



into the
ORCHID HOUSE
IN SEARCH OF BEAUTY

STANLEY BREEDEN *and* KAISA BREEDEN
with BRUCE GRAY

 FREMANTLE PRESS

Endpapers: The flowers of *Vanda roeblingiana* are fragrant and about 5 cm wide. This species' home is in the cool mountain forests of Malaysia and the Philippines, where it grows into huge epiphytes, mostly in oak forests.

Half-title: *Zygopetalum maculatum* is an epiphyte on moss-covered trees in swampy forests in Brazil, Peru and Bolivia. Like most tropical orchids, it has no common name. Botanical terms such as epiphyte are explained on pages 34–38.

Frontispiece: *Cattleya intermedia* appears delicate and fragile. In fact it is tough and hardy. It has to be, for its preferred habitat is as an epiphyte in scrubby forests close to the beach, where it is exposed to salt spray, hot sun and dry periods. Widely distributed along the Atlantic coast from Brazil to northern Argentina.

Opposite: The depth of colour in the flowers of the Blue Vanda, *Vanda coerulea*, varies. Some are pale, others a deep blue. Though from the tropics, this species does not mind the cold. It ranges along the eastern Himalayan mountains at an altitude of up to 1700 metres. It is an epiphyte that grows on stunted oak trees. At times it is covered in snow. It can also withstand a dry season and warm monsoon rains.

Following pages: *Dendrobium formosum* translates into Beautiful Dendrobium, a tribute to the exceptionally large, delicate flowers. Like the Blue Vanda, this species is found along the eastern Himalayas but at lower altitudes where it is warmer, wetter and more shaded as the trees are not deciduous.

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FOREWORD

This is a book to marvel at, be enthralled, enchanted, perhaps overwhelmed. As with its predecessors by Stan and Kaisa Breeden, it breaks new ground in providing images produced through high-end digital photography. The result is an orchid photography book like no other I have seen. The quality, depth of field and alluring natural colouration achieved are genuinely exceptional.

In addition to taking the photographs, Stan has summarised the main stories of tropical orchids, their biology, collection and cultivation in succinct, readable text. Kaisa has worked miracles in digital reproduction. Bruce Gray’s lifetime of collecting and growing species of tropical orchids underpins and has enabled production of the book, affording a rare opportunity to capture images of such a diverse and interesting array of tropical orchids.

I found myself revisiting these pages again and again. Each time I saw a structure previously unnoticed, or learnt a fact new to me about commonplace and rare tropical orchids.

With so many species, the orchid family remains the richest on Earth, rivalled only by daisies. We are still learning why this is so. Modern fossil discoveries combined with insights gained through comparative DNA sequencing have revealed that the orchids have lineages stretching back tens of millions of years. They have had long periods of time to diversify, but so have many other plant families with far fewer species. Something special about orchids has enabled bounteous diversification.

The answer seems to involve the modes of reproduction of orchids, especially their pollination biology. The basic structure of orchid flowers enables countless variations that lead to differential pollination by insects, or occasional birds. Such differential pollination achieves a degree of reproductive isolation between novel variants and their parental populations. If natural selection favours such novel variants, new species are born and proliferate. So, orchid diversity may well revolve around their seemingly infinite capacity to generate new ways of reproducing in partnership with pollinators. It’s all about sex, it seems.

The ancient Greeks may have recognised this in applying the name ‘orchid’ to these plants, since it means ‘testicle’ in Greek, prosaically alluding to the shape and size of bulbs of Mediterranean terrestrial species. Perhaps a deeper meaning and evolutionary insight was also intended?

Orchids in glasshouses, with their myriad floral structures so eloquently revealed herein, unquestionably invite wonder and aesthetic delight. However, glasshouse collections won’t reveal their secrets regarding orchid pollination, unless pollinators too are captured and reproduce in captivity with orchids under study. If we are to understand the great evolutionary question of prolific orchid speciation, glasshouse collections might nonetheless inspire curiosity and motivate greater interest in seeing and studying wild populations. Such field research ultimately is needed for a rigorous understanding of the ecology, evolution and conservation of orchids. Moreover, as Stan notes, with modern tissue culture techniques, and the ease with which thousands of orchid seeds can be generated from single pods from artificial pollination in the glasshouse, there is no need for modern growers to collect plants in the wild.

