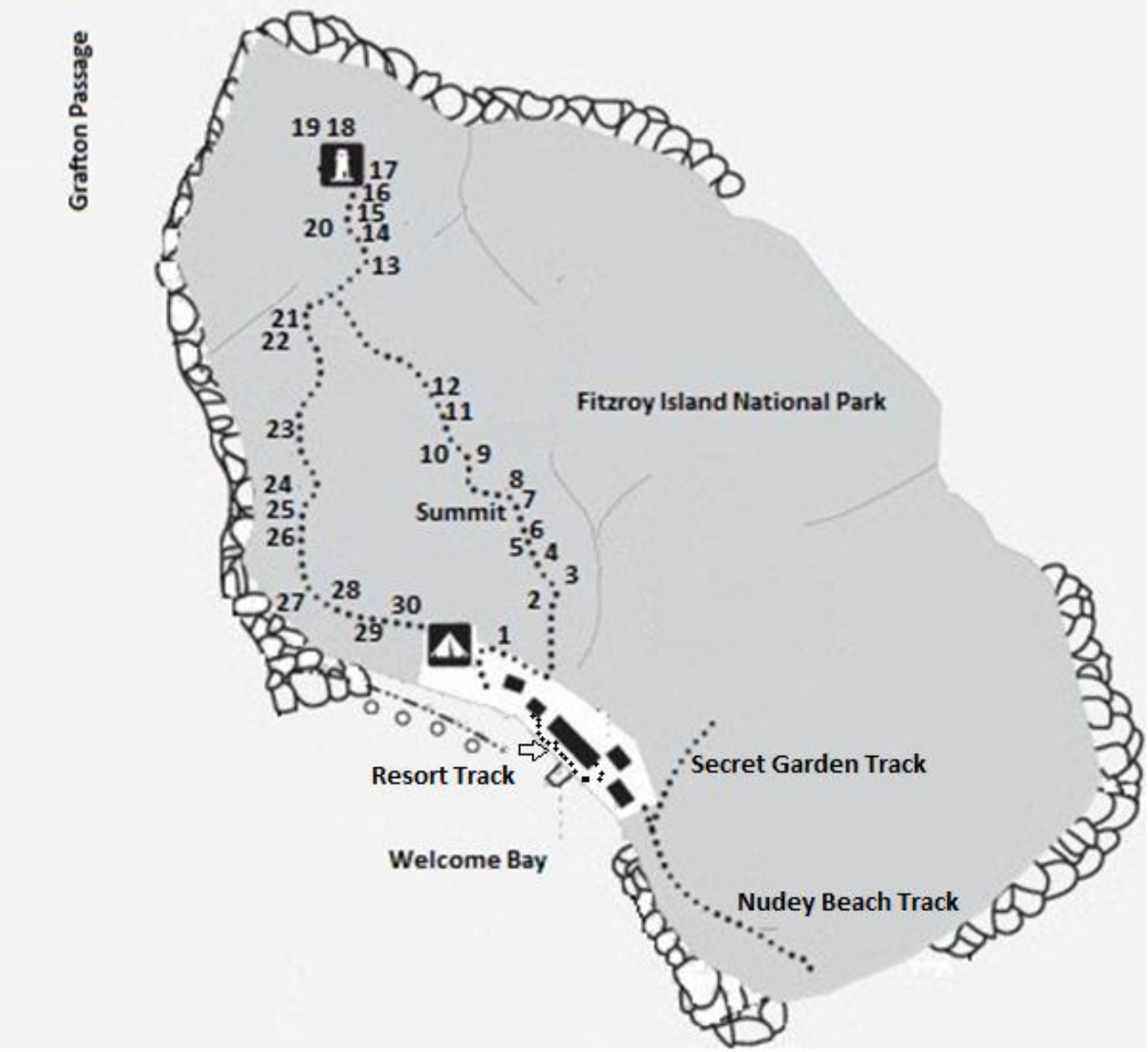
The Ultimate Self-Guided Booklet:

Summit/Lighthouse, Secret Garden, Nudey Beach and the Resort Grounds



Plus bonus material: Fitzroy Island Tropical Fruits and Fitzroy Island Bad Boys!

IF YOU INTEND TO UNDERTAKE THE SELF-GUIDED SECRET GARDEN TRACK, BE AWARE:

1. Queensland Parks and Wildlife Service recommend allowing 45 minutes to complete the return loop
2. Take plenty of water, good walking shoes, a mobile phone and sunscreen
3. Leaf litter debris can hide holes created by submerged granite boulders to the side of the track. To prevent injury never leave the path
4. You are moving through a National Park so be mindful of the flora and fauna and do not throw any rubbish away. If it was not too heavy to carry when full of water and/or food, it is not too heavy to take back empty!!!

The information in this booklet is dedicated to all those that have called Fitzroy Island home, from the island's original inhabitants, the Gunggandji people, to the military and lightkeepers who each played their role in shaping the island's fate. The Gunggandji were walking these paths before paths existed, living off these trees and surviving in this forest for thousands of years before the first European explorers ever set foot on this land.

When war threatened our shores the men of the No. 28 Radar Station stepped up to protect these lands; their influence can still be seen across the island today as can the Lightkeepers that came after them. Each served their country in isolation in lieu of modern comforts. They performed their tasks with total diligence in the knowledge that any lapse could cost those that relied on their services dearly.

This guide has been brought to you by J. Moloney and Fitzroy Island Resort

Contents:

