

"This delightful book, about one of my favourite places in the whole world, has a bit of everything—science, history, fun facts and more. It's such a gripping read that once you start, you won't be able to *leaf* it alone!"

—Dr Shawn Lum, president of Nature Society (Singapore), winner of the 2017 President's Award for the Environment and senior lecturer at the Asian School of the Environment, Nanyang Technological University

"It is wonderful to see the Botanic Gardens getting the Secrets of Singapore treatment. Now a younger audience can get curious about a place that is so much more than just a park. As Singapore's best-preserved historic landscape and its first UNESCO site, the Botanic Gardens is an encyclopaedia of sometimes unlikely things, such as the tiger orchid that is so large that a crane would be needed to lift it. With this book, you can surprise your friends with quirky knowledge of the Gardens that everybody thinks they know!"

—Dr Nigel Taylor, director of the Singapore Botanic Gardens

"A wonderful book that will intrigue and engage young readers (and their parents) in the botanical treasure house that is the Singapore Botanic Gardens. Who knew that Singapore has the largest collection of orchids in the world? Or that a banana is actually a herb? Or that birds are able to disperse chilli pepper seeds because they cannot sense spiciness? All this and more await discovery by young readers of this book."

—Linda Locke, children's book author and great-grandniece of Agnes Joaquim, creator of the Vanda Miss Joaquim orchid

"A very informative book that enables our children to understand our nation's heritage by walking down the memory lane of the Botanic Gardens. The language used is simple yet able to spark the curiosity of children in a light-hearted and fun way."

-Lois Ng, Ministry of Education science teacher

SECRETS OF SINGAPORE

BOTANIC GARDENS



written by
Lesley-Anne & Monica Lim
illustrated by
Elvin Ching



Also by Monica Lim The Good, the Bad and the PSLE

Copyright © 2018 by Monica Lim and Lesley-Anne Tan Illustrations copyright © 2018 Epigram Books All rights reserved. Published in Singapore by Epigram Books. www.epigrambooks.sg

> Illustrations by Elvin Ching Edited by Eldes Tran Book layout by Chee Jia Yi

National Library Board, Singapore Cataloguing in Publication Data

Names: Tan, Lesley-Anne. | Lim, Monica, author. | Zeropointfive, illustrator.

Title: Secrets of Singapore : Botanic Gardens / written by Lesley-Anne &

Monica Lim; illustrated by Elvin Ching.

Description: Singapore : Epigram Books, [2017]

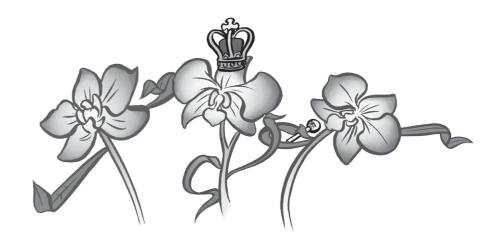
Identifiers: OCN 1020669947 ISBN 978-981-46-5547-7 (paperback) ISBN 978-981-46-5548-4 (ebook)

Subjects: LCSH: Singapore—History—Juvenile literature. | Botanic Gardens (Singapore)—Juvenile literature. | Botanic Gardens (Singapore)—

History—Juvenile literature. | Botanical gardens—Singapore—Juvenile literature.

Classification: DDC 959.57—dc23

First Edition
10 9 8 7 6 5 4 3 2 1





We discovered that some flowers smell like rotting dead bodies, some plants are creepy (literally) and some fruits are violently explosive. Besides these, we also found...



Tigers! Orchids!

Tiger orchids!

The Botanic Gardens is a wonderland of everything gorgeously green (and red and purple and yellow). Every flower, fruit and fern has a story to tell. So you see, a tree is not just a tree.

HOW TO USE THIS BOOK

The cool plants you can check out in the Botanic Gardens are marked as GARDEN GLIMPSES.

See if you can find all of them! If you need some help, just follow the corresponding Garden Glimpses number on the handy maps on pages 138–143.

Any other interesting nuggets of information about the Botanic Gardens or plants in general are marked as

FASCINATING FACT . Now it's time to part the green curtains and start the adventure!

