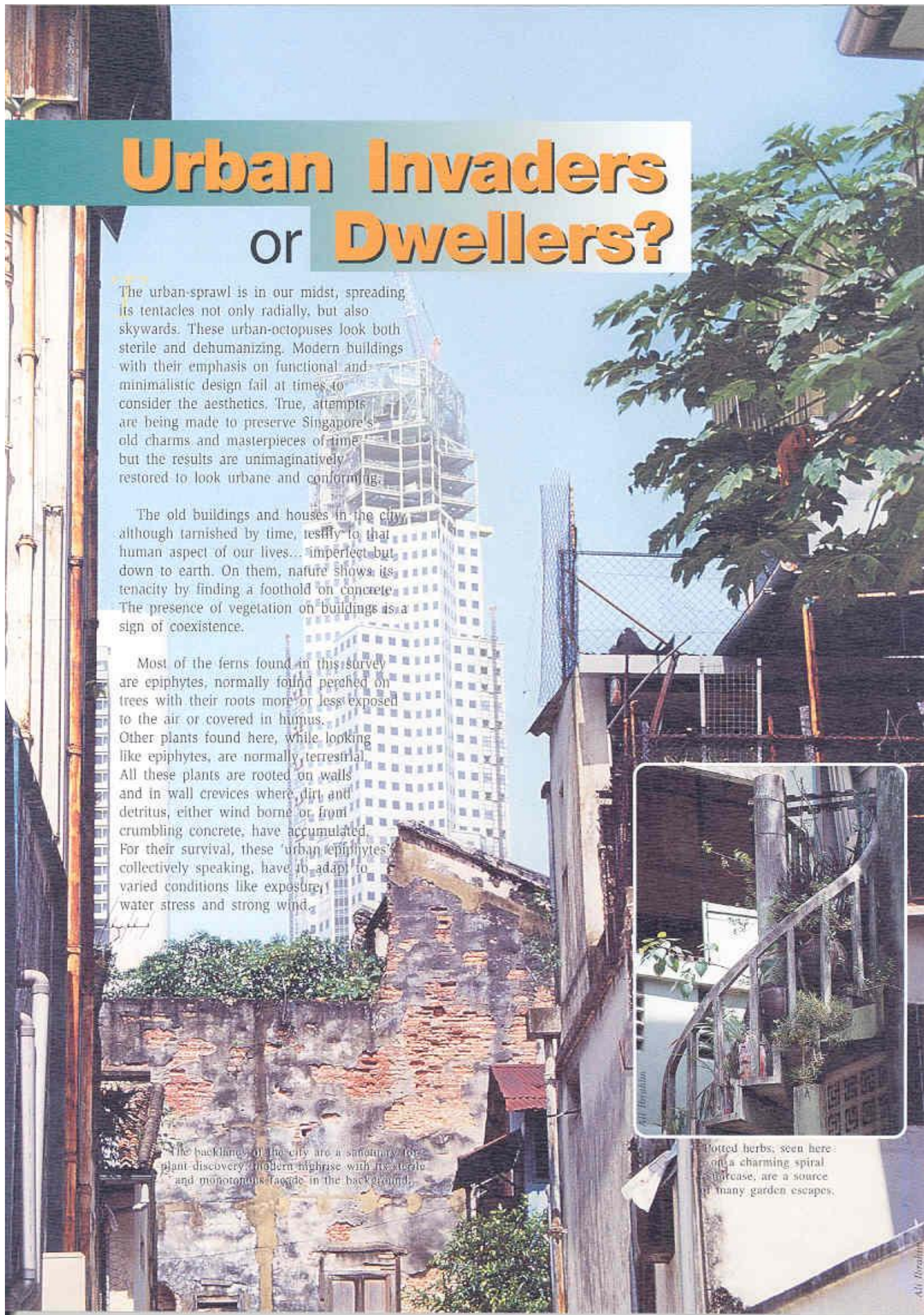
The urban-sprawl is in our midst, spreading its tentacles not only radially, but also skywards. These urban-octopuses look both sterile and dehumanizing. Modern buildings with their emphasis on functional and minimalist design fail at times to consider the aesthetics. True, attempts are being made to preserve Singapore's old charms and masterpieces of time, but the results are unimaginatively restored to look urbane and conforming.

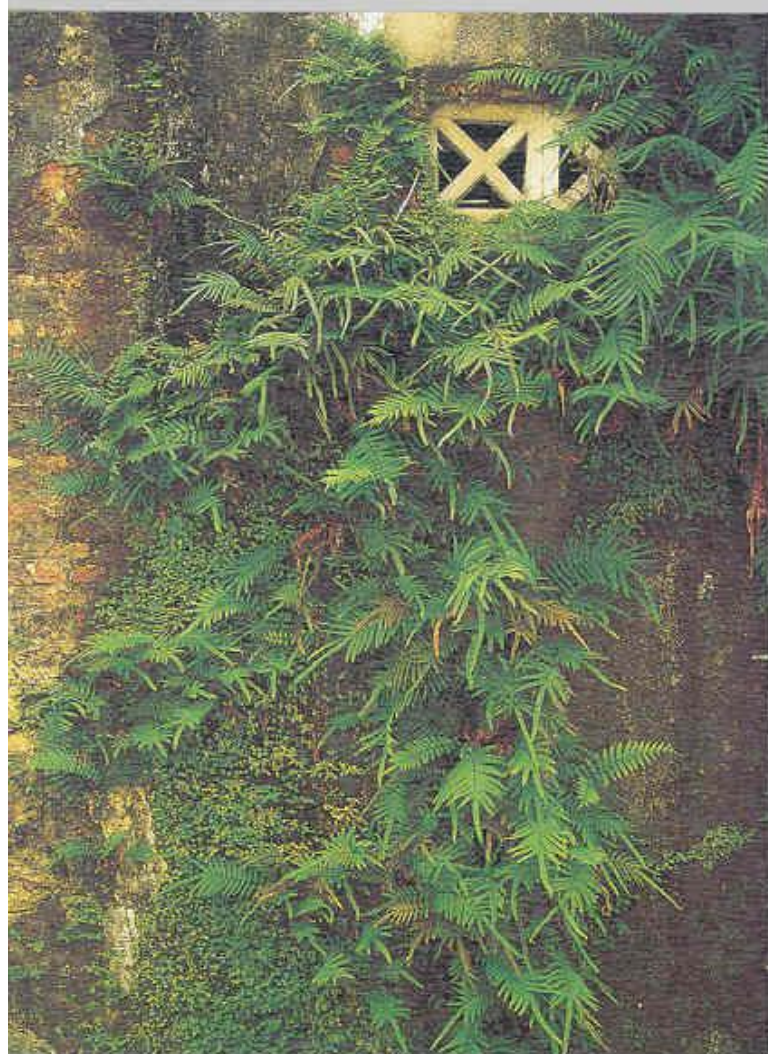
The old buildings and houses in the city, although tarnished by time, testify to that human aspect of our lives... imperfect but down to earth. On them, nature shows its tenacity by finding a foothold on concrete. The presence of vegetation on buildings as a sign of coexistence.