Plant life worldwide, orchids included, has reached a turning point. We now have less than half of the wild vegetation that once covered the planet still growing. Moreover, threats to plant life are greatest in the two habitats where orchids are most diverse — tropical forests and Mediterranean woodlands and shrublands.

I hope this book will help inspire greater appreciation of the stunning diversity of form and colour seen in tropical orchid flowers. For this purpose, glasshouse collections like those of Bruce Gray are invaluable. Whether such collections also stimulate greater efforts in caring for the habitats occupied by the wild progenitors of glasshouse plants is a question all lovers of orchids should consider. The responsibility to care and conserve orchids in the wild lies with all of us.

I commend this book to readers who rejoice in and care about the diversity of the natural world, and congratulate the authors and all involved in the book’s splendid production.

Stephen D. Hopper AC
Professor of Biodiversity, University of Western Australia, Albany
Director Emeritus, Royal Botanic Gardens, Kew





Pages 8–9: The most dramatic of the sixty or so species of *Stanhopea* is *S. tigrina*. Its large flowers, up to 20 cm across, fill the air with an intoxicating perfume. It is so strong that some people cannot be in the same room with these flowers. The fragrance is complex, even more so than that of a good wine. Various sensitive noses have detected scents that are both spicy and sweet at the same time, with overtones of raspberry, roses and vanilla. Specialist pollinating bees can detect this perfume over great distances. The flowers last only two or three days. Endemic to eastern Mexico.

Preceding page: The Swamp Orchid, *Phaius tankervilleae*, is a tall terrestrial with a flowering stem that may reach two metres in height and carry up to sixteen flowers. Growing from eastern Australia through southern Asia and into China, it is one of the most widespread of orchids. It was the first species from tropical Asia to reach England, arriving from China in 1778.

Left: Some orchids impress because of the size of their flowers. Others, like the Bird-beak Oncidium, *Oncidium sotoanum*, spread their beauty in masses of small flowers. These 2 cm flowers are scented — strong cinnamon with overtones of vanilla in the morning and the other way around in the afternoon. Few of the 330 species of *Oncidium* are fragrant. This species' original home is in the mountains of Mexico, Central America and Colombia. It is also known as Mexico's Pink Angels.

INTRODUCTION

When introducing the subject of orchids into a conversation the usual response is, ‘Ah, orchids ...’ with the sentence trailing off into thoughtfulness, accompanied by a faraway look in the eyes as the speaker struggles to articulate the flowers’ specialness. The orchids’ mystery and allure seems to be beyond expression. Yet it is palpable. It is as if they cast a spell.

I came under this spell many years ago, but it was not until I entered Bruce Gray’s orchid house with its overwhelming array of tropical orchids from around the world that I was totally captivated. Orchid species I’d read about, dreamt of seeing, were there in front of me.

No matter how often I visited the orchid house, there was always something new, something gorgeous. Kaisa, too, was enchanted. Bruce’s orchid house is one of the most exciting and interesting places on the Atherton Tableland in far north Queensland, where we live.

So the three of us, Bruce, Kaisa and I, thought it would be a good idea to photograph as many of the orchids as was practicable. We could not possibly photograph all 1,100 species in Bruce’s care. What you see on these pages, therefore, is what caught our eye and imagination.

All the orchids are tropical, natural species with one natural hybrid. None of us has an interest in man-made orchids, the hybrids.

Kaisa and I live in the tropical rainforest and Bruce is not far away. Being a kind and generous man, he let us take his orchids home to photograph — even the rarest and his most prized. Some were in tiny pots that fitted in our car’s cup holder, others so large they needed three people to lift them onto the back seat. Our orchidmobile, as we came to call it, was often stuffed full of flowering plants. As strong winds could damage the flowers I had to drive with the windows closed. This had its advantages as many had scents that made the trip home extra pleasurable. But they could also be too much of a good thing — some scents were so strong they made me feel light-headed. At other times the smells were distinctly unpleasant, like rotting meat. I then had to drive with a handkerchief over my nose and mouth.