CONTENTS

SECTION 1

A Walk in the Park	. 1
Tanglin Core	. 4
Central Core	16
Bukit Timah Core	26
Tyersall-Gallop Core	32
Blast from the Past: Conservation and Preservation	37
Animals Gone Wild: Wildlife in the Gardens	46

SECTION 2

The Weird and Wacky World of Plants: Plant Diversity
Sowing the Seeds: Plant Reproduction
How Does Your Garden Grow? Life Cycle of Plants82
Survival of the Fittest: Plant Adaptations90
Tree Cheers for Plants! Top 10 Benefits of Plants107
SECTION 3
City in a Garden125
Down the Garden Path131
Holly-Wood Plant Awards136
GARDEN GLIMPSES MAPS 138



A Walk in the Park

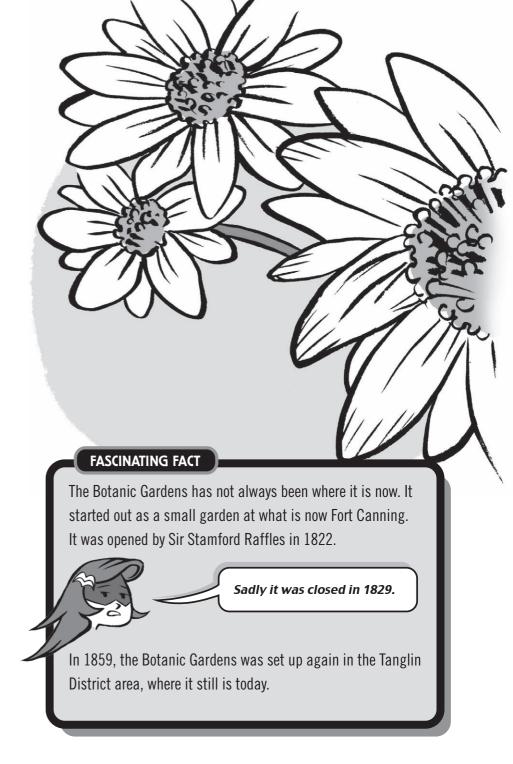
The Singapore Botanic Gardens is a beautiful place with all sorts of plants—more than 10,000 species of flowers, trees, shrubs and all things green! It is more than 150 years old and is the first botanic gardens in Asia to make UNESCO's World Heritage List.

If you're planning to visit the Botanic Gardens, and we hope you do, know that it's probably unrealistic to see everything within a day. (Well, maybe you could if you had a personal buggy or the world's longest legs.)



The Botanic Gardens today is MASSIVE. Due to various expansion efforts, it now takes up 82 hectares in the heart of Bukit Timah. That's equivalent to more than 100 football fields! (Or large enough to park almost 4,000 double-decker buses.) The UNESCO site covers 49 hectares.

The Botanic Gardens is divided into four "Cores". Each is special in its own way and it's a good idea to explore them in turn. In this book, we highlight some of the more popular areas within each Core.



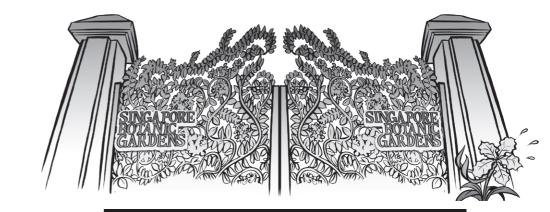
Tanglin Core

Entrance: Tanglin Gate



Back in the 1800s and early 1900s, entertainment was limited, with no TV or Internet (Oh, the horror!). There were also few places of leisure, so the beautiful grounds of the Botanic Gardens attracted many people looking to relax or enjoy the lush greenery.

Today, visitors continue to flock to the Botanic Gardens to enjoy its scenic surroundings. Many exercise enthusiasts practise yoga or taichi in the open areas, but if you prefer to chill out, you can take a slow stroll along the paths or picnic beneath the shade of trees. No matter what you enjoy, visiting the Botanic Gardens is like a breath of fresh air after being stuck indoors all day.



GARDEN GLIMPSES



Many visitors enter by the iconic Tanglin Gate, which is easily recognisable by its exquisite flowery design. The design is based on the plant *Bauhinia kockiana*, which produces bright orange blooms. If you look closely, you'll realise that the *Bauhinia kockiana* can be found right beside the swinging gates!

You might have to squint extra hard to spot those fiery orange flowers, though. That particular plant seems a little shy and, quite uncharacteristically for its species, doesn't flower much. Maybe it feels overshadowed by its cast-aluminium counterparts on the gate.



