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OBITUARY

Dr Leong Chee Chiew – a botanist at heart

On 13 June 2024, the National Parks Board (NParks), Singapore, lost one of its longest serving stalwarts – Dr Leong Chee Chiew, or Lawrence to some, passed away in the evening after a long battle with cancer. Fortuitous in its timing, a copy of the newly published book *Commentary on Singapore. Vol 2. Economy, Environment and Population*, including a chapter on 50 years of greening Singapore from Garden City to City in Nature that Dr Leong had co-authored (Er & Leong, 2024), arrived at K.B.H. Er's office the next day. The chapter in the book encapsulates 40 years of dedicated service that Dr Leong had given to the greening of Singapore. Dr Leong's contribution was best captured in a letter penned to him by the Minister for National Development, Desmond Lee, two days before his passing: "From the time you joined the Singapore Botanic Gardens in 1983, you helped chart Singapore's green journey, from a Garden City to a City in a Garden, and now City in Nature. Singapore is greener because of your efforts." (Lee, 2024).

Dr Leong joined the Singapore Botanic Gardens (SBG) in 1983 as a research officer. He did a stint at the Strategic Planning Division of the Ministry of National Development (MND) from 1987 to 1989. In 1990, he was appointed Deputy Executive Director of NParks. When the Parks and Recreation Department (PRD) merged with

NParks in 1996, he became the Deputy Chief Executive Officer and continued in that capacity till 2020. By then, he was already past retirement, but agreed to continue to helm SBG, Fort Canning Park and Istana Gardens, and the Nature Reserves, as its Executive Director until his passing. Concurrent to his appointments, he was the Commissioner of Parks and Recreation from 2006 to 2023.

Dr Leong's contributions to the greening of Singapore are well-known to all who have worked with him in MND, NParks, the nature community and industry, and many of these were covered in the special volume of Gardenwise dedicated to Dr Leong in July 2024 (Gardenwise, Vol 63, July 2024). Perhaps, what is less known about Dr Leong was his dedication to SBG and how he worked silently to build up the science at SBG.

Growing up in Kuala Lumpur, Dr Leong went to what was then known as La Salle Peel Road Secondary School and then St John's Institution. He did reasonably well in biology, and decided to pursue botany at the University of Malaya (UM) where he graduated with a Bachelor of Science (2nd Class Honours) in 1975, a Master of Science in plant physiology in 1978, and eventually a PhD in plant physiology in 1983. By the time he completed his PhD, he had already been a tutor at UM for nine years. Frustrated at the lack of opportunities, he decided to apply for the position of research officer at SBG with the PRD, then the predecessor of the NParks. He was thrilled when the Public Service Commission informed him that he had got the job. Years later, he would recount this to K.B.H. Er, and expressed a deep appreciation of the opportunity that was given to him. Perhaps, because of this, he worked tirelessly and dedicated his entire career to progressing the Gardens, and NParks.

As Research Officer at the Gardens between 1983 and 1987, he worked on the effectiveness of herbicides to retard the growth of *Baphia nitida* G.Lodd., so that it could be maintained as a hedge (Leong, 1987a), as well as the use of herbicides for the selective control of cow grass, sedges and broadleaf weeds in Tifgreen Bermuda grass turf in golf courses (Leong, 1987b). The results showed that the right application of herbicide was able to retard the growth of *Baphia* by six months and curb the growth of weeds in Tifgreen Bermuda grass turf, thereby saving on maintenance and manpower costs. From these early years of research, he recognised that the management of the horticultural estate was closely tied to science and research, and worked hard to establish the Centre of Urban Greenery and Ecology (CUGE) when Ng Lang was Chief Executive Officer of NParks in 2011. Concomitant to this, he pushed for the certification of arborists and arboriculture research, which became cornerstone programmes of CUGE till today.

Despite taking on the administrative appointment as Deputy Executive Director of the newly formed NParks in 1990, and later as its Deputy Chief Executive Officer for 24 years, he held strongly to the mission of making the Gardens a premier tropical botanical institution, for which research in botanical science is central to its remit. Dr Leong worked closely with then Executive Director and Chief Executive Officer of NParks, Dr Kiat W. Tan, on the re-development masterplan of SBG over 16 years from 1990 to 2006. This saw the development of the Central Core that included the National Orchid Garden and Palm Valley and Shaw Foundation Symphony Stage, Bukit Timah

Core that included the Evolution Garden, and Tanglin Core that encompassed the Botany Centre. The Botany Centre brought together the Herbarium, Library, Orchid Breeding and Micropropagation Laboratory, and classrooms, into new buildings which were critical for SBG to grow as a premier botanical institution with a focus on Southeast Asia.