Once or twice a week for two years I drove over to Bruce’s place ferrying plants back and forth. I would photograph them in a small clearing in our rainforest using only natural light. There are more details about the photography in the final chapter.

In this three-way partnership Bruce provided the flowers, Kaisa took part in the photography and processed the digital photographs — something at which she is uncommonly skilful — while I took the photographs and wrote the text. Throughout we were guided by Bruce’s expertise about the world’s tropical orchids.

The scientific describing and naming of orchids — their taxonomy — is enormously complex. Names often change and new species are constantly added. We, especially Bruce, have kept up with this as best we could.

Orchids’ common names are few and not very enlightening. Some, such as Slipper Orchid, Cooktown Orchid and Moth Orchid, are widely used and understood. The scientific names of many groups have been adopted as their common names — such as cattleya, dendrobium, cymbidium, vanda, phalaenopsis and others. In this way people speak of the Pink-lipped Cattleya, Beautiful Dendrobium, Blue Vanda, Eye-spot Stanhopea and so on.

The colours of orchid flowers range from the most brilliant imaginable to the subdued and subtle. Kaisa has taken her skills to their limits to get these colours as near to the original as possible.

Botanical terms in the captions are explained in Chapter 3.

All the photographs are of orchids from Bruce Gray’s orchid house.

Stan Breeden
Topaz, Queensland
January 2016





Preceding page: Paphiopedilum glaucophyllum is a terrestrial slipper orchid from Sumatra and Java in Indonesia. It flourishes among mosses in damp soils rich in humus on rocky mountain slopes.

Left: Renanthera monachica is found only in the rainforests on the island of Luzon in the Philippines. The velvet-textured flowers are 3–4 cm long, and long-lasting. Inflorescences may be 45 cm in length and carry as many as 30 flowers.

Chapter One

THE ORCHID HOUSE

From the outside, the orchid houses impress by their size. Collectively they occupy about the same area as an average suburban home. They are surrounded by lawns and shrubs. The whitewashed glass of the main house and the green shade cloth of the other four hide what lives inside. Only the chimney, smoking on this cool morning, gives a hint of something interesting.

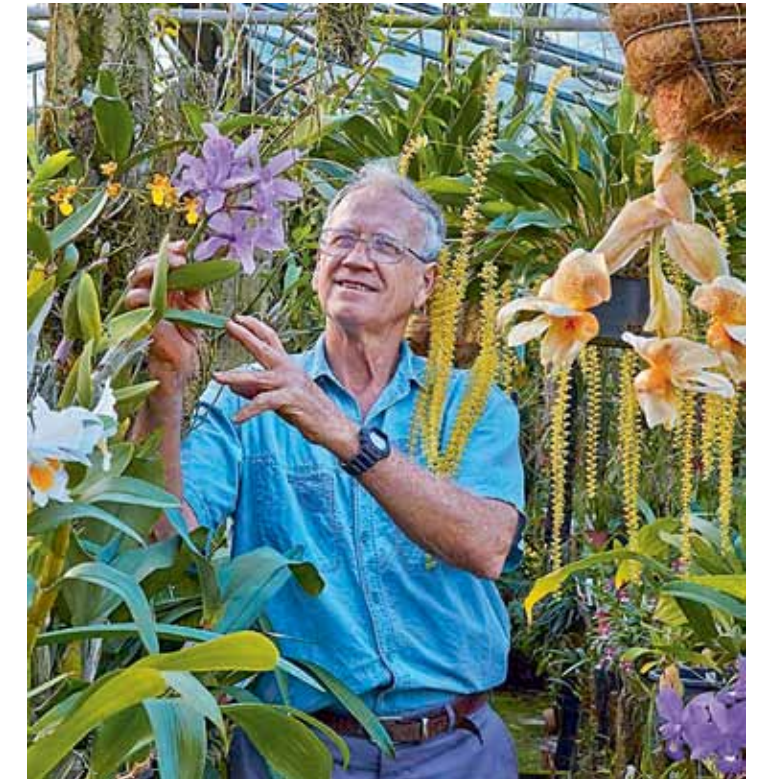
It is not until Bruce invites me to enter through the front door of the glasshouse that the wonder of tropical orchids is revealed. It seems to embrace me. I stand still, for a while letting it all sink in — the warmth, the humidity, the rich scents, the dense green growth with splashes of colour from the flowers. This is truly tropical. ‘You can feel that things grow here, and grow well,’ Bruce remarks.