Bandstand

Live music began to be played at the Botanic Gardens from 1862. British bands performed every month at night, by the light of the full moon.



Even during the Japanese Occupation, this practice continued with Japanese bands taking up the baton.

GARDEN CLIMPSES 2

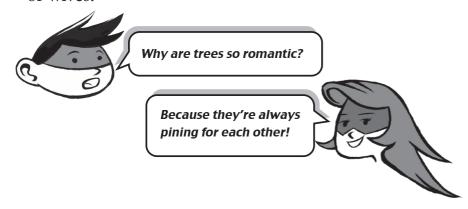
People often equate the famous eight-sided gazebo with the bandstand. In reality, the bandstand refers to the entire area of the park where the gazebo stands. The gazebo was only added in 1930 to provide shelter for the band.

You might notice that the bandstand is surrounded by rain trees. What's unusual about these rain trees is that their leaves are yellow instead of green! This is due to a pigment shortage in the trees and is a rare phenomenon. Only one in 1,000 rain trees have yellow leaves.

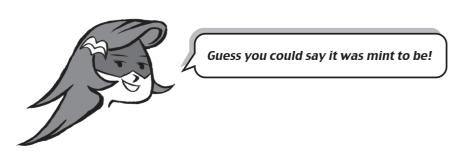
They might not be one in a million but they sure are rare!



With pretty surroundings and tuneful melodies, the Botanic Gardens has always been an especially popular place for love and romance. Back then, arranged marriages were common and the Gardens was frequently a meeting place for families to bring their children to meet their potential husbands or wives.



Today, the bandstand is still used for music performances, and it continues to be a popular venue for couples taking their wedding pictures.



GARDEN 3

Breathe in...breathe out... Smell that? If you smell something sweet, you may be near the Frangipani Collection. Frangipani flowers are often used in Hawaiian leis (or garlands) that you may have seen in pictures or in TV programmes.

However, in some Asian cultures, the frangipani is associated with death and is commonly found near cemeteries. In Malay folklore, the frangipani scent is believed to accompany the pontianak (vampire), so maybe think twice before presenting the flower to your loved one!

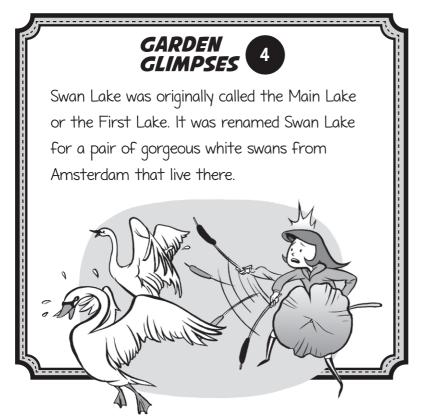


But it's so BOO-tiful!

The Frangipani Collection has old-school swings for visitors. What a lovely place to take a break and have a swinging good time.

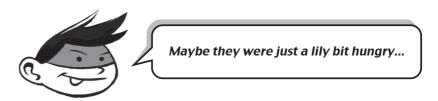
Swan Lake

Another iconic feature of the Botanic Gardens is Swan Lake. You might be surprised to know that it's an artificial lake, meaning that it didn't originally exist. Built in 1866, it is the oldest ornamental water feature in Singapore. It's a very popular spot for picnics. (Of course, we mean picnics BY the lake, not IN the lake!)



Once upon a time, there were more than swans living in that lake. In 1892, an escaped crocodile decided to settle down in the cool waters. An unlucky coolie went to draw water and was attacked! The lake had to be drained to catch the offending croc. Gee, we didn't realise the peaceful Swan Lake could be so dangerous!

Swan Lake also had beautiful water lilies, but they started disappearing mysteriously. So in 1961, the lake had to be drained—again. The culprits? Six turtles at the bottom of the lake that had been enjoying a buffet of water lilies!



Botany Centre

The Botanic Gardens is well known around the world for its orchids—not just for its variety but also for its ability to grow orchids from seeds.

Growing orchids from seeds is a complicated and precise process. Orchid seeds are very tiny and have to be treated with care in a sterile environment.

GARDEN GLIMPSES 5

The entire process of orchid growing can be seen through the big glass windows at the Botany Centre. Surprisingly, it looks more like a science lab than a greenhouse!

The various rooms are conveniently numbered so you can observe the orchids' journey step by step.