Self-Guided Summit and Lighthouse Historical Hike

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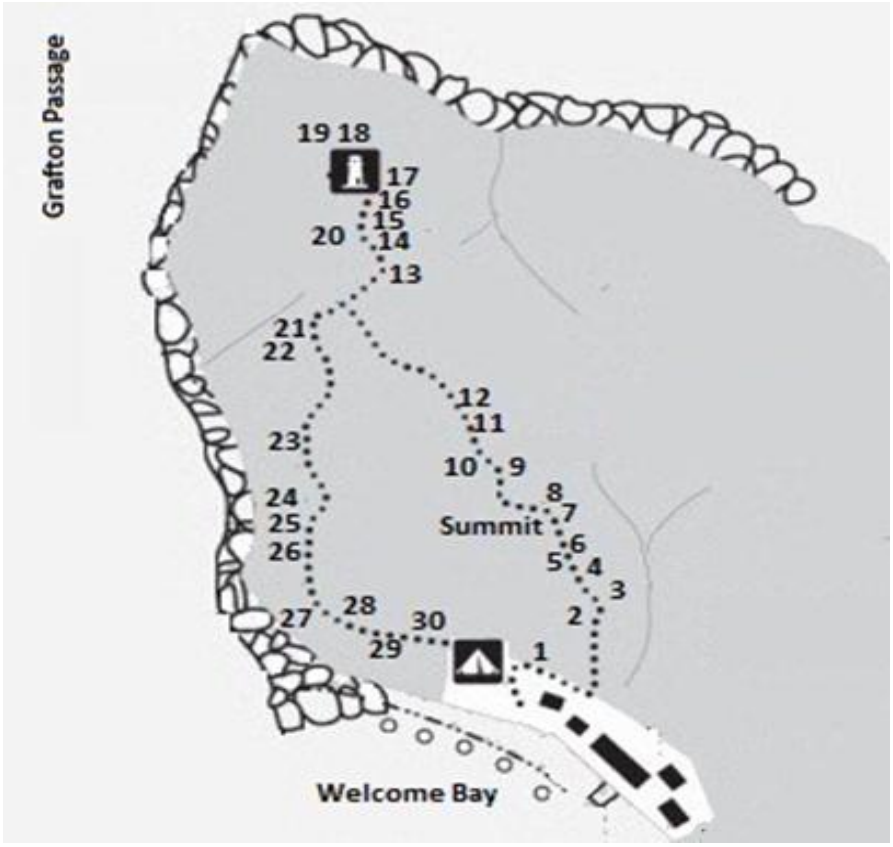

The track may not be exactly as it appears in this diagram

Take only photographs; leave only footprints

Abbreviations

A/S	Anti-Submarine
Doover	The combination of the RDF, tower, transmitter, receiver, aerial and personnel hut
F/O	Flight Officer
HotH	House on the Hill
IJN	Imperial Japanese Army
L/A	Leading Aircraftmen
LISA	Loop Indicating Signal Apparatus
Lt	Lieutenant
MCS	Mesoscale Convective System
QPWR	Queensland Parks and Wildlife Rangers Service
RAAF	Royal Australian Airforce
RAN	Royal Australian Navy
RDF	Radio Direction Finder
WSS	Wireless Signal Station
W/T	Wireless Transmitter

Fitzroy Island: home of No. 28 Radar Station and the Lightkeepers

In the lead up to the war members of the IJN were scouring the northern coast disguised as fishermen. They examined various islands and inlets to map locations that could prove useful after they joined the fight. A team arrived on Fitzroy Island in November 1938 and made note of its numerous freshwater springs before being discovered and forced to flee ahead of the coastguard *Vigilante*. From the moment war broke out in Europe, Germany had Raiders cruising Australian waters sowing mines along the coast and attacking merchant vessels. As conflict spread across the Pacific Theatre, IJN submarines joined their German counterparts prowling Australia's shores and striking at her vulnerable shipping. Their joint campaign was so effective that it has been labelled the most successful enemy campaign ever undertaken against Allied shipping in Australian waters. In retaliation a series of Radar Stations were established along the coast: an additional 19 stations were erected and manned in 1942 alone. Six were dotted along Tropical North Queensland's east coast. One was No. 28 Radar Station on Fitzroy Island. Radar Stations played a significant role in locating and identifying enemy vessels.

At the dawn of World War II, radar was a revolutionary new technology that had a significant impact on the outcome of individual battles and, ultimately, on the war itself. The improved technology had to be kept a strict secret and Fitzroy Island was no exception: one of the Station's guards faced disciplinary action after he spoke freely about the Station and its work while on shore leave. Regulation Identification Cards had to be recalled and reprinted after those dispatched to the island identified the Unit as an RDF Unit and a security breach was reported when food supplies were labelled 'Fitzroy Island' rather than 'Cairns'. Very few images exist of the island during the war years; cameras were immediately confiscated by the Officer in Charge and guards were mounted at the buildings to prevent unauthorised access.

The Unit was formed from a combination of the RAAF and RAN, and collectively known as No. 28 Radar Station. The servicemen operated multiple defensive devices including a Lighthouse, W/T, WSS, RDF and Submarine Indicator Loops. The Unit officially began work on 21st December 1942 and was closed on 4th October 1945.

Throughout the war Fitzroy Island hosted over 100 men during one of the most stressful periods in Australia's history, and they played their part brilliantly. They safely guided hundreds of servicemen to safety and successfully identified and monitored one, possibly two, enemy submarines that had penetrated the Grafton Passage. They cut the first road across the island's mountains and created a small community, portions of which remained behind after the war.

As the decades progressed their influence over the island gradually diminished as the Lightkeepers came into their own, reshaping the face of Fitzroy to meet their different needs. In the 1950's Fitzroy Island was declared a National Park and the QPWR began efforts to restore the island's native beauty. However, some remnants from both preceding periods remain, forever linking the tourism destination we know and enjoy today to the isolated island experienced by the servicemen and their Lightkeeping successors.

1. **Dam constructed by No. 28 Radar Station Personnel, 1942**
   Visual Sighting: rear of the Dam alongside track (marker on the right hand side)

   This island has always enjoyed an abundance of fresh water flowing across several small creeks and streams. They cut their way down the mountainside and have shaped the face of Fitzroy. When No. 28 Radar Station personnel arrived they recognised the need for a dam and with military efficiency they swiftly created a small weir. The structural integrity was so sound that it is still in use today with very few alterations to the original design. The roof was purposely built to avoid mosquito infestations and the station avoided the outbreaks of dengue fever and malaria which were prolific in Cairns. In fact the No. 28 Radar Station was regarded the cleanest station in Tropical North Queensland. Sadly, this achievement was lost as the years progressed due to unsanitary conditions in the showers leading to an infestation of tinea.

2. The Hazards of Mines
Visual Sighting: scrubland (marker on the left hand side)

Mines were a constant hazard for wartime shipping. Whilst some sinkings were the result of minefields sown by enemy vessels, it turned out to be our own mines that proved the most hazardous. Defensive minefields were laid with banal regularity along strategic coastal positions. Occasionally a single mine would slip its mooring and float freely on the currents where it became a serious hazard to Allied shipping.

Mines haunted the waters around Fitzroy Island between 1943 and 1952. Individual cylinders would pop up periodically, threatening both the ships anchoring inside Welcome Bay and the safety of those ashore. Some mines were defused by specialist teams, but others were not spotted in time, and exploded against the granite boulders framing the beach.