Most of the ferns found in this survey are epiphytes, normally found perched on trees with their roots more or less exposed to the air or covered in humus. Other plants found here, while looking like epiphytes, are normally terrestrial. All these plants are rooted on walls and in wall crevices where dirt and detritus, either wind borne or from crumbling concrete, have accumulated. For their survival, these 'urban epiphytes' collectively speaking, have to adapt to varied conditions like exposure, water stress and strong wind.

The backings of the city are a sanctuary for plant discovery. Modern highrise with its sterile and monotonous facade in the background.

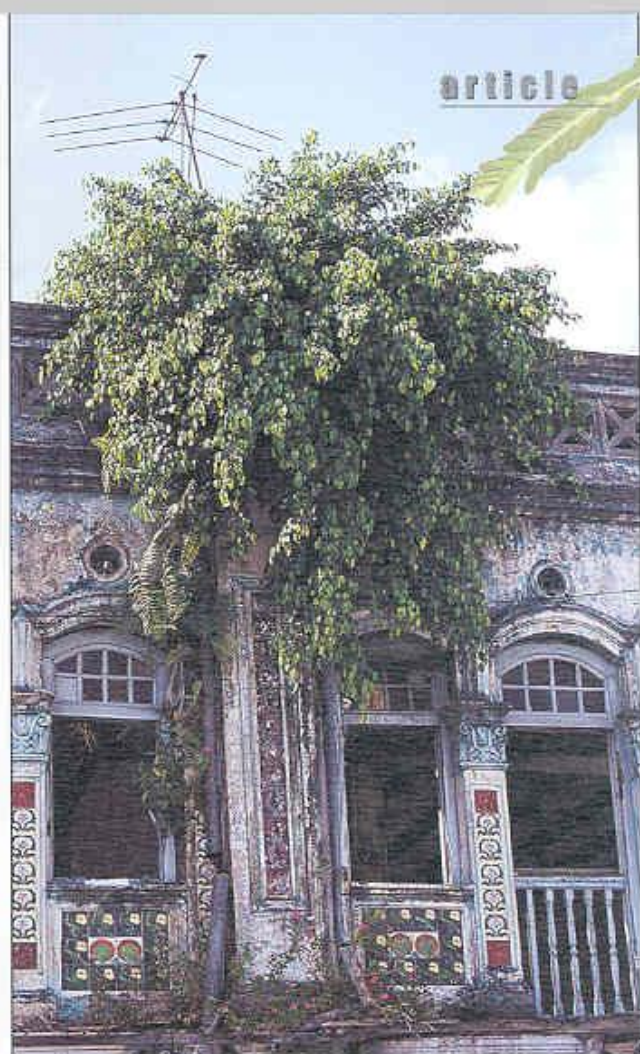
Potted herbs, seen here on a charming spiral staircase, are a source of many garden escapes.





All Ibrahim

A tapestry of ferns (*Pteris vittata*), Artillery plant (*Pilea microphylla*) and mosses growing from a wall at the back of a shophouse along North Bridge Road; surely an inspiration for those of us aspiring to create vertical greenery on buildings.



All Ibrahim

Ficus benjamina (Waxing) occupying a fire-gutted home at Sungei Road like a citadel in the sky.

Spores and microscopic organisms are prevalent in the air. Old walls offer a unique habitat for their proliferation. The presence of algae and lichens will prepare the way for mosses and other pioneers like ferns to grow. As wind-blown particles and dirt build up, higher plants including garden escapes like pot-herbs used for medicine and ornamental purposes will make their appearance when their seeds or propagules land by chance. Fig trees brought in by birds seem to luxuriate in this seemingly harsh urban setting.

The search for urban epiphytes took me to backlanes and urban renewal sites in parts of the city. I was anxious to photograph such occurrences before they all disappear.

New buildings that have come up during the last forty years of progress are less conducive habitats for plants, one of the reasons being that modern buildings use more steel, glass and synthetic construction materials.

Footholds for plants to establish like rain gutters, surface drain pipes, ledges, balconies and ornate fittings are largely missing in the new-age design. Many of the pre-World War II, and colonial buildings have either been demolished or restored, minus urban epiphytes.

There is a genuine case for getting rid of destructive big fig trees which



All Ibrahim

A serial colony of algae, lichens, mosses, ferns and higher plants sprouting from a white-washed wall off Jalan Pisang.



All Ibrahim

Passiflora foetida (Love-in-the-Mist) cascading down from a parapet laden with miniature orange-coloured passion fruits.



A rare find of *Rivinia humilis* (Bloodberry) emerging from a crack in the plastered wall of a building at Orchard Road and bearing interesting red fruits.



A once famous coffeeshop car-marked for urban renewal, with it the demise of the plants on it.



A pink bridal-like bouquet of *Catharanthus rosea* (Periwinkle) adorning the column of a shop house at Circular Road.



Ficus religiosa (Bodhi Tree) with resilient new shoots sprouting from a severed root-stump growing out of this wall face, forming an aesthetically pleasing plantscape.

can tear down walls once they get established. But for other species, perhaps we need to modify our views and try to accept and conserve them at some cost.

With the move towards roof-top and vertical greenery, a real challenge is to further introduce, establish and maintain such 'Gardens in the Sky.' These 'urban epiphytes' or should I coin the term 'urban ecophytes' are nature's curiosity that are universally seen in the cities of the world. 🌿

Ali Ibrahim

Pulau Ubin



Drynaria quercifolia (Oak Leaf Fern) in a snug position below an overhang at Telok Ayer Street.

Plants encountered in the survey are as follows:

Ferns, Herbs, Shrubs and Climbers:

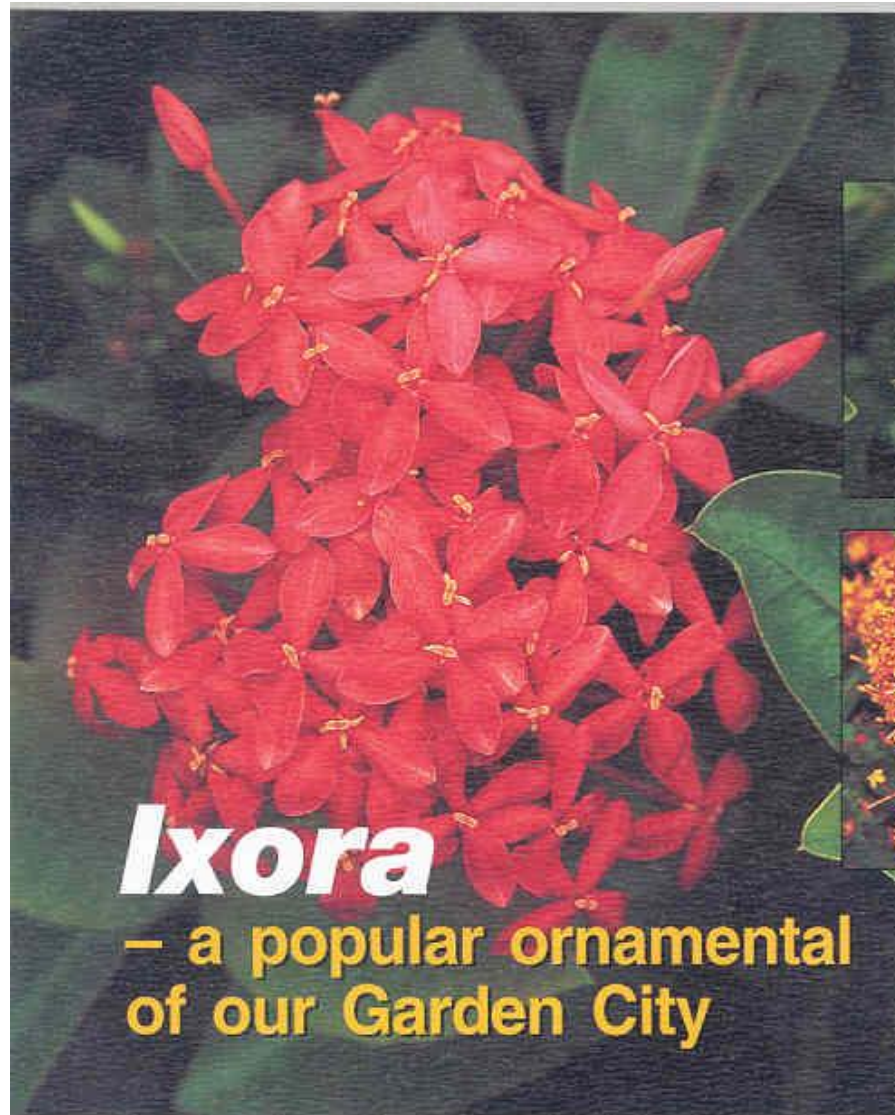
Andrographis paniculata (Hempedu Bumi), *Asplenium nidus* (Bird's Nest Fern), *Boerhavia diffusa*, *Borreria* sp., *Catharanthus roseus* (Periwinkle), *Cleome rutidosperma* (Cleome), *Cordia cyclindristachys* (String Bush), *Davallia denticulata* (Rabbit's Foot Fern), *Drynaria quercifolia* (Oak Leaf Fern), *Euphorbia hirta*, *Kalanchoe pinnata*, *Kalanchoe tubiflora*, *Ludwigia* sp., *Nephrolepis biserrata* (Ladder Fern), *Opuntia* sp., *Passiflora foetida* (Love-in the-Mist), *Passiflora suberosa*, *Peperomia pellucida* (Common Peperomia), *Phyllanthus amarus*, *Pilea microphylla* (Artillery Plant), *Portulaca oleracea*, *Pouzolzia zeylanica*, *Pteris vittata*, *Pyrosia piloselloides* (Dragon's Scale Fern), *Rivina humilis*, *Scoparia dulcis*, *Tradescantia spathacea* (Oyster Plant), *Vernonia cinerea*.

Trees and Palms:

Acacia auriculiformis (Yellow Wattle), *Carica papaya* (Papaya), *Elaeis guineensis* (Oil Palm), *Ficus bengalensis* var. *krishnae* (Krishna's Cup), *Ficus benjamina* (Waringin), *Ficus caulocarpa*, *Ficus microcarpa* (Malayan Banyan), *Ficus religiosa* (Bodhi Tree), *Ficus virens* var. *glabella*, *Muntingia calabura* (West Indian Cherry Tree) and *Pipterus argenteus*.



Kalanchoe tubiflora, with linear leaves bearing apical plantlets, from a window ledge of an abandoned building (formerly the Calcutta Hotel).



Ixora

— a popular ornamental of our Garden City

Spectacular floral clusters of various *Ixora* species, hybrids, cultivars and forms



Ixora Vietnam (red)



Ixora compacta (orange)



Dwarf cultivar of *Ixora* (orange)



Dwarf cultivar of *Ixora* (red)

Ixora (Rubiaceae) is a large genus of about 400 species distributed throughout tropical Africa, Asia, Australia and the islands of the South Pacific. *Ixoras* are popular as ornamentals in the tropics. They are grown for their compact growth habit and often-spectacular clusters of showy flowers, produced almost continuously throughout the year. Species and cultivars of *Ixoras* like *Ixora chinensis*, *Ixora javanica*, *Ixora Super Pink*, *Ixora Super King*, *Ixora Sunkist* and others when in full bloom, display massive colour outbreaks. Even if the plants are not in bloom their usual neat compact habit is a showcase for any landscaped area. *Ixoras* are extensively cultivated in the tropics in massed beddings, as hedges, borders of flowerbeds and in clumps. Certain kinds are excellent individual specimens and can be cultivated as standards (*Ixora Super King*) or even trained as bonsai (*Ixora chinensis*). They are also popular as houseplants and are used to beautify porches, patios, decks, balconies or even backyard sitting areas. Dwarf forms like, *Ixora Dwarf Orange*, *Ixora Dwarf Yellow*, *Ixora Dwarf Pink* and *Ixora Dwarf White*, provide a continuous and brilliant display of colours in small gardens around reflexology paths, rocks or small seating areas.

The name *Ixora* is derived from *Isvara*, lord, referring to the god Siva. *Ixora coccinea* is an ornamental plant in India that has been described in ancient Sanskrit literature.

Dwarf cultivars are popular among landscape designers and seen in intense bloom in different parts of Singapore



As a bed under an avenue of Royal palms.



As border planting.



Ixora coccinea Red brightens a corner in front of Fullerton Building.



A mass bedding of *Ixora* Super Pink along a walkway is soothing to the eyes.

Most are low shrubs while a few are small trees. The latter include *Ixora finlaysonianana* (Thailand), *Ixora congesta* (Myanmar, Thailand and Malay Peninsula) and *Ixora lobbii* (Malay Peninsula) etc. Dwarf forms which are dense and compact with small, leathery, pointed leaves are also common in cultivation.

Ixora leaves vary in texture, size and shape. Those of *Ixora* Super Pink are dark green and lustrous, while those of *Ixora odorata*, *Ixora javanica* and *Ixora* Super King are rather rough and less shiny. *Ixora* Variegated and *Ixora* Curly are liked for their variegated and wrinkled leaves respectively. *Ixora* Vietnam Red and *Ixora* Yellow look gorgeous when their young bronze-red, tender leaves emerged.

are borne in dense clusters and range in colour from yellow, pink, red, orange to pure white. Some species of *Ixoras* such as *Ixora odorata* (Madagascar) and *Ixora parviflora* (India) are popular for their wonderful lingering fragrance.

In our Garden City, tall, magnificent trees soften the effect of Singapore's high-rise buildings. While the trees provide shade, not many mass-flower in Singapore's relatively unchanging climate. Therefore the vibrancy and colour of the cityscape is much dependant on foliage or blooming shrubs like *Ixoras*, *Heliconias*, *Bougainvilleas* and *Cannas*.