1) Media Preparation Room:

In the wild, each type of orchid has a symbiotic relationship with a specific fungus. In other words, Type A orchid needs to be around Type B fungus for the seed to grow. In the lab, however, it's impossible to find the fungus that each specific type of orchid needs.

To grow an orchid in a lab, a growing medium takes on the job of the fungus. The medium is infused with nutrients such as banana, potato and other types of vegetables mixed with agar agar jelly.



Even orchids need to eat their fruits and veggies to grow!

- 2) Transfer Room: As the orchid seedlings grow, they are transplanted into flasks under sterile conditions.
- shake it off! To clone (or make copies of) orchids, you need to reproduce many of the same cells. To do this, the flasks of orchid tissue are moved to shakers. It might look as if the tissue is doing a groovy dance but it's not for fun! The shaking confuses

 the orchid tissue as it can't sense

gravity. So instead of growing into a plant, it just produces more cells.

4) Culture Room: Some orchid tissue are allowed to grow into plants. When the plants are ready to be moved out of the lab environment, they will be transported to a regular nursery.



AWW... looks like those little babies are all grown up!



The whole process of growing an orchid takes three to five years, or longer in some cases. Incidentally, the Botanic Gardens doesn't just grow orchids in the lab. It also does this for members of the ginger family and ferns.

GARDEN 6

Did you know that the Botanic Gardens is home to possibly the oldest orchid in the world? It's a tiger orchid that was planted in 1861 by Lawrence Niven, the first manager of the Gardens. We don't think he would have expected the orchid to still be alive and well more than 150 years later!

In fact, the giant tiger orchid is not just surviving—it has become a thriving monster. Its diameter measures about 5 metres and its flower spike is 3 metres tall. That's taller than any human alive! You can see it near the prisoner-of-war brick steps (see page 45). Talk about reaching the ultimate Beast Mode!

higus

MEDIT

My Mar

... When he

MANA

14/11

Central Core

Entrance: Burkill Gate, Palm Valley Gate or Nassim Gate



National Orchid Garden

The National Orchid Garden houses the largest collection of orchids in the world—some 1,200 species and 2,000 hybrids!

Singapore is well known for orchids. The orchid is our national flower and it can be found on many of our national symbols. The first set of Singapore currency created after Independence featured orchids. Orchids can also be found on stamps, jewelry and souvenirs.

Singapore's love of orchids goes way back and its cultivation can be traced to the Botanic Gardens. Orchid breeding was started in 1928 by Eric

Holttum, director of the Botanic Gardens at the time. Holttum was very interested in ornamental horticulture (which refers to plants that add beauty to the landscape). He is known for popularising three plants in Singapore—orchids, bougainvilleas (see page 68) and frangipani (see page 9).

Clearly, Holttum thought orchids were beautiful and wanted to cultivate them. He introduced a new way of breeding orchid hybrids in the laboratory.

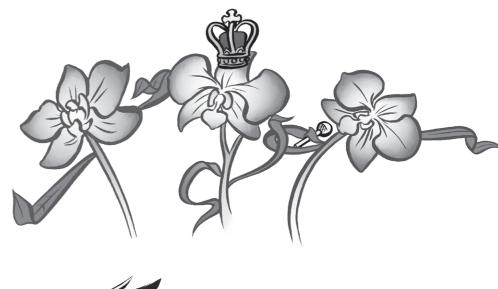
Hybrids refer to orchids that are created from the cross-fertilisation of two different types of orchid.

GARDEN GLIMPSES

The orchid breeding programme became very successful and created many spectacular hybrids. In time, orchids came to symbolise good relationships between Singapore and other countries. From 1956, the government began to name orchid hybrids after VIPs (Very Important Persons), such as Presidents and celebrities who visit Singapore.

For example, when Prince William and Duchess Kate from England visited Singapore in 2012, they received their very own *Papilionanda* William Catherine. It's an attractive white orchid with purple spots and a majestically dark purple lip.

There are more than 200 VIP orchids. Spot your favourite at the VIP Orchid Garden and Celebrity Orchid Garden!





The Botanic Gardens has the largest orchid collection in the world, but the one most loved by Singaporeans has to be the Vanda Miss Joaquim.

GARDEN 8

Meet Singapore's national flower—the lovely Vanda Miss Joaquim. She likes to dress in delicate shades of violet. She's a hybrid, meaning her parents are two different orchid species.