One mine surpassed the rest for its impact on the island: following Japan's capitulation when Japanese foreign minister Mamoru Shigemitsu signed the official declaration of surrender aboard the USS *Missouri*, wartime activities all over Australia started winding down. The team on Fitzroy Island was busy preparing to shut down the station when a mine erupted on Fitzroy's foreshore igniting the surrounding vegetation and unleashing a wildfire of epic proportions. The men of No. 28 Radar Station fought desperately to save their camp, their equipment and their very lives. The fire burned with such intensity that the smoke completely obscured the Lighthouse's beam for several days. By the time the fire was doused nearly half the island lay smouldering. The electric cable used to power the light was so impaired that it took another week to return the beam to full capacity.

3. Submarine Indicator Loops in Welcome Bay
Visual Sighting: view over Welcome Bay (marker on the left hand side)

Submarine Indicator Loops were an effective tool for locating submerged enemy craft. Special cables were laid across the sea bed, able to detect the minute magnetic pulses emitted by passing submarines. There was no method that a submarine crew could employ to prevent this; even if a submarine was degaussed or 'wiped' it still emitted a magnetic pulse that created small, detectable currents.

The Indicator Loops in Welcome Bay were positioned in three loops called lobes. The main lobe was placed in the centre of the two smaller lobes, each of which was inclined at 25° to the main lobe. The two smaller lobes had 20% of the main lobe's strength. All three lobes met in a 'tail' that led to shore. A conductor was fitted to the right lobe to act as a variable resistor used to equalize the resistance of both half-loops, and located inside the Loop Control Hut on shore. When a magnetised vessel passed over the conductor it produced an induced voltage that was recorded on specialist equipment located inside the Loop Control Hut, monitored by members of the RAN. When a Japanese submarine was discovered lurking in the Grafton Passage, its movements were carefully monitored using a combination of the Submarine Indicator Loops and the RDF equipment.

4. Coastal Convoys
Visual Sighting: view over Welcome Bay (marker on the right hand side)

Despite the defensive minefields strewn along the coast, Japanese submarines were a constant presence. Their surprise attacks exacted a far greater toll on Allied shipping than those of the German Raiders. In the first six months of 1943 IJN submarines sank ten vessels along the Queensland coast alone, damaged three and unsuccessfully attacked a further eight. This forced the Australian Government to introduce coastal convoys. Merchant and troop ships travelling through Australian waters were joined by anti-submarine escorts. These escorts ranged from Corvettes to Destroyers, Sloops, Submarine Chasers and Torpedo Boats. During the day the convoys were monitored by various RAAF aircraft hovering above.

Welcome Bay was recognised as a perfect rendezvous location for the warships as they exited and entered convoys according to need. On 24th June 1942 HMAS *Swan* detached at Fitzroy Island from a convoy escorting the SS *Swartenhondt* as it shuttled refugees from Port Moresby to Townsville. HMAS *Swan* then joined the corvette HMAS *Bendigo* at anchor in Welcome Bay, lingering until the SS *Tasman* and *John Jay* passed through on their way to Port Moresby. HMAS *Swan* and HMAS *Bendigo* promptly joined the ships as their protective escorts. This is one example from hundreds of wartime transactions in Welcome Bay; most days saw a warship or two waiting patiently off the island for their next convoy.

5. The Grafton Passage: the only open coastal path between Tropical North Queensland and the Frontline
Visual Sighting: view over Welcome Bay (marker on left hand side)

The Great Barrier Reef was extensively mined in a bid to close off the numerous channels allowing enemy access to the Queensland coast. HMAS *Bungaree* periodically toured the reefs around Cairns to lay fresh minefields. The only coastal path left open to Allied shipping was through the Grafton passage, past Fitzroy Island. This made the Grafton Passage extremely busy, as Cairns was the main port for dairy, timber, crop farms and cattle stations. In addition to local produce, the city accounted for a quarter of the supplies imported from America, as well as every merchant and military craft en route between Townsville and the Papua New Guinean front line, and from Papua New Guinea to every major battlefield further abroad. All in all, No. 28 Radar Station had its hands full confirming the identity of every single craft to pass the island, both on the water and in the air. Throughout 1943 the team was processing over 200 plots a day. This decreased as the war progressed: from 1944 onwards the station focussed less on confirming the identity of craft and more on assisting returning pilots to land safely; especially those who had become disorientated.

6. Amphibious Landing Craft practice
Visual Sighting: view over Welcome Bay (marker on the left hand side)

In the lead-up to the 1944 Borneo beach assaults several beaches around Cairns were transformed into training grounds for Amphibious Landing Craft. On 31st October 1944 the Combined Operational Fleet set sail for Fitzroy Island to allow their crews to gain vital experience negotiating the coral reef surrounding Welcome Bay. This practice would prove essential when the time came to pit their skills against the Japanese defenders in the Pacific Theatre.

7. The Cross
Visual Sighting: extremely faint red cross painted on far end of large boulder facing platform (marker on the right side of the track, near rock when approaching platform)

It is not known when this cross first appeared, nor who painted it. There are several possibilities. Chaplains regularly toured Fitzroy Island holding services for the members of No. 28 Radar Station who wished to attend. It is possible that the cross was marked by the military chaplain so that the men could enjoy the island's beautiful views while listening to the Word.

It is equally possible that the cross was painted in the decade after by a bereaved relative who had just lost a loved one. Head Lightkeeper L. Daniels lost his wife tragically in February 1955, when she slipped from rocks while collecting shells, and drowned. Misfortune struck again the same year when Lightkeeper W. Leahy succumbed to Weil's disease at Christmas time. The Lightkeepers' operational log does not record whether the bodies were removed from the island or if they were buried somewhere on Fitzroy.

8. Radar Beacon

Visual Sighting: metal fragments embedded in multiple granite boulders around platform (marker on the ground towards the largest granite boulders)

A beacon is a radio transmitter for air and sea navigation. Beacons are often described as the radio equivalent of a lighthouse since the transmitter sends out a Morse code transmission either on Long Wave (150 – 400 kHz) or Medium Wave (520 – 1720 kHz) frequency. When No. 28 Radar Station operators were attempting to locate the electrical signal emitted by unknown vessels they would first identify its signal frequency, a feat they could accomplish through the beacon. The next step was to determine the craft's direction of travel by calculating when the signal was at its weakest versus its strongest. This method allowed members of No. 28 Radar Station to track the enemy submarine discovered in 1943 and to redirect Allied aircraft to a safe landing.