When K.B.H. Er returned to NParks as Chief Executive Officer in 2014, Dr Leong would often recount the challenges of establishing the Gardens to what it was then – a botanical garden worthy of inscription as a UNESCO World Heritage Site. They were aligned on the need to strengthen the scientific remit of the Gardens, and ensure that it took its pride of place amongst the botanic gardens in the world, such as Royal Botanic Gardens, Kew, Royal Botanic Garden Edinburgh and Missouri Botanical Garden. In the next decade from 2014 to 2023, Dr Leong oversaw the development of the new Tyersall-Gallop Core, which increased the footprint of the SBG from 64 ha to 82 ha, the largest in its history. In doing so, the living collections were expanded with renewed focus on Southeast Asian rainforest species, including dipterocarps, freshwater swamp species and wild fruit species. Dr Leong also re-built the Research & Conservation Branch of the Gardens, which included the Singapore Herbarium (SING), Library, and Molecular Biology and Micropropagation Laboratory, following the retirement of several key staff. He convinced P.Y. Tan, who spent the formative years of his professional career in the Gardens, to return as its Group Director and Chief Science & Technology Officer of NParks in 2019. A new scientific research team at the Gardens was set in place, comprising a core group of principal and senior researchers, and younger budding researchers. The research remit was extended into the fields of plant genomics and ecology, thereby enabling an integrative taxonomy workflow that combines alpha taxonomy with phylogenetic, phylogeographic and ecological studies, in order to better address the taxonomic challenges of plant species complexes. To support the Gardens' botanical research needs, he brought about the re-development of the molecular and micropropagation laboratory, and research collection greenhouses, as well as the development of Singapore's first seed bank. He also fully supported several currently ongoing projects such as to catalogue the Library, digitalise SING Herbarium and expand the facilities holding Herbarium and the Library collections. Dr Leong's leadership provided the impetus for a taxonomic renaissance in SBG, which saw a resurgence in the taxonomic research output on the flora of Singapore and Southeast Asia. Since 2014, the researchers at the Gardens have described an average of 47 new plant species a year, with two peak years of 62 new species in 2017 and 68 new species in 2023.

In growing the Gardens, Dr Leong was cognisant that the Gardens should not operate in isolation and sought to draw closer nexus with other botanic gardens and herbaria internationally. He encouraged the SBG researchers to actively participate in Flora projects in Southeast Asia, such as Flora Malesiana, Tree Flora of Sabah and Sarawak, Flora of Peninsular Malaysia, Flora of Thailand, and Flora of Cambodia, Laos and Vietnam. Closer to home, he felt strongly that the Gardens should work closely with other divisions in NParks and the nature community. For example, he was instrumental in the active involvement of researchers from the Gardens in the

comprehensive biodiversity surveys of Bukit Timah Nature Reserve and Central Catchment Nature Reserve, which were major undertakings led by the National Biodiversity Centre (NBC) and Conservation division, with the participation of the nature community. Likewise, he encouraged close collaboration between the Gardens and Pasir Panjang Nursery on ex-situ native plant conservation and species recovery, and Wildlife Management division and NBC on research projects. The result of these efforts could be seen in the completion of four milestone research projects that have since been published – 1) A comprehensive biodiversity survey of Bukit Timah Nature Reserve by Chan and Davison (2019); 2) Flora of Singapore: Checklist and bibliography by Lindsay et al. (2022); 3) An account of the re-discovery of 173 presumed nationally extinct plant taxa and discovery of 155 new native plant records in Singapore over 14 years, including 22 new to science and five endemics by Neo et al. (2024); and 4) A study of the birds in the Gardens' Rainforest that showed how avian functional diversity was retained after more than 120 years of turnover by Low et al. (2024). When K.B.H. Er sent the Low et al.'s paper to Dr Leong as he was undergoing the last stages of chemotherapy before his passing, he remarked in his usual serious but happy tone, "This is important science."

The Gardens and NParks were like family to Dr Leong. He would be at work as early as 6 in the morning and left the office often after 8 at night. He valued every minute he had in NParks and the Gardens, and was most happy when he could continue working after retirement. How can we thank someone who had dedicated 40 years of service to green Singapore and build a premier botanical institution at the Gardens? In the more than 25 years that we have known Dr Leong, he would shun the limelight and avoid attending any award ceremony if he could. In his own quiet way, he would work behind the scenes to make things happen. So, we surmise that he would probably not want any honorifics, awards nor accolades, but to get on with transforming Singapore into a City in Nature and making the Gardens the premier tropical botanical institution – that is the measure of the man.

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