What did the Vanda Miss Joaquim say to her parents?

I'm proud to be y'orchid!

The orchid was named after Agnes Joaquim, who first created it. In 1981, it was chosen to be our national flower because it is brightly coloured and can bloom throughout the year.

You can see the Vanda Miss Joaquim at the Heritage Orchid Garden and near the bandstand (Tanglin Core).

Rain Forest

A primary rainforest is a tropical jungle that has never been cleared. It's hard to believe that there are any rainforests left in urban Singapore. Yet, just minutes away from the busy shopping street, Orchard Road, is a six-hectare tropical rainforest right in the heart of the Botanic Gardens.

Where do plants shop for their winter coats?





Brrr-berry!

GARDEN 9

Within this precious rainforest are some 314 species of plants. Some trees here are as tall as 50 metres (or about the height of a 20-storey HDB block) and were already standing even before Raffles founded Singapore in 1819. That makes these trees at least 200 years old!

The story goes that even up to 1908, there were still tigers in the rainforest. Henry Ridley, the Botanic Gardens director then, was said to have come face to face with a tiger when he was taking a walk one day!



More than 80 per cent of the plants in the Rain Forest are rare or endangered. They are being conserved so we can continue to enjoy them. Read more about conservation on page 37.

GARDEN GLIMPSES 10

You may have noticed that the grounds of the rainforest are mostly carpeted in dead leaves. No, they're not rubbish! As dead leaves decompose, they release extra nutrients and can help create an environment to aid plant growth.

For this reason, dead leaves are also used to cover the grounds of other parts of the Botanic Gardens.





23

Palm Valley and Symphony Lake

The Botanic Gardens is a popular retreat for visitors looking to escape the hustle and bustle of city living. A favourite spot is the lush lawn of Palm Valley overlooking Symphony Lake. The lake was named because this is where the Shaw Foundation Symphony Stage was specially built in 2004. The Singapore Symphony Orchestra (SSO) holds its regular SSO Classics in the Park concerts on the stage.

Sitting right in the middle of the water, with a roof designed to look like petals, the eye-catching stage looks almost like a gigantic flower. The perfect stage for a bloomin' good concert!



GARDEN 11 GLIMPSES

Palm Valley was so named because it's home to more than 220 species of palms. The palm tree is one of the most recognisable trees in a tropical environment, but...surprise, surprise, not all palms are trees! Some are shrubs or vines.



What about a face palm?

You may have come across a local dessert called gula melaka. Did you know that the ingredients of the dessert come from three types of palms? Palm sugar comes from the sap of a sugar palm tree, sago pearls are made from the starchy stems of the sago palm, and coconut milk is extracted from the fruit of the coconut palm!

About the Authors





Monica Lim and Lesley-Anne Tan are a mother-daughter writing team (in that order). They are co-authors of the action-packed Danger Dan children's book series.

Lesley-Anne likes quiet places and quiet moments. Yes, she's quiet. Why do you think she became a writer? From a young age, Lesley-Anne has had a passion for writing and a fascination with words. She loves literature lessons and topped her school's Secondary 4 level in Advanced Literature in 2013. The first Danger Dan book was published in January 2014, when she was just 16.

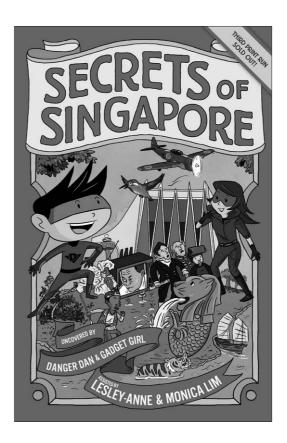
Monica is not as quiet but she has a deathly fear of public speaking. Why do you think she became a writer too? Monica runs her own writing agency for corporate clients. She also writes a popular blog on parenting and education, which inspired her first book, *The Good, the Bad and the PSLE: Trials of an Almost Kiasu Mother.* She has been featured by both Singapore and international media, including *The Straits Times, Lianhe Zaobao, Young Parents* magazine, Mediacorp, Hong Kong's *South China Morning Post* and the US documentary programme *Dan Rather Reports*.

Monica and Lesley-Anne have spoken at events, such as the Hong Kong International Young Readers Festival; the Singapore Writers Festival's Words Go Round; the National Library Board's Read! Fest; as well as at many local and international schools. Yes, that's a lot of speaking. Which is tough for one so quiet and another who dislikes public speaking. But being able to share their love of writing makes it all worthwhile.