Ixoras are cultivated throughout Singapore and many kinds are available in local nurseries. This bears testimony to both their hardiness and popularity. As there is a steady supply of new forms, this is one group of plants that will not go out of fashion. 🌿

The star-shaped flowers

Kakali Majumdar

Parks Management Department



Grammatophyllum speciosum in the Gardens

Re-introducing **Tigers** — *Grammatophyllum speciosum*

Tigers, the largest members of the cat family are majestic animals. Few animals capture people's imagination as the tigers do. The last tiger in Singapore was shot dead at Choa Chu Kang in 1930. Here, I would like to tell you the story of another type of tiger in Singapore, just as majestic and grand.

Grammatophyllum speciosum is also known as the "Tiger Orchid." It is so named because the stripes on its petals and sepals resemble the markings on the skin of a tiger. This epiphytic species can be found in Burma, Thailand, Laos, Sumatra, Java, Borneo, and the Philippines, often on trees near streams in the lowland. It is known to produce the largest orchid plants in the world. A mature plant could weigh over a tonne. It is a wonder how such a huge plant can live on the branch of a tree. Pseudobulbs of the plant can reach 3 m in length. Leaves are 50 - 60 cm long and 3 - 4 cm wide. Individual flowers are 10 cm across

and are light greenish-yellow with dense brown markings. Flowering is rather irregular with some plants blooming only in alternate years. In Singapore, it usually flowers in February or July. The enormous inflorescences, that reach over 2 m tall, are sensational.

Mr H. N. Ridley, a Director of the Gardens recorded that the Tiger Orchid was found in the wild in Toas (Tuas) and Pulau Ubin in 1900. Unfortunately, naturally occurring plants are now extinct.

Singapore used to be the home of more than 180 native orchid species, a large number for a small island of 647.5 sq. km. This diversity was due to the existence of a wide range of habitats and the favourable equatorial climate. However, native orchids are classified as highly endangered in Singapore and many have become extinct. There are only about 40 native species left. A comparison of habitats on the island 150 years ago

and now, shows that most of the mangrove and forested areas where orchids used to thrive have been replaced by industrial and residential estates.

In an attempt to conserve this native orchid, we have propagated the Tiger Orchid by seedpod culture under aseptic conditions and re-introduced it to the wild, to gardens and parks.

A few years ago, a Tiger Orchid in the Gardens flowered and was self-pollinated. The huge seedpod was harvested 7 months later. Seeds germinated one month after being sown on a suitable culture medium. After about 12 months in the laboratory, the seedlings were planted out in the nursery.

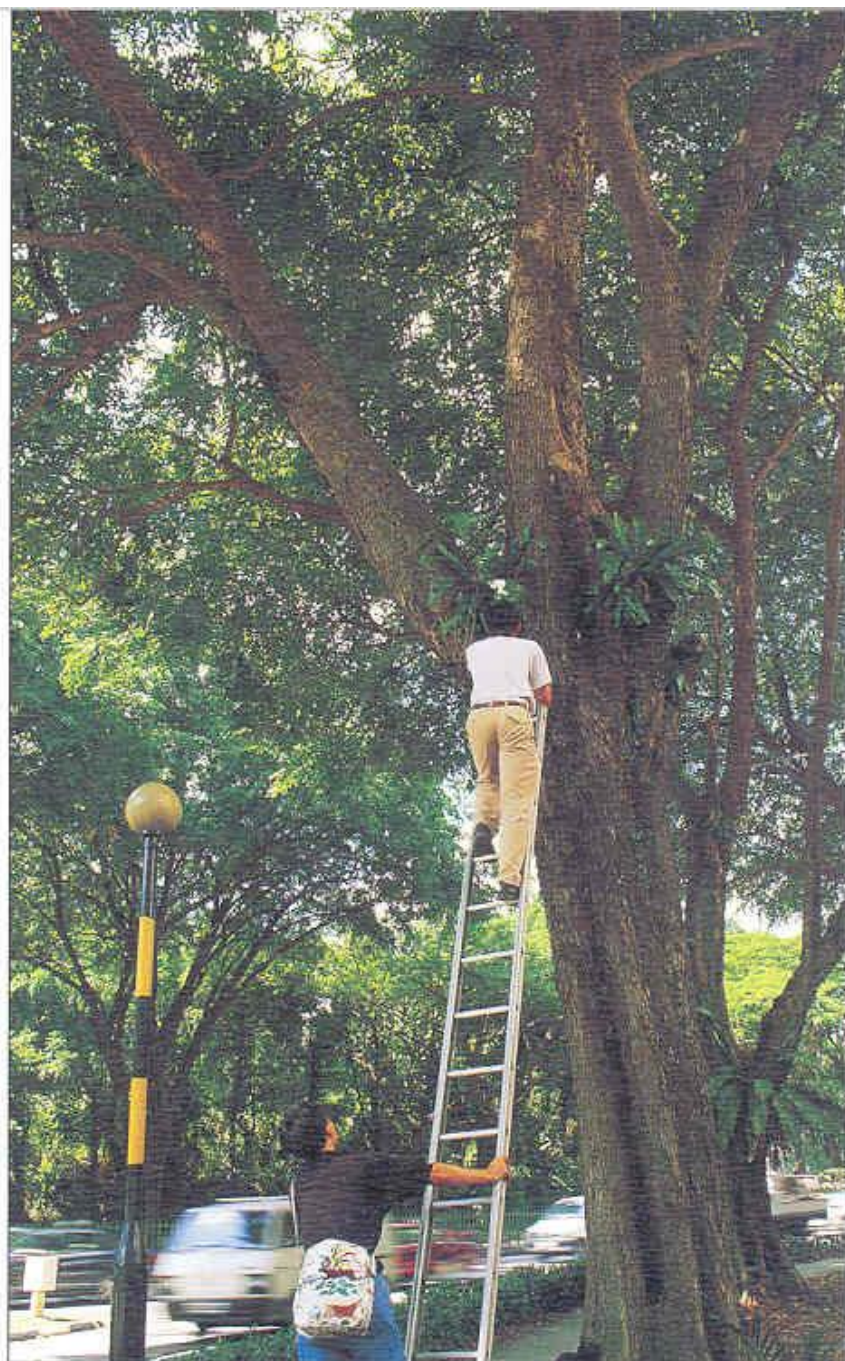
Since the Tiger Orchid occurred naturally in Pulau Ubin, the first batch of seedlings was re-introduced there in July 1999 when they were 26 months old and about 15 - 20 cm

tall with 5 - 6 leaves. They were affixed onto durian, rambutan, mango, Angsana, Tembusu and Rain trees. Seedlings were also planted on trees in the Gardens, around the Visitor Centre at the Bukit Timah Nature Reserve, and in the Orchard Boulevard area in the heart of the city.

The seedlings we planted have been growing for more than one year now in their new homes. Those in Pulau Ubin and Orchard Boulevard are doing well. New shoots have developed and roots are firmly established on tree branches. Unfortunately, most seedlings planted in the Gardens and the Bukit Timah Nature Reserve were damaged or removed by animals (probably by squirrels and monkeys respectively).