The beacon had to be serviced regularly, especially in the humid tropical atmosphere where electrical fatigue occurs more frequently than in cooler climates. On one occasion a number of men were at the Summit carrying out maintenance on the beacon and its framework when a fire spontaneously erupted from the surrounding scrub. The cause of the fire was never discovered. If you look closely you can still see several metal fragments from the beacon's structural support carved into the Summit's giant granite boulders.

9. Z-Force Commandos training for *Jaywick*

Visual Sighting: view over Grafton Passage (marker on the right hand side)

During the war Cairns was predominantly a military town and one of the many top-secret military organisations operating out of its scrubland was the House on the Hill, also known as the Z-Experimental Station. Off limits to civilians, the HotH was one of many locations utilised by the legendary Z-Force, an elite Commando Unit whose members were dropped deep behind enemy lines to perform sabotage, reconnaissance and to train natives in guerrilla warfare. Their most famous raid was the remarkable Operation *Jaywick.* A small team of 14 travelled to Singapore aboard a refurbished fishing boat where six broke off to paddle 50Km undetected into Singapore Harbour. They laid limpet mines and sank seven ships, equating to 40 000 tons. The team spent a full 33 days in Japanese territory disguised as fishermen before they escaped back to Australia. It has been labelled "*the most audacious and longest sea-raid in the history of naval warfare*".

The team trained hard in the rainforests around Cairns to prepare for their mission. One of the greatest endurance tests they were subjected to was to paddle 1217Km (as the crow flies) between their secret Commando School on Fraser Island and the HotH. It would have taken the men directly past Fitzroy Island. What the men of No. 28 Radar Station thought of the bizarre group paddling along through the only remaining wartime shipping channel can only be guessed at.

10. Insulation Threads used to power the Island

Visual Sighting: tree lined with insulation cups (marker on the left hand side)

Look closely at the trees and you can see where insulation coils have been positioned. These allowed both telephone and electric cables to thread between the generator located at the Base Camp and the various pieces of electrical equipment distributed across the island. Storms were a constant issue for the personnel of No. 28 Radar Station. They blew down insulator trees and created power failures. On 6th September 1944 a fierce gale shook the island. By the time it passed, half a mile of telephone line had been blown down and the power supply had shorted. Two mechanics were sent to locate the cause. After hiking half a mile up the steep slope in the middle of the night (carting a particularly heavy ladder) they discovered the cause of the short was an electrocuted Flying Fox entangled between the 'hot' and 'neutral' cables.

11. The Old Lighthouse

Visual Sighting: various concrete bases and random remnants (marker on the right hand side)

In 1929 a small automatic Swedish gas light had been established on Little Fitzroy Island, but it proved too weak for wartime shipping. By 1943 a larger, stronger light was constructed on Fitzroy Island; the concrete foundations from the various structures are all that remains today. The light was housed in a fibro and wooden building with the light itself resting on a concrete base not far off the ground. It was powered through a 19/064 triple braided hard-drawn wire attached to a 240-volt electric supply back at Base Camp. The new light had a visibility arc over 40° and 1½ million candlepower strength. The strength of the beam (combined with its position approximately 400 feet above sea level) allowed the light to be seen at a distance of 30 miles, giving a ship two hours to correct its path as necessary. The new Lighthouse was manned by an Officer and two Naval Ratings and became fully operational at 21:00 hours on 14th August 1943.

It was quickly discovered that the rotating oscillating lens panels had created a distinctive – and completely accidental – characteristic of blinking Morse code to passing ships. By pure chance a ship travelling too far north of the safe passage would see one long flash followed by two short flashes: Morse code for "D" (go down). A vessel too far south of the channel saw two short flashes followed by a long flash: Morse code "U" (go up). Any craft positioned perfectly in the channel merely saw four even flashes every 16 seconds.

In 1947 responsibility for the light was transferred to the Lightkeepers. Improvements had already been made to the conditions around the light, and the Lightkeepers continued to build on the RAN's expansions. Over the years the light went from a simple affair to having its own power source, with two independent generators housed inside a small engine shed, fuel and water tanks, and a garage. An alarm system was linked to the Lightkeepers' homes to alert the men whenever a fault developed during the night. A small lighthouse beacon was erected on Little Fitzroy Island to further enhance the light's capabilities.

12. Building a Road

Visual Sighting: the road (marker on the right hand side)

Today's road is the result of years of improvements made to the initial dirt tracks created by the men of No. 28 Radar Station. The uneven tracks wreaked havoc on the island's vehicles both during the Armed Forces' occupation and during the Lightkeeper years. The Lighthouse jeep underwent weekly maintenance to repair the destroyed steering column, burst tyres and blown motors. Occasionally the damage was too difficult for the Lightkeepers to restore and a mechanic was shipped across from the mainland.

One morning Head Lightkeeper Daniels was returning from shutting down the light when the brakes failed at a most inopportune moment – just as he was negotiating the steepest part of the Lighthouse track. The vehicle overturned and Daniels was thrown out. A doctor was brought out to treat his injuries. A few weeks later his bad luck continued when the alarm sounded at midnight. After locating and fixing the problem, Daniels was stumbling back down the path when he slipped on some roadside rocks and cut a deep gash into the sole of his foot. It took a day to stop the staunch blood flow and five days of rest before he could return to active duty. By the end of 1954 the decision was made to concrete the road. The Lightkeepers immediately began clearing trees and levelling the track. Concreting began in earnest in early 1955 following a second incident where the jeep overturned. Work was temporarily put on hold after Daniels' wife passed but resumed soon after and was completed within months.