The benches holding the plants are about waist-high — but nothing of them is visible. The plants might as well be on a moss-covered fallen tree trunk. Rising from the floor are more plants, reaching upwards. Others hang down from rails on the ceiling, their luxuriant foliage and vibrant flowers cascading downwards. As we worm our way through this thick jungle, parting the leaves to get through, I am confronted with cascades of large pink flowers. I recognise them as a species of *Phalaenopsis*. Up high are sprays of a bright Blue Vanda. At eye-level, a dense mat of yellow *Dendrobium* grows on a large piece of tree bark. There are scores more flowers whose identities are a mystery to me. Bruce enlightens me as we go along. He points out the intense orange flowers of a *Brassia* and a rare species from Borneo with flowers the shape of birds in flight. He pulls one out from the back of the bench and suggests I smell the maroon flowers; an awful stench like carrion. On another bench, a company of lady’s slipper orchids stand closely crowded together. For me they are perhaps the most intriguing of all flowers.

We move into a larger house, not glassed in but wrapped in shade cloth. Here I see intensely pink, large *Cattleya* flowers and sprays of *Oncidium*, brown and yellow, four metres long, that wind in and out of the other plants. Another *Oncidium* is a froth of pink. Bruce introduces me to a *Stanhopea* — an orchid I’d never heard of. This time the scent of the large pendulous flowers is unsubtly sweet. There are many fascinating miniatures. Bruce points one out and identifies it as a species of *Dracula*. It has a mottled face, red and white, with long ‘wires’ extending from the sepals. ‘Yes,’ Bruce says, ‘There is a *Dracula vampira*.’ For a group of plants to be named *Dracula* I’d imagined large, even menacing, flowers, but in this case the word means ‘little dragon’.

On and on we wander through more houses, more flowers, more scents, an occasional fine spray from an automatic misting sprinkler. For many species Bruce has a story. About a sheet of bark densely covered by an orchid with tiny flowers he says, ‘I’ve had this for thirty years and it has never been without flowers.’ Of a *Dendrobium* with wild-looking spotted flowers he says, ‘I got this in New Guinea in 1973 as a small plant.’ Now it is huge and takes two people to lift. These orchids are not static. In these tropics under one roof, they form several dynamic ecosystems, ever growing, ever changing.

Bruce was born and raised on a dairy farm surrounded by rainforest on the Atherton Tableland in far north Queensland. He loved the forests and avidly explored them from an early age. His mother grew plants, including a few orchids in a bushhouse in the backyard. It is the orchids that Bruce remembers most clearly. Rainforests and orchids



Opposite, top left: Bruce’s wife, Joy, with his prize-winning *Coelogyne rochussenii* — it had 5,400 individual flowers. Descendants of this plant are identified as ‘Joy’.

Opposite, top right: Bruce in his orchid house.

Opposite, bottom: The orchid house. Whether from the cloud forests of South America, the Himalayan Mountains of India, the mangroves of the Philippines, the rocky outcrops of Madagascar or the dense rainforests of New Guinea, tropical species thrive here.



have figured largely in his life ever since. He has travelled widely in pursuit of both but still lives on the Tableland.

When he was eighteen or nineteen Bruce bought some orchids, cattleya hybrids, and built his own bushhouse. These orchids prospered and flowered spectacularly. A like-minded friend commented that these hybrids, though beautiful, were just made by people ‘playing around’. He suggested that Bruce should grow species — the natural orchids. And that is what he has done for the last fifty years. His interest in species, combined with his love of rainforest, led Bruce to study the Australian native orchids, especially those of north-east Queensland. He became particularly interested in the orchids of Cape York Peninsula and is now recognised as one of the authorities on them.

Bruce clearly remembers his first modest greenhouse. Over the years it grew and grew, was pulled down, rebuilt, moved, extended and modified. In 2014 he added another spacious area to his complex. It filled within months. He is adamant this will be the last extension. He says, ‘I’ve got more than 1,100 species and varieties. With duplicates and a few hybrids this comes to about 6,000 plants. I just cannot look after any more than that. I’ll still add more species but I’ll just have to make room on the existing benches.’