With experience from the initial trials, we decided to introduce seedlings to the Bukit Batok Nature Park in the beginning of 2001. This time, the seedlings were more mature, about 30 - 40 cm tall, with 16 - 20 leaves. They had at least three shoots, a well-established root system and fleshy pseudobulbs. So far they have been growing very well. In February 2001, large seedlings were planted on trees along Orchard Boulevard and on the yellow Rain trees around the Bandstand in the Gardens. In April 2001, the same was introduced to a site adjacent to a mangrove area in Pulau Ubin, and in early May again to the Bukit Timah Nature Reserve.

Considerable knowledge about how to re-introduce orchids has been gained from this exercise. Several factors appear to play important roles in the survival of introduced seedlings. These include the microclimate of the area (relative humidity, for example), texture of bark of the host, presence of other epiphytes and the size of seedlings. Seedlings planted in areas with high relative humidity tend to survive better than those in dry areas. For example, in Pulau Ubin, seedlings established in a damp area inside a secondary forest are



New home for the Tiger Orchid along Orchard Boulevard

healthier and more vigorous than those growing near the sea where the breeze tends to dry up the bark faster. Texture of the bark is important because certain barks tend to retain more moisture. For instance, Rain trees are generally better hosts than Tembusu. Trees that support more epiphytes tend to be better hosts than those with fewer epiphytes. It seems that if the conditions are suitable for other epiphytes, they are also more appropriate for *G. speciosum*. The size of seedlings is also an important factor in determining survival. Seedlings with 16 - 20 leaves (30 - 40 cm tall) tend to survive better than those with only five leaves (15 - 20 cm tall).

We hope that the Tiger Orchids will continue to thrive well in their new homes. With continual support from the various Divisions of NParks, more of this beautiful and majestic species will find its way to nature areas and parks in Singapore.

Acknowledgements: We would like to thank the Singapore Botanic Gardens Division, the Parks Management South/West Division, and the Istana and Conservation Management Division, for their enthusiastic support of the project.

**Yam Tim Wing
Aung Thame**

Orchid Breeding and Multiplication Unit



Renaissance of the Fungal Collection

The impetus for curating the fungal collection came from international requests for the loan of particular specimens, which we could not service as we could not find them. The reason for this was two-fold. Firstly, the collection had not been curated (i.e. keeping the scientific names up-to-date and following a modern arrangement) for a long time and many specimens were filed under obsolete names so it was not clear where to look for a particular species. Secondly, almost half the specimens had not been integrated into the general collection. For example, there were about 50 sealed tin boxes dating from the 1920s and 1930s full of specimens wrapped in their original newspaper. Some fungi were kept in wooden boxes with a glass lid making it impossible to fit them onto shelves in the herbarium cupboards. More recent collections have accumulated mixed in boxes as the herbarium cupboards were already full. Our new staff, Gwee Aik Teck was tasked to tackle the seventy-year backlog.

Curation of the collection

As we lack mycological expertise, we appealed to the Mycology Unit at the Royal Botanic Gardens, Kew, to help us with the scientific basis for a total reorganisation. Both Professor Paul Bridge and Dr Brian Spooner have been and continue to be a great help in giving advice and expertise. Firstly, we have reorganised the whole collection numbering the families and genera following the Kew *Index to Genera and Family Arrangement* — February, 1999.

Secondly, in simple cases we were able to use modern generic concepts according to Ainsworth and Bisby's *Dictionary of the Fungi*. However, for some genera mycological expertise is required and this is where Brian and



Glass-topped boxes containing unmounted and unsorted specimens

Paul step in. A case in point is the bracket fungi formerly included in the genus *Fomes*. *Fomes* has been redefined and the majority of its species are split between ten different genera. A two-day visit to the Herbarium by Paul in May 2001

was able, among other things, to begin to sort out this problem by identifying the individual species to its respective genus.

Brian and Paul have also advised us on the best way to



Mohd Noor unpacks specimens from a tin box prior to mounting them

mount the larger bracket fungi, which previously had been secured on to herbarium sheets making very unwieldy specimens. We now mount them in sealed polybags and arrange them vertically.

Tackling the backlog of specimens in boxes and the tins was akin to Hercules's task of cleaning the Aegean stables. Not only was the number of specimens large (about 2,000) but it was a delicate task. The 60- to 70-year old newspaper crumbled on touch so extreme care had to be taken to ensure that the specimens and labels did not get mixed up. The labels too were extremely brittle. The task of mounting these specimens was undertaken by Mohd Noor bin Jumaat. First, he mounted the label on archive quality paper, then the specimen was placed in a polybag of the appropriate size, and this and the label placed in another polybag. This ensures that the fungal specimen does not stain the label.

The mounted specimens were then handed over to Gwee Aik Teck who undertook the task of rearranging the entire collection numbering about 5,500 specimens into labelled boxes following the Kew system. The specimens collected from Singapore, which

Major Collectors of Fungal Specimens

H.N. Ridley, the first Director of the Gardens (1888-1912), started the fungal collection and systematically collected macrofungi (mushrooms and toadstools) from the Gardens. He commissioned Charles de Alwis to make watercolour paintings of the fresh specimens before they were dried (*Gardenwise* 15 (2000) 24). Duplicates were sent to Kew for identification and many of the species proved to be new to science. Several species were named after Ridley, such as *Daedalea ridleyi*, *Polyporus ridleyi* and *Xylaria ridleyi*.

Mrs Ethel M. Burkill, wife of I. H. Burkill the second Director (1912-1925), not only collected macrofungi from the Gardens but also made watercolour paintings of them. These paintings are invaluable as the shape and colours of the fungi are lost when they are dried to make specimens. Sadly, the paintings were borrowed and not returned. Her specimens were also sent to Kew and many proved new to science. *Entoloma burkillae* commemorates her.

C. F. Baker, Professor at the College of Agriculture, Los Banos in the Philippines, spent a sabbatical leave in 1917 working on Fungi Imperfecti (fungi that do not produce a sexual stage), many of which cause plant diseases, and built up a great collection of specimens. These he sent to Saccardo who described them in his great multi-volume *Sylloge Fungorum*. A fungal genus from the Philippines, *Bakeromyces*, was named for him.

T. F. Chipp worked as Assistant Director for just 18 months between 1919 and 1921. He also collected specimens and compiled the first list of fungi in an article entitled *A List of Fungi in the Malay Peninsula* (*Gardens Bulletin Straits Settlements* 2 (1921) 311-418).

The first mycologist to be employed by the Gardens was E.J.H. Corner, Assistant Director (1923-1942). He collected not only from the Gardens but also from the forests of Singapore and Malaysia. In addition, he studied their growth and seasons in the Gardens Rain Forest, which he searched almost daily in the year 1929. He discovered there were two distinct seasons, the first in March to May and the second between August and September to December. However, the individual toadstools were very short-lived lasting only a few days to a week. He was able to track the growth of about a hundred species in the Gardens Rain Forest. Corner is famous for using pig-tailed

macaques to collect plant specimens. One, Che Minah, was especially clever at collecting toadstools and could tell by taste whether they were poisonous or not. Corner is commemorated by the genus *Corneromyces*, as well as several species.

Chang Kiaw Lan was the first local mycologist employed in the Herbarium from 1959 to 1987. She had studied for her PhD under Corner at Cambridge. Her collections from Singapore have made a substantial contribution to the fungal collection.