13. Former Horse Paddock

Visual Sighting: random star pickets scattered throughout scrubland (marker on the right hand side)

Today there is a strict law forbidding pets from visiting Fitzroy Island; they are not even allowed to walk on the beach. Though Fitzroy Island was designated National Park in the 1950's, the land leased to the Lightkeepers was outside it; a technicality that allowed the Keepers to have pets. One of the Lightkeeping families reportedly converted the area in front of you into a horse paddock. Looking closely, you can see some old fence markers and a small oasis where a minute spring upwells. A stone wall had been built around the spring by the military to give the men working at the RDF Station a small weir, allowing easy water collection. Years later it proved a convenient drinking trough for the horses. The Johnston family also kept guinea pigs. One day the children were attending lessons when one happened to glance out the window in time to see a 6m Scrub Python (its body as thick as an arm) inside their guinea pig cage. Its mouth was wrapped around the closest animal as the others huddled in the corner and quaked. The guinea pig was quickly rescued and the offending snake driven off via a serious tail shaking. For the rest of its life the unfortunate guinea pig had an elongated body like that of a sausage dog. As events transpired, it was the only guinea pig to survive the episode. The others all died of fright. Not every encounter with a wild animal left an unpleasant memory. The Johnston's also stumbled across a stubbled, abandoned baby cockatoo while on the island. It never grew feathers but came to be a beloved family pet called George. George recognised his own name. If he ever heard a familiar "*Hey George*" on the breeze he would propel himself forward and teeter determinedly down the steep Lighthouse road with a responding "*hello hello hello*" to meet his family part-way. When Governor Ramsay's wife met George she was so taken with him that she knitted him his very own jumper.

The island's last Head Lightkeeper was J. Edington, whose family had pet dogs. Their dog Panda suffered terribly from fright during storms. After a Resort was constructed in the 1980's Panda became an island legend. She was frequently discovered hiding beneath the manager's caravan or swimming around the pool where she sought comfort during storms. The Edington's often received phone calls to collect their soggy pet when the thunder rolled overhead.

14. Remnants of a Storage Shed

Visual Sighting: concrete base (marker on the right hand side)

The Lightkeepers had a standing order with a barge to bring fresh supplies. Between two and nine hours were devoted to unloading the delivery, carting the various materials to their designated locations and reloading the empty containers back onto the barge. Some provisions went into the storage sheds positioned near the beach. Others were allocated nearer to the Lighthouse, and some necessities were directed to this storage shed built alongside the new cottages in 1960.

15. Former Night Watch Hut

Visual Sighting: old track leading to former Night Watch Hut position (marker on the right hand side)

The men of No. 28 Radar Station had to man their stations 24 hours a day. Those working in the Indicator Loop Hut could stumble back to their rooms quite easily, but those coming from the Doover had to traverse the uneven, narrow track back to Base at the foot of the hill. The steep track was dangerous enough during the day; at night it was almost impossible. It was especially perilous for the RAN personnel manning the WSS. They were not always able to make it back to their sleeping quarters at the end of their shift; especially during inclement weather. A small shack was erected near the Doover to allow exhausted men to sleep nearby and reduce the number of unnecessary injuries. A photo of the night watch hut is one of only two images known to exist of No. 28 Radar Station. During the era of the Lightkeepers, the clearing was used as a medical emergency helicopter pad. *Fitzroy Island Resort does not endorse visitors leaving the structured path to look for the location of the former Night Watch Station.*

16. The Radar Station

Visual Sighting: portions of a defensive stone wall and random metal fragments of radar scattered throughout scrub (marker on the right hand side)

The stone wall, remnants of which are visible here, was a defensive structure common around Radar Stations. The idea was that the small walls would hamper the forward momentum of advancing enemy troops in the unlikely event of the area being stormed. The small delay could theoretically give the men inside time to destroy the specialist equipment, and some RDF Stations had bombs built into the structure for this very purpose. A few remnants of the burnt-out RDF are scattered throughout this patch of scrubland. An RDF is a device designed to trace the direction of a radio signal back to its source. It can locate an unknown enemy transmitter by comparing the signal using two or more measurements of known transmitters (or two or more signals from known locations). By 1939 the British had created an improved system that could accurately locate a signal within seconds. It was a game changer. Over the course of the war Australian scientists redesigned radar sets to permit rapid assembly/dismantling in the field as well as the capacity to withstand extreme humidity. They created a special light weight radar (LW) Radar unit which could be assembled in the field within a few hours. The Australian LW unit on Fitzroy Island functioned at 200MCS.

The Doover underwent regular maintenance and was extensively camouflaged. The excessive humidity of the tropics created a phenomenon known as tropicalisation that degraded sets prematurely and could effectively knock a radar out of action. This was experienced several times by the team on Fitzroy, and resulted in serious operational delays. On more than one occasion hundreds of passing boats and planes had to be manually plotted over the course of a day while the equipment underwent repairs. *Fitzroy Island Resort does not endorse visitors leaving the structured path to look for the scattered metal remains of the Radar Station.*

17. The Lighthouse

Visual Sighting: Lighthouse (marker on the right hand side)

The original lighthouse was shut down in 1973 after this one was established. The new light was weaker, and proved less effective; it is not known why those in charge decided to go with a weaker beam. Perhaps they had started to rely more on boats using advanced technology to guide themselves. Whatever the reason, the light remained an essential source of guidance. The Lightkeepers often received telephone calls reporting that the light had failed when in fact it was operating perfectly; its beam was just too weak to penetrate certain weather. Several attempts were made to strengthen it including installing solar panels to the roof. These were destroyed when Cyclone Joy swept across the region in 1990. The damage to the light and surrounding compound sped up the Government's decision to close the station in favour of a small automated light on Little Fitzroy Island. This became functional in 1992, marking the end of the Lightkeepers' era on the island.

18. Rastus' Grave

Visual Sighting: view over the Grafton Passage from Lighthouse (marker facing towards the Grafton Passage)

Selected members of the RAN remained behind after the war to continue to service the light. Control was finally transferred to the Department of Transport and Shipping in 1947 followed immediately by the appearance of the first Head Lightkeeper, M.V. Rooke. Rooke brought his trusted dog Rastus with him. When Rastus passed in 1949 Rooke built his beloved pet a beautiful grave complete with tombstone. Rooke selected his location before anything else was here – there were no houses or structures in the vicinity, it was just scrubland. It was complete chance that the selected site was so close to where the new lighthouse and compound would be constructed more than a decade later. Rooke was not alone for long; his wedding in 1950 became the first known wedding hosted on Fitzroy Island. The newlyweds honeymooned in Port Douglas for a week before returning to duties. *Fitzroy Island Resort does not endorse visitors leaving the structured path to search for Rastus' Grave. There is no clear path to the grave site. There is physical risk and danger in searching for it. The original collapsed gravesite nearby is an additional hazard.*

19. Wireless Signal Station

Visual Sighting: view over the Grafton Passage from Lighthouse (marker facing towards the Grafton Passage)

The idea of establishing a WSS on Fitzroy Island was first raised in the opening months of 1942. At the time the suggestion was put on hold in favour of a RDF Station with the use of a W/T. In theory the island's personnel could use the W/T to radio through vital information to the Cairns Fighter Sector. But the system was deeply flawed: every W/T set in the region was tuned to the same frequency. If another Station was broadcasting, the team on Fitzroy had to wait until the channel was clear. This could cause delays of up to two and half hours. Should the wireless connection between Fitzroy Island and Cairns fail (as happened on occasion) then the island's transmissions were redirected to the No. 27 Radar Station on Dunk Island. The issues did not end there. Once the information reached Cairns it had to be decoded by the Cairns Fighter Sector office (located in Trinity Beach) before finally reaching the Naval Officer in Charge. This slowed the exchange of information and doubled the chance of human error, especially as the personnel in Cairns had a reputation for making mistakes.