Each of his orchid houses has been designed and modified over the years so that he has five separate areas, each with special conditions to suit particular groups of plants. The heated house is maintained at a minimum of 15 degrees Celsius, has automatic watering, humidity misting, automatic opening and closing roof and wall vents and fans. Everything except the heater was designed and built by Bruce.

The heated glasshouse is a favourite, but space is limited and plants are packed in. There is an upper storey, mid storey, bench and floor. Bruce places plants where the light is best for them. It has become so crowded that it’s hard just to get in and out, but a lot of orchids like to be close to one another. They seem to benefit from the crowding: ‘Makes it a bit more like a forest. Species from similar conditions are grouped together, it’s more natural that way. I sometimes tell people they should put their tiger-shooting hat on before going in because it’s just like a jungle and you never know what you might find.’

Bruce has described more than twenty new species of orchids and discovered many others during his travels. Before retiring, he worked for almost thirty years as a botanist and botanical collector for the Forest Research Institute of the CSIRO in Atherton. He still collects in his spare time.

To collect treetop botanical specimens such as leaves, flowers and fruit, Bruce takes his shanghai and shoots a lead sinker attached to a light line high into the canopy. Branches and twigs are then pulled down with a heavier line. In this work with tall trees Bruce also found new species other than orchids. Some sixteen of them have been named after him.

A visitor from the Missouri Botanical Garden in the USA invited Bruce to visit Ecuador to see some of the orchid forests there, and also practise his slingshot skills. These skills have since taken him back to Ecuador, Peru and Vietnam several times, and to Madagascar, Panama, Fiji and New Caledonia. Here, too, he found new species of orchids, some of which are named after him. He also travelled to Borneo and New Guinea.

There is no one place Bruce likes above all others — ‘anywhere there are plants, but especially rainforest, all feel good’ is his comment. He adds that an orchid grower should look at plants in the forest as often as possible. ‘You get a feel for where the plants are and the conditions under which they grow. Seeing one plant in the wild is worth more than a book of notes,’ he explains.

When a particularly beautiful orchid flowers in the greenhouse, such as *Cattleya intermedia* (frontispiece), Bruce often wonders what a really big plant in full flower in

Opposite: Not all the beauties in the orchid house are large and flamboyant. The flowers of *Kegeliella atropilosa* are only 3 cm across. Its original home is in the cloud forests of Central America.





the rainforest would look like. 'Ah, that would be absolutely fantastic. Mind-blowing. They are quite rare now. But I've seen some amazing things. To see hundreds, more likely thousands, of Cooktown Orchids in flower in a Cape York monsoon forest is something that gets you going.'

Bruce's expertise, and the lessons he learned by going into the forest and seeing plants growing there, were highlighted in 2010 when he won the Australian Orchid Council's Species Orchid of the Year award. It was for a magnificent *Coelogyne rochussenii* (see page 19), a species from south Asia. The plant scored a First Class Certificate, with 91.8 points out of a possible 100. The plant's 76 weeping inflorescences, each about a metre long, formed a curtain of 5,400 flowers. Bruce named this particular plant 'Joy' after his wife. He also won the Australian Species Orchid of the Year in 2002 with an Ecuadorian species, *Gongora scaphephorus*. His orchids have won numerous other awards.

Bruce constantly adds new species to his collection, nowadays mostly through swapping with other growers. 'I love to exchange,' he says, 'and of course having so many species I have a lot to bargain with. In this way I'm constantly in touch with a great many growers.'

For Bruce, his orchid house is a constant delight. It also has friends around the world, people who are in awe of the beauty and wonder it harbours.

Above: *Bulbophyllum mastersianum* is an epiphyte from hill forests in Borneo and Indonesia.

Opposite: *Rhynchostele bicktoniensis* bears its fragrant flowers on a stem about a metre tall. It loves the cool high forests, at an altitude of up to 3,000 metres, in Mexico and Central America.

Following pages: *Dendrobium polysema* comes from the mossy rainforests in the mountains of New Guinea, where it grows into large epiphytes. Bruce has had this plant since 1973.