Professor Paul Bridge advising on fungal identification



Gwee Aik Teck rearranging the fungal collection. Note that the thicker specimens are stored vertically.

The Gardens as a Type Site

For botanists who lived within the Gardens, the grounds particularly the Rain Forest (then called the Gardens Jungle) was an ideal place to collect these ephemeral fungi. We have about 900 specimens collected from the Gardens. In the early days, the tropical flora was not well-known, which explains why so many of the species collected in the Gardens turned out to be new to science.

The specimen on which the scientific description and name is based is called **the type specimen** and it is the vital element that fixes a particular scientific name to a particular sort of plant or animal. If ever any confusion about the

correct identity arises regarding the application of a scientific name, the type specimen can be re-examined to settle the problem. Thus, type specimens are the most valuable of all herbarium specimens.

However, one specimen often cannot represent the entire range of variation within a species, so that biologists often want to study the population from the place where the type was collected, which is called **the type site**. Since several species were first collected from the Gardens Rain Forest and it has remained largely untouched over time, it is an important type site. Because of this, it is internationally a site of Special Scientific Interest.

number about 1,500 of which about 900 were collected from the Gardens, are kept separately for rapid access.

This sorting process enabled specimens labelled as types to be taken out. On a visit to Kew, under the guidance of Brian and Paul, I was able to verify the status of the early collections of Ridley, Burkill and Baker as types (see box). These are now databased and filed in the type collection.

The mounting, accessioning and rearrangement of the entire collection was completed in the space of six months.

Importance of the collection

The collections by Ridley, Ethel Burkill and Baker (see box) were some of the earliest for tropical fungi so it is not surprising that many of them proved to be new species and the specimens they collected became the types. In addition, Corner's extensive collections have been the basis of much taxonomic research, both by himself and other mycologists. Most of the requests for loan of specimens are for Corner's collection, an indication of the international importance of the collection.

On the Singapore scene, no biodiversity survey on fungi would

be complete without examination of the Gardens' collection as it spans more than a century and includes specimens collected from habitats that have since fallen to development, besides being the largest collection of Singapore specimens, particularly of macrofungi (the mushrooms and toadstools). Of particular interest to the Gardens, is the role of the Rain Forest as a type site (see box). However, a complete inventory and appreciation of the Singapore collection await mycological expertise, which we are presently lacking. 🌿

Ruth Kiew
Herbarium & Library


Lord Mayor of London Plants a Tree

The tree, a Para Rubber (*Hevea brasiliensis*), was presented to the people of Singapore, by the City of London as a gift to commemorate the third millennium. The Right Honourable Lord Mayor Alderman Sir David Howard Bt, obviously a keen gardener, rolled up his sleeves and very competently planted the tree himself.

The event on 29 October 2001, was witnessed by officials from the British High Commission and Gardens' staff and was followed by a reception at the Halia Restaurant nearby and a tour of the Gardens.

Rubber trees first arrived in this part of the world in 1877 from Brazil via the Royal Botanic Gardens Kew, UK. The eleven seedlings that were planted in the Gardens formed the modest beginnings of an industry that soon dominated the agricultural landscape of the region. The Gardens played a leading role in nurturing an industry that made London the rubber trading centre of the world.

This tree symbolises not only the friendship between the peoples of London and the Republic of Singapore, but also the historical roles of both Gardens and cities in the rubber industry.

The London Millennium Tree can be found along Maranta Avenue closer to the Orchid Plaza end. 

Abdul Hamid Hassan
Visitor Services

The Right Honourable Lord Mayor Alderman Sir Howard Bt and the Gardens' Director, Chin See Chung with the newly planted Millennium Tree



Ginger Encounters



Foreign visitors can now try out some of our local tidbits like the preserved ginger slices or ginger soft candy, available at Ginger Villa.

The mention of "ginger" would normally bring to our minds, the rhizome used in cooking, ginger beer, gingerbread or even *teh halia* (ginger tea). Hence, many must be wondering what's there to see in the Gardens' upcoming attraction, the Ginger Garden.

Under development, this new garden will feature plants from the ginger and related families the world over. Visitors will soon be treated to a wide array of gingers in all shapes and forms, many with surprisingly beautiful leaves and very attractive flowers. The prelude to the ginger experience are two new outlets in the Ginger Garden, the Ginger Villa and the *Halia* Restaurant (*halia* is ginger in Malay).

When one enters the meticulously constructed Ginger Villa, one will notice that the souvenir shop's architecture and décor has an interesting *Peranakan* (Straits Chinese) influence. Shopping here is



Set in the midst of the Ginger Garden, *Halia* is the perfect place to spend a leisurely afternoon or a romantic evening.

reminiscent of old Singapore where momentos are displayed in ornately carved cabinets, weaved rattan baskets and on marble-top tables. The shop has an extensive collection of exclusively created souvenirs for the Ginger Garden like the Torch Ginger T-shirt, magnets, ginger tea and a whole range of ginger tidbits. Looking for that perfect gift to bring home, visitors can also find an assortment of ethnic souvenirs like batik sarongs, beaded bags or even the world famous "Tiger Balm" medicated ointment.

If one is tired after all that shopping, the *Halia* Restaurant is just next door to rest one's feet. Visitors can either choose to bask in the warmth of the sun at the outdoor deck, or take refuge in the air-conditioned restaurant. A must-try at the restaurant is the *Halia Infusion*,

which is a refreshing, tummy-warming ginger drink. Served in a specially designed wooden box-tray, the spiced ginger is placed in a tall glass into which boiling hot water is poured, half-full. The beverage is then left to infuse for 10 minutes, after which, depending on the individual's preference, honey or more hot water may be added. The infusion is a perfect finish to a meal. *Halia* serves a casual menu of local and western favourites by day, and a continental menu for night dining.

Visitors to the Gardens, can look forward to the official opening of the Ginger Garden in the latter half of 2002, for that complete ginger experience.

Yap Siow Hong
Visitor Services

NEW AND EXCITING



A 7 years old specimen of *Licuala cordata*

Andrea Kee

Licuala cordata

A fan-palm, *Licuala cordata* is one of about 180 species in this genus. This handsome plant is definitely a favourite of plant lovers and collectors and is prized for being rare. This palm is endemic to the rainforest of Sarawak, Malaysia.


A small, charming and neat palm with a compact form, it can eventually grow to a height of 1.5 m. Matured plants bear leaf stalks of about 60 cm long. The attractive and almost circular

fronds are glossy dark green. Each frond is about 60 cm across.

Licuala cordata is a slow growing palm and does well in shaded areas with a high humidity and slightly moist soil. It makes an excellent garden ornamental as well as a stunning indoor plant.

The Gardens first acquired ten seeds through an exchange with Mr Larry Watson from Queensland,

Australia in 1986. The plants have taken one and half decades of nurturing to reach their present size and splendour.

Specimens of *Licuala cordata* can be seen at several spots in the Gardens including Lawn 5 along Maranta Avenue and in the National Orchid Garden. 

Andrea Kee
Plant Resource Centre



WHAT'S BLOOMING?