By 1944 the focus of No. 28 Radar Station had shifted from defence to guidance. The Axis threat to Allied shipping had passed and the Unit was increasingly relied on to assist returning Allied Airmen who had become disorientated. Adding a WSS to the island allowed the Ratings to communicate with the pilots easily and without delay. Members of the RAN selected a building site near the RDF and the new WSS was completed in February 1944. The surrounding defensive stone wall was built as a theoretical means to delay advancing enemy troops. This wall and the concrete base of the hut are all that remain today. The men were additionally given a signal lamp to further aid their communication capabilities. Owing to the advances made in the Pacific Theatre by the end of 1944, the need for the WSS quickly passed. As result the WSS ceased operation at 23:59 on 31st December 1944, after just ten months of service. Its operators were trained to replace those managing the Lighthouse. *Fitzroy Island Resort does not endorse visitors leaving the structured path to search for the WSS remnants – they are minimal. This is off the National Park track and has no path. Leaving the structured path is dangerous. Any injuries sustained from ignoring this advice are: a) the responsibility of the individual involved and b) taken in the knowledge of the added risk involved, as it is impossible to provide first aid in this location*.

20. The Lightkeepers' Cottages

Visual Sighting: the former Lightkeeper Compound (marker on the right hand side)

After the war the majority of the military buildings were sold to Yarrabah Mission on the condition that they be removed from the island; the few that remained were for the express use of the Lightkeepers. They included a pump house connected to two water tanks, the ablutions and laundry room, a recreational room and a solitary building. The last two were converted into two one-bedroom cottages for the Lightkeepers and their families to live in. Conditions were cramped, so in 1956 the decision was made to build two new homes. At that point both of the Lightkeepers had families of five and the Head Lightkeeper had another child on the way. Despite the urgency the project was only completed in January 1960.

The new three-bedroom cottages were luxurious by comparison. The original plans (based on Thursday Island's Lightkeeper homes) were expanded to include a pantry, a servery between the kitchen and dining room and extra storage space, including a spot to store fuel. The new homes were also given electric lighting, hot and cold water services, a septic tank, water storage tanks, clothes lines and the added luxury of linoleum. The complex created around the two homes was greater still with a new store room, work shop, office, garage and two fowl houses (allowing the families to house their birds separately). A box room was built specifically for holding the Lightkeepers' personal effects when they were on holiday, as their temporary replacements would move into their homes in the meantime. The fence was constructed around the compound to keep the island's feral goats away from the Lightkeepers' vegetable patches and gardens. A generator room was added later to complete the ensemble.

At the time of construction, the island's light was still located near the Summit. An underground cable was established linking the light to the new cottages to signal the alarm whenever the light faulted. The Lightkeepers took it in turns to answer the alarm should it sound overnight. The majority of the time the fault could be found and rectified with relative ease but on more than one occasion the Lightkeepers were forced to mount an all-night watch on the beam until a mechanic could be brought out to fix the issue.

21. Former Dam

Visual Sighting: old pump shed within revegetation area (marker on the right hand side)

Once the Lightkeepers had relocated to the new complex it was too inconvenient to keep using the military dam to collect water. A quick scout of the area turned up another freshwater spring closer to the centre of operations. A pump shed (still visible today) was erected and a dam was quickly established in the small gully below. After the Lighthouse closed in 1992 this land automatically reverted to National Park. QPWR were swift to establish the gully as a revegetation area in the hope of returning it to its native state.

22. The Japanese Submarine, 8th – 17th May 1943

Visual Sighting: view over the Grafton Passage (marker on the right hand side)

No. 28 Radar Station discovered a Japanese Submarine lurking in the Grafton Passage on 8th May 1943. The Unit monitored the craft for several days as it avoided several attempts by the RAN to destroy it with depth charges. The skipper of A/S *Fairmile MS 426* spotted the craft on the surface recharging its batteries between the south-eastern point of Cape Grafton and Fitzroy, moving south-east at an estimated speed of 18 – 25 knots. The craft disappeared behind the island but was briefly seen again to the south. The sighting confirmed the Unit's suspicions that they had discovered a Japanese I-Class Submarine. The I-Class was built up to 400 feet long and capable of achieving speeds of up to 24 knots on the surface. In addition to its arsenal of torpedoes, some I-Class submarines carried 42 mines while others held either reconnaissance aircraft or midget submarines.

Its presence highlighted the fact that Japan was aware of the role played by Cairns in moving reinforcements to the front. All ships were ordered to keep clear of the area until further notice. A/S warships descended on the Grafton Passage determined to find and destroy the vessel as it skilfully evaded them time and again. After several days it became clear that the craft was not in the region to lay mines or attack shipping. Its refusal to retreat following its discovery suggested that it had a specific mission to complete. Several theories were proposed including that it may have been taking weather soundings or making observations of Cairns' harbour defence and patrol systems. It was also speculated that the submarine may have been dropping or collecting agents after the RDF detected it suspiciously motionless at the surface for a period. The Cairns region was notorious for leaking secret military information throughout the war, but despite several investigations, very few spies were uncovered.

In the early hours of 17th May the island's Wireless Transmitter was suddenly jammed so that it was impossible to communicate with its mainland counterparts. At first it appeared that the submarine was merely testing the system to see what alternative frequency the W/T would use after the main channel was blocked. As time ticked slowly by a new suspicion arose: the IJN could be trying to determine whether No. 28 Radar Station was using the advanced 271 type radar set. This technology was vastly superior to the Japanese equivalent and some Japanese officers had credited it with being the highest level of air defence in the world. It was supposed that the IJN was attempting to capture a working 271 type radar. Tension filled the air as the servicemen braced themselves for a possible raid. The team was particularly vulnerable owing to the IJN's intimate knowledge of the island that had come from their 1938 reconnaissance. Fortunately for the men, the 271 type radar was not the unit in use on Fitzroy. The island's personnel continued to plot the submarine's movements diligently until the jamming suddenly ended and the submarine slipped quietly away into the darkness. (See also #28.)