About the Illustrator



Elvin Ching works as an illustrator and story-board artist in Singapore. He likes to create his own little comics in his free time and some of his short stories have been published in the Eisner-nominated comics anthology *Liquid City*. He has also illustrated trading cards for Marvel, comics for the *Pangu* series of books by Martha Keswick and the *Badang* mini-comic for National Day celebrations in 2016. Elvin has too many comic books at home. He has so many comics that there are some he hasn't even found time to read yet!

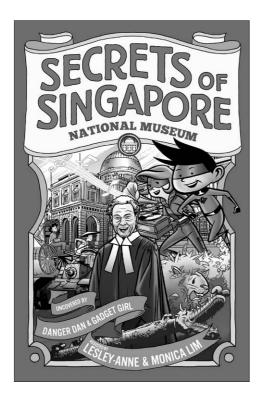


In *Secrets of Singapore*, Danger Dan and Gadget Girl uncover the nation's past, from the time of Sang Nila Utama in 1299 to independence in 1965. But wait, there's more!

They also investigate intriguing areas seldom found in your history books (shhhh!), like cinemas, airports, sports and, of course, food! Join the superhero duo as they unearth fascinating facts like:

- Which animals have escaped from the Singapore Zoo?
- How long was the very first MRT ride?
- Where can you see a tiger car? (And what on earth is a tiger car??)

The answers to these burning questions and much more in Danger Dan and Gadget Girl's guide to Singapore's past.



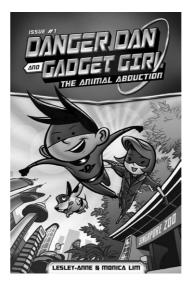
In *Secrets of Singapore: National Museum*, Danger Dan and Gadget Girl take a peek behind the pillars of the National Museum to see what secrets they guard. AND WHAT A TREASURE TROVE!

From way back to the time of Sang Nila Utama right up to modern day Singapore, the superhero duo unearths curious artefacts such as a headless horseman figurine from the 1300s, and banana money (not made from actual bananas) from the Japanese Occupation.

In exploring the Museum, Danger Dan and Gadget Girl discover that the Musum itself hides a curious past. It was once located in a school (Raffles Institution, no less!), and some of the more unusual gifts it received included an elephant and a tiger. Luckily, they were dead. Otherwise, there would have been chaos in the Museum.

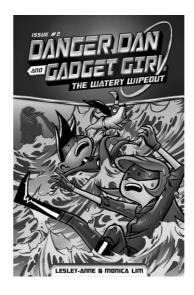
Join Danger Dan and Gadget Girl on an adventure through the National Museum and watch history come to life right before your eyes! #EpicThrowback

JUMP INTO THE ADVENTURES OF DANGER DAN AND GADGET GIRL IN FUTURE SINGAPORE

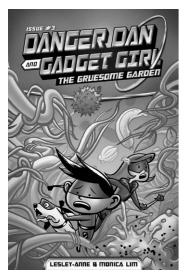


Danny and Melody are back, except they're in Melody's world now! Welcome to Singapore 2135, where cars travel on "skyways", the grass is soft enough to sleep on, and everything runs perfectly. Danny is thrilled with the brilliant gadgets...but some things are not quite what they seem.

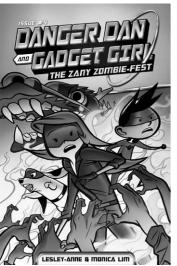
In *The Animal Abduction*, a new secret friend brings trouble to the Zoo, and Danger Dan and Gadget Girl have to clean up the mess before it grows to elephant proportions. And Danger Dan has to face his greatest archenemy once more—the Cockroach!



In *The Watery Wipeout*, Danger Dan, Gadget Girl and Power Paws navigate underground tunnels, break mind-boggling codes and even get to ride on a Hover Cab! They discover that future Singapore is an island of never-ending thrills and spills. Follow the superhero trio as they go on a heart-stopping quest to prevent Singapore from breaking out in little red spots!



In *The Gruesome Garden*, Danger Dan, Gadget Girl and Power Paws are in a leafy mess! A secret evil has taken root among the plants in 2135, causing them to have a life of their own. Join the superheroes as they untangle themselves from this overgrown problem!