Ong Bee Eng

Clerodendrum speciosissimum


Clerodendrum speciosissimum is a "show stopper." This spectacular flowering shrub greets visitors at the Cascade Garden in the Visitor Centre complex.

This shrub bears bright orange-red, broad terminal panicles that reach over 30 cm tall. The spectacular floral characters contrast strongly with the large heart-shaped

leaves that measure 12 to 25 cm long. The attractive leaves are velvety and dark green and borne in opposite pairs from a tetragonal stem. The fruits, sparingly produced in our Gardens, are a dark blue.

The sun-loving plant, which grows to about 4 m, prefers a moist soil and can be propagated by cuttings and seeds.

Our specimens first planted out in June 2000 bloom almost continuously.

*Cléródendrum*s with about 400 species from the tropics and subtropics are mostly from Asia and Africa. This species is apparently native to Java. 

Julie Ong Bee Eng
SBG Management

HIGHLIGHT FROM THE SCHOOL OF HORTICULTURE

National Skills Recognition System (NSRS)

The National Skills Recognition System is a national framework for skills training and re-training implemented by the Singapore Productivity Board (PSB) with the support of the Ministry of Trade and Industry (MTI) and Ministry of Manpower (MOM). It aims to enhance performance standards and professionalism, hence the employability of the workforce, by motivating continuous learning and the acquisition of new skills, leading to an increase competitiveness in the global market. NSRS is industry-driven and is made accessible to everyone in the workforce.

The primary objectives are to:

- i. establish work performance standards
- ii. identify job competencies and
- iii. certify skills acquired

There are 3 levels of the National Skills Certificate (NSC) based on different degree of competence. The basic level, NSC 3, validates competency in performing a range of tasks which is mostly routine and predictable; the intermediate level, NSC 2, validates competency in performing a range of tasks which is

non-routine and with some degree of complexity, while the upper level, NSC 1, validates competency in performing a broad range of tasks which is mostly complex and non-routine.

Cognizant of the need to upgrade the landscaping/horticultural industry through skills training, NParks joined NSRS in July 2001 and leads a 17-member Industry Skills Standards Committee (ISSC) to set skills and work performance standards for the industry. Apart from NParks, the ISSC is represented by the Housing & Development Board (HDB), Town Councils, Jurong Town Corporation (JTC), Sentosa Development Corporation (SDC), Ministry of Defence (MINDEF), Civil Aviation Authority of Singapore (CAAS), the Landscape Contractors Association and key players from the private sector.

Together with the National Skills Centre (NSC) of PSB, the Landscaping/Horticultural ISSC is tasked with developing the Functional Map (the Functional Map delineates the Key Purpose, Critical Functional Areas, Key Job Functions

and Units of Competence of the industry) and skills standards for the industry, and establishing centres for training, assessing and certifying skills acquired.

With NSRS, a mechanism is put in place to provide proper standardisation and certification of landscaping and horticultural skills, and thus, ensure a skilled and effective workforce for landscape designers/architects, contractors and developers to sustain our Garden City. There is also market potential in the region for expertise so developed.

To date, the Functional Map is ready for adoption. The ISSC has prioritised 7 Units of Competence from the Functional Map and identified host companies for their development, with the assistance of associate consultants appointed by PSB. NParks, as the chair of the Committee, has applied to PSB to be an approved training and assessment centre for NSRS with respect to the landscaping/horticultural industry.

Nashita Mustafa
Education Branch

OBITUARY

John W Ewart

February 1909 – 31 July 2001 Taupo, New Zealand

It was with sadness that the Gardens learned of the demise of John Ewart, who had worked for many years in the Gardens.

After studying for the Kew Diploma in Horticulture, Ewart took up the post of Assistant Curator of the Botanic Gardens on 9th October 1937. In July 1938, he was transferred within the Straits Settlement Botanic Gardens Department to Penang, where he took charge of the Waterfall Garden and the Residency Domain there for a year, returning to Singapore in June 1939. He was on leave when the Japanese occupied Singapore and was transferred to the Department of Agriculture in the Gold Coast (Ghana) for the duration of the war. He returned to Singapore soon after the Japanese surrendered and was in charge of the Gardens until the return of the Director, M.R. Henderson, in January 1946.

Ewart then lived in the Assistant Director's house and had charge under the Director of the running of the Gardens, which he discharged tastefully and efficiently. Some of the prize introductions like the New Guinea Creeper and the Jade Vine were first grown in the garden attached to his bungalow where they came under his immediate observation. In addition to this, he made regular collections of cultivated plants for the Gardens Herbarium and,

outside the Gardens, had supervisory duties in the Government House Domain, gave advice and assistance to the City Parks Department and to the Singapore Gardening Society.

In April 1946, he was appointed Agriculture Officer, Singapore, a post he held in addition to his Curatorship of the Gardens until his compulsory retirement under Malayanisation terms on 26th March 1957. For a short period (6th June to 23rd August 1954), he acted as Director of the Gardens between the retirement of M.R. Henderson and the arrival of J.W. Purseglove.

Ewart retired to Taupo, New Zealand, where he started a successful horticultural business, first in carnations then, as age caught up, a small farm with avocados, vegetables and chrysanthemums. He returned to Singapore in 1986 for the Singapore Gardening Society's 50th Anniversary, which he greatly enjoyed.

H. M. Burkill
Director, 1957–1969

Christina Soh & Ruth Kiew
Library



KEY VISITORS TO THE GARDENS (Jul - Dec 2001)