23. Investigating a Second Beach for Landing Materials
Visual Sighting: steep hill leading to Lighthouse Road (marker on the right hand side)

By 1946 the RAN agents left behind to run the light had tired of the old, time-consuming method of landing their supplies (see also #29). They began to consider an alternative landing that would allow a vessel to pull right up to the beach to load and unload supplies. The RAN proposed creating a new road departing from the Lighthouse track near your current location and threading downhill to a small strip of beach to the north-east of White Rock. A surveyor, J.E.G. Stevenson, came out to examine the location but found the 'beach' was too narrow to penetrate far enough to land supplies. Stevenson also realised that it would be next to impossible to clear a workable road down the side of the hill in the exact line the RAN proposed. He suggested a potential alternative path but noted that it "*will be obstructed by some granite boulders which will have to be shot apart"*. In the end the military decided that it was easier to keep using the system in place, despite its many drawbacks.

24. A Kaleidoscope of Road Repairs
Visual Sighting: several obviously altered patches of concreting along road (marker on the right hand side)

In 1946 the decision was made to ease some of the strain on the power supply by installing a small power generator at the RAN's Lighthouse. Store sheds and fuel tanks were constructed nearby and a space was cleared to allow vehicle access. However one issue persisted: the track was a shambles after four years of use. It was poorly graded, bombarded with black dust, had one steep turn of 300˚ and nearly 200m of the track was exposed along a steep elbow. Three quarters of the road was subject to heavy scour and half the track was scarred with deep ridges, some between 12 and 15 inches deep. It was decided that the track linking the enhanced Lighthouse facilities to the Campsite had to be improved before a vehicle could be brought to the island. In addition to re-grading the path, the decision was made to physically relocate an eighth of the track so as to avoid the worst of the dusty pinch, and to widen it so that the jeep could travel right up to the light, easing the burden of carting everything by hand. These were the first road works to be performed on Fitzroy Island since the first tracks were cut.

This rickety track endured for nearly a decade, bogging the Lightkeepers' jeep in the wet season and shaking its steering column into oblivion during the dry. The first concrete road was laid in 1955; the Lightkeepers hauled bags of coral up the steep path to mix with the concrete and pour the initial foundations. To save time they did not bother to remove large rocks but merely poured their concrete straight over the top. This meant that in the following years some parts of the road degraded before others. For the next forty years various Lightkeepers were tasked with repairing the road damage. In the early days they continued to haul coral and sand to the top of the track for mixing. As the years passed the coral was gradually replaced with stones, and most recently, simply sand. As you walk down the road you can see the various repair jobs undertaken by the 59 Lightkeepers that tended the road after the initial foundation was laid. You can see portions where they deviated from the previous path or used different ingredients in their concrete. Some had their children and pets leave footprints or scratch initials in the concoction to leave a permanent reminder of their time on the island.

25. The Issues with Electrifying an Island
Visual Sighting: tree with protruding metal fragments (marker on the right hand side). ***Since this was marked the larger tree over the road collapsed and snapped this tree during its fall. The remnants of both are over the bank; you can no longer see the metal fragments***

9000 yards of triple braided hard-drawn wire was intertwined between the trees ("*higgledy piggledy*" as one man expressed it) to power the military's various pieces of electrical equipment. The trees were often blown over in strong winds creating electrical shorts and on occasion igniting fires. By the time No. 28 Radar Station was disbanded most of the island's wire had been destroyed by bushfire, as had the Radar Station itself. In subsequent years more of the trees that were utilised as insulation poles have been destroyed and several of

those that remain have lost the white insulation cups. Despite this, sharp eyes can still detect the tell-tale signs of human habitation.

26. Insulation Threads and Coils: The Ever Present Threat of Electrocution
Visual Sighting: fallen tree with insulation cups on side- starting to slip over cliff (marker on the right hand side)

Storms were a major issue for Radar Stations operating in the tropics: they interfered with the equipment, created shorts in the electrical wiring and brought the threat of electrocution. No. 28 Radar Station was not immune. Two men were electrocuted within the first six months of operation. L/A J. W. Hillier was sent from Townsville to re-calibrate the radar. He was working in the RDF hut during a thunderstorm alongside an unknown member of the radar station. L/A J. W. Hillier was on the phone reporting to the station's Commanding Officer, F/O Thomas (at Base Camp) as the unnamed Unit member radioed the Cairns Fighter Sector. Suddenly the structure they were sheltering inside released a flow of water that permeated the battery and sent a blue electrical arc into both men. It exploded with a deafening roar, flinging the pair nine feet into the air. F/O Thomas believed they had been killed and hung up the phone with a *"Well they're gone. That's the end of those two"*. As the shocked team absorbed the news two smouldering figures suddenly appeared in the distance staggering down the hill – extremely sore, but alive. It was more than could be said for the equipment. The incident blew the main power generator located at the Base Camp and seared every power line so that nothing electrical worked on the island for several days afterwards.

27. Abandoned Storage Shed and Drum Stand
Visual Sighting: concrete base and former diesel fuel stand (marker on the right hand side)

A launch arrived from Cairns three times a week bringing fresh food supplies and other equipment to the men of No. 28 Radar Station. It took an average of two and a half hours to make the passage (longer in rough conditions). By the time the launch arrived, the food had often been spoilt by salt water contamination. Despite the unreliable quality of the food, the servicemen kept limited provisions on the island and relied on their regular supply run. This changed after the introduction of the Lightkeepers: it could be weeks between visits from supply barges, so large quantities of fuel, food and other articles were held in numerous positions around the island. The Lightkeepers kept several store sheds near the landing beach to hold the bulk of the supplies, and they set up a simple stand to hold the fuel drums. After the first hotel was introduced on Fitzroy Island, the Edingtons would often find tourists waiting in vain beside this shed for a bus to carry them up the hill. They were not always impressed to discover that no such bus existed. For the Lightkeepers, hiking up the hill was a normal part of their day. One Lightkeeper favoured walking backwards as he felt it was easier but Edington's wife was so proficient that she could balance a grandchild on each hip while carrying a handful of towels and washing as she climbed.