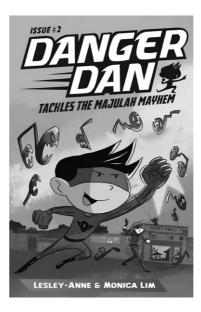
In *The Zany Zombie-Fest*, Danger Dan, Gadget Girl and Power Paws come face-to-face with the horrifying monsters of Haw Par Villa...and we're not even talking about those in the Ten Courts of Hell! The superheroes have to defuse the situation or risk becoming zombies themselves. Will they triumph? Or will this House of Horrors haunt them forever?



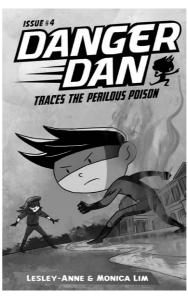
In *The Robot Revolution*, Danger Dan, Gadget Girl and Power Paws have to abandon all gadgets and rely solely on their imagination and wits to fight the technological takeover. Can they power through and pull the plug on the deadly machines? Sparks will fly, smoke will rise, smog will smother Singapore in this epic battle!

HOW DID DANGER DAN AND GADGET GIRL FIRST MEET? READ THE FIRST DANGER DAN SERIES TO FIND OUT!



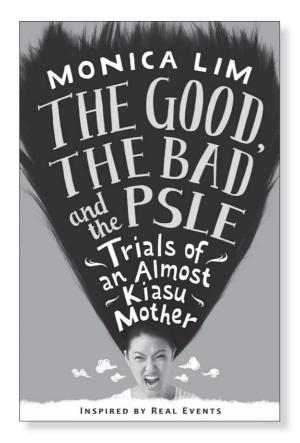








Also by Monica Lim



"This is an honest and endearing story about the trials of a mum with primary school-going children. I finished it in one sitting because the book had me laughing out loud at so many points. It was as funny as it was touching. I enjoyed it thoroughly because I could see myself and my kids behaving in the exact same way."

—Jane Ng, correspondent, The Sunday Times

Ling, a typical Singaporean mum, has made it her goal in life to help her children succeed in school. At all costs.

This (almost) kiasu mum records her journey diary-style, describing hilarious episodes involving crazy worksheets, assessment book overload and jittery parent-teacher meetings. Ling's humorous take on surviving Singapore schools will have you laughing and give you serious food for thought, all at the same time!

All books available on shop.epigrambooks.sg

"It is wonderful to see the Botanic Gardens getting the Secrets of Singapore treatment... With this book, you can surprise your friends with quirky knowledge of the Gardens that everybody thinks they know!"

—Dr Nigel Taylor, director of the Singapore Botanic Gardens

IN SECRETS OF SINGAPORE: BOTANIC GARDENS, DANGER DAN AND GADGET GIRL GO OUT ON A LIMB TO UPROOT THE SINGAPORE BOTANIC GARDENS' DEEPEST. DARKEST SECRETS.

WITHIN THE LUSH GROUNDS, THE SUPERHERO DUO FINDS A TREE SO FAMOUS THAT ITS PORTRAIT CAN BE FOUND IN ANY SINGAPOREAN'S WALLET, AS WELL AS AN ORCHID OLDER AND TALLER THAN ANY HUMAN ALIVE. FLYING BACK 140 YEARS INTO THE PAST, THEY ALSO DISCOVER THAT THE BOTANIC GARDENS USED TO BE HOME TO A MIXED BAG OF CRITTERS, INCLUDING A TAPIR WHO DREAMED OF BEING A ROCK. NOT A ROCK STAR. JUST A ROCK.



THERE'S MORE! DANGER DAN AND GADGET GIRL REALISE THAT THE BOTANICAL WORLD IS MORE TWISTED THAN THEY THINK. AS IT TURNS OUT, STRAWBERRIES ARE ONLY PRETENDING TO BE BERRIES, TOMATOES CAN'T DECIDE WHETHER THEY ARE FRUIT OR VEGETABLE, AND SUNFLOWERS ARE REALLY EVIL AT HEART.

TREK THROUGH THE SINGAPORE BOTANIC

GARDENS WITH DANGER DAN AND GADGET

GIRL. YOU WILL NEVER LOOK AT YOUR

PLANT PALS THE SAME WAY AGAIN!

fb.com/DangerDanBooks dangerdanbooks.blogspot.sg