NAME	FROM
Datuk Dr Abdul Razak Mohd Ali	Forest Research Institute of Malaysia, Malaysia
Mr Abdullah Tarmugi	Minister for Community Development and Sports, Singapore
Dr Assad Kotaite	President of the International Civil Aviation Council
Dr Axel Poulsen	University of Aarhus, Denmark
Dr B M P Singhakumara	University of Sri J'pura, Sri Lanka
Dr Barbara Gravendul	National Herbarium of Netherlands, Leiden University, The Netherlands
HE BounNhang Vorachith	Prime Minister of the Lao People's Democratic Republic
Dr D S Pokle	Department of Botany, Deogiri College, India
Dr David Frodin	Royal Botanic Gardens, Kew, UK
Sir David Howard Bl	The Right Honourable Lord Mayor Alderman, London, UK
Ms Elspeth Haston	Department of Botany, University of Reading, UK
Dr Francis Ng	Forest Research Institute of Malaysia, Kuala Lumpur, Malaysia
HE Gloria Macapagal-Arroyo	President of the Republic of the Philippines
Mr Haruo Taira	Kagoshima Prefectural Government, Japan
Dr Hidanobu Funakoshi	Shinshu University, Japan
Prof Hiroshi Tobe	Kyoto University, Japan
Dr Jan Kirschner	Institute of Botany, Academy of Sciences, Prohovele, Czechoslovakia
Mr Januarius Joblik	Institute of Tropical Biology and Conservation, University Malaysia Sabah, Malaysia
Mrs Joelle Foulon	Spouse of Mayor of Arcachon, France
Dr K M Mathew	Rapinat Herbarium, Tiruchirapalli, India
HE Karel Brezina	Minister of the Government of the Czech Republic and Head of the Office of the Czech Government to Singapore
Prof Kazuo Oginome	Kochi Women University, Japan
Mr Kazuhiko Satomi	The Kochi Prefectural Makino Botanical Garden, Japan
Mr Kenichi Tsukino	Kagoshima Prefectural Government, Japan
Mrs Khammeung Vorachith	Spouse of the Prime Minister of the Lao People's Democratic Republic
Mr Kyle Williams	Department of Botany, Duke University, USA
Mr Lawrence M Liao	Department of Biology, University of San Carlos, Cebu, Philippines
Mr Li Zhenguo	Mayor of Sping City, Jiling, People's Republic of China
Mr M S Hamid FWC	Ministry of Federal and Capital Authority, Nigeria
Ms Machiko Kimura	Kagoshima University, Japan
Ms Marie Fougere	Institute de Recherche en Biologie Vegetale, Montreal, Canada
The Honourable Datuk (Dr) Mohd Effendi Bin Norwawi	Minister for Agriculture, Malaysia
Mr Osamu Sasaki	Fukui Prefecture Assembly, Japan
Mrs Phouangsy Phengkhammy	Spouse of Minister for Social Welfare, Lao People's Democratic Republic
Ms Pia Nutt	Muenster University, Germany
Mr Pieter Baas	National Herbarium of Netherlands, Leiden University, The Netherlands
Mr R D Serpent	Australian Antarctic Division, Tasmania, Australia
Prof R Natarajan	India
Mr S R Nathan	President of the Republic of Singapore
Dr Samrit Yossomsakdi	Burapha University, Thailand
Prof Shi Lei	Botanic Garden, Chinese Academy of Sciences, Beijing, People's Republic of China
Mr Shoichi Rokutan	Kagoshima Prefectural Government, Japan
Khungying Dr Suthawan Sathirathai	Spouse of the Minister for Foreign Affairs, Thailand
Dr Tsou Chih-Hua	Xishuangbanna Tropical Botanical Garden, People's Republic of China
Mr Waku Katsuaki	Chairman of Board of Directors, Association for Projects Commemorating Japan Flora 2000, Hyogo Prefecture, Japan
Prof Xian-Chun Zhang	National Herbarium, Chinese Academy of Sciences, Beijing, People's Republic of China
Mr Xue Ping	Ministry of Land and Transport, People's Republic of China



An orchid was named after HE BounNhang Vorachith, the Prime Minister of the Lao People's Democratic Republic on the 1st of November.



The orchid naming ceremony at Burkill Hall for HE Gloria Macapagal-Arroyo during her visit to the Gardens on the 26th of August.

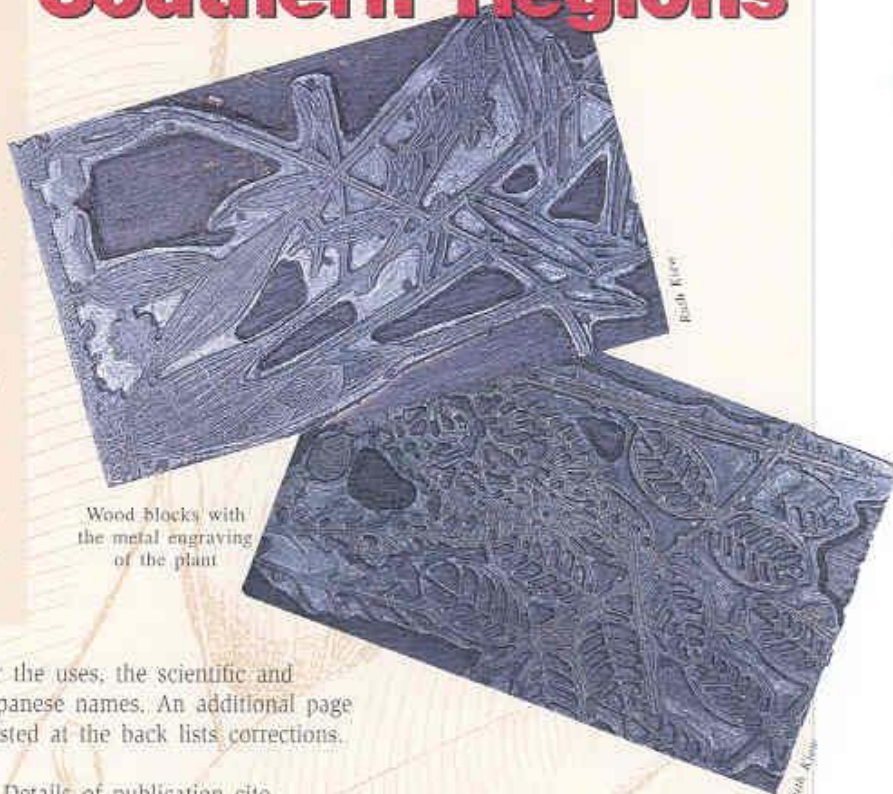


FROM THE ARCHIVES



The engraving of *Calophyllum inophyllum*.
Oil from the seeds was traditionally used
for rheumatism.

Illustrations of Useful Plants of the Southern Regions



Wood blocks with
the metal engraving
of the plant

Under a table in the herbarium is a stout wooden box. It is full of wood blocks each set with a beautiful metal engraving carved in relief with the image of a plant and its scientific name. These are the original blocks used to print a slender publication produced during the Japanese Occupation entitled *Illustrations of Useful Plants of the Southern Regions*. This publication illustrates 175 species of useful local plants, mainly medicines but also a few spices, beverages, poisons, fibres and timber. Although the title page reports it as Volume One, no further volumes were produced.

The text is in Japanese, apart from the scientific names in roman script. I am indebted to Junko Nagata, NParks Design Development Branch, for translation. For each species there is given the common Japanese name, the area and climatic zone in which it is found, and a brief description of the plant and its uses. Indices are provided

for the uses, the scientific and Japanese names. An additional page pasted at the back lists corrections.

Details of publication cite Watanabe Kiyō Hiko as editor, the Japanese Military Department as publisher, the date of printing as 15 August 1944, and date of publication as 20 August 1944.

Lieutenant Watanabe was well known in the Gardens as, according to E.J.H. Corner in *The Marquis. A Tale of Syonan-to*, he roamed the Gardens in full military uniform complete with sword. He occupied the house where Corner had lived before the Occupation. This was bare of furniture, so he drew his pictures of local economic plants on the floor.

The Annual Reports of the Gardens report that he made in all 480 drawings between May and December 1944, and that the staff in the Herbarium identified the species for him. Of these drawings, 175 were obviously used as a basis for carving

the engravings mounted on the wooden blocks. However, comparison between the two shows the engraver as the more deft artist.

At the end of the war, Watanabe left his original drawings numbering many hundreds with the Gardens. Later he became Professor Emeritus at Chubu University and, in 1969, he used these drawings to produce his weighty tome of 1147 pages entitled *Illustrated Guide to Tropical Plants* with E.J.H. Corner, Professor Emeritus at Cambridge University, providing the English text. His original drawings are still in our library archives. 

Ruth Kiew
Herbarium & Library