28. Loop Control Hut
Visual Sighting: remains of decrepit shed through trees (marker on the left hand side)

It is believed the broken-down structure visible in the bush may be the only original building left standing from the days of World War II; all others have vanished over time. This structure is outside the military compound; it does not appear in the original drawings highlighting the numerous buildings within the base, nor does it appear in any of the RAAF maps marking the positions of their integral structures distributed across the island. There is only one building that we know was on the island and yet does not appear in any records. That is of course the Loop Control Hut, the structure that received the information from the Submarine Indicator Loops concealed inside Welcome Bay. It had to be located close the shore but sufficiently concealed to be invisible to enemy vessels. It is hypothesised that these remains may be that structure, stripped of its equipment and left as an empty shell for the Lightkeepers to use as they saw fit.

Typically there were nine pieces of equipment crammed inside a Loop Control Hut. The first was the Balancing Box, a variable resistor connected to the submerged Submarine Indicator Cables. The Balancing Box received the signals and printed the resulting 'sound waves' through a Recorder for RAN Ratings to analyse. The result is similar to that of a seismograph. The Adjusting Box helped to analyse the data while the LISA amplified the signals with the help of an Amplifier and a Loudspeaker. The Integrator fed the original information through to the Amplifier and Recorder, while a small motor drove the Recorder and the Input Transformer Box provided power to the rest of the equipment.

When the Indicator Loops signalled the presence of the Japanese Submarine in 1943 it was up to the RAN to determine whether the signal was genuine. The enemy craft was positively identified with the aid of the RAAF manning the RDF. However, the recordings made of the submarine on 16th and 17th May were at odds to those made between 8th and 15th May. An Investigative Team travelled to the island to help locate the craft and concluded that the anomaly gave the impression that a second, larger submarine was operating around the island on 16th and17th May. After the submarine slipped away the Lead Investigating Officer, Lt. Benbow, rounded off his detailed report of the incident by stating that it was in fact possible that a second submarine had appeared and been the one to challenge the island's RDF by jamming its transmitter.

29. Barge Deliveries

Visual Sighting: faint traces of previous path through scrub (marker on the right hand side)

The topography of the island's fringing reef meant that the military launch was only able to bring supplies to within 200 yards of the shore. The rest of the distance was too shallow for the vessel to navigate successfully. No. 28 Radar Station had a small dinghy and a flat bottomed boat to traverse the remaining gap. Personnel made multiple return trips on their small crafts collecting the provisions, which then had to be transferred to the relevant storage facilities by hand. As the war stretched on the men took advantage of repair work undertaken at their Base Camp to commandeer surplus material and build a timber slipway. This made launching dinghies significantly easier. To the men this was an integral addition to their possessions as they were beginning to depend on fishing for both stimulation and food. It was little wonder they were relying on fresh catch. A report of conditions dated May 1944 found that the Station was being supplied with tins of milk that had expired the previous year. With the return of peace, the slipway was removed along with military structures. A decade later the Lightkeepers found themselves facing the same predicament. They took the first opportunity to add a boat shed and a small boat ramp to the construction work taking place on the island. Fishing was just as vital to those living on the island in the later years – it afforded both entertainment and an alternative food source. Over time several Lightkeepers built up their knowledge of the area's best fishing locations which they would visit at every opportunity.

30. No. 28 Radar Station's Base Camp

Visual Sighting: Turtle Rehabilitation Centre (marker on the left hand side)

Members of the Cairns Harbour Board arrived on Fitzroy Island in 1942 to build the first of the station's facilities. They selected the area where the Turtle Rehabilitation Centre stands today. The civilians were withdrawn as the first members of No. 28 Radar Station arrived so that the Unit could concentrate on building their top-secret facilities, chiefly the RDF station and the Loop Indicator Hut. The Unit worked with such diligence to establish their station that seven men were hospitalised within three months. Each languished in hospital between two weeks and a month – some were hospitalised multiple times. Their bad luck did not end there; two of the Unit's members were killed in a plane crash.

For those that made it to the island, maintaining their mental state was just as important as tending their physical health. Over the years the various Commanding Officers had their hands full trying to control their

men. Despite the isolation individuals managed to sneak back into Cairns without permission with audacious regularity. The Commanding Officers encouraged the off-duty servicemen to channel their energy into fishing, badminton, volleyball, football or one of several indoor sports instead. Some men took to making coral necklaces while others created a vegetable garden to supplement their rations. One of the Airmen was a former surf lifesaver from Sydney. He supervised the production of a shark-proof cage around the rocks to allow the men to participate in his favourite pastime: swimming.

By the beginning of 1944 the various structures littering the Base Camp were falling apart as multiple storms took their toll. The Signal Hut required waterproofing and the windows needed repair to avoid a second electrocution event. Both of the Ratings' living quarters were on the verge of collapse. One had been rendered completely uninhabitable after portions of the roof caved in. The second had a splintered crack running the length of the wall. It left the men inside decidedly nervous each time a strong wind swept through. Even the Officers' Sleeping Hut was not immune: the roof was close to giving way and one wall was gradually caving in; the top had blown in some 18 inches, a gap that was slowly increasing with time. The situation worsened when the men staffing the WSS arrived, putting more pressure on the already limited living facilities. Emergency repairs were postponed time and again so that the situation had barely started to improve when the station was closed. The final act of No. 28 Radar Station personnel was to strip all the military equipment from the island. The servicemen were careful to avoid exposing the secret technology to members of the general public. The majority of the Base Camp structures were dismantled and the raw materials stripped from the island. The Lightkeepers moved into the small, un-airconditioned units with their families. They relied on meat safes suspended from the ceiling to prevent ants and other insects from spoiling their food. Wives cooked dinner over a wood-fire oven and grew various fruits and vegetables (which were often pillaged by day trippers coming across on their own vessels). For their children, Fitzroy Island provided an idyllic childhood (although the goannas proved far too friendly on more than one occasion whilst they were using the outside bathroom).

The remaining buildings were slowly removed over the following decades as different sections were opened and closed by the Lightkeepers, Park Rangers and the tourism industry. The island's changing face has reflected the alterations in Fitzroy's role as it gradually evolved over time into the island we see and appreciate today.

Self-Guided Secret Garden Rainforest Ecology Walk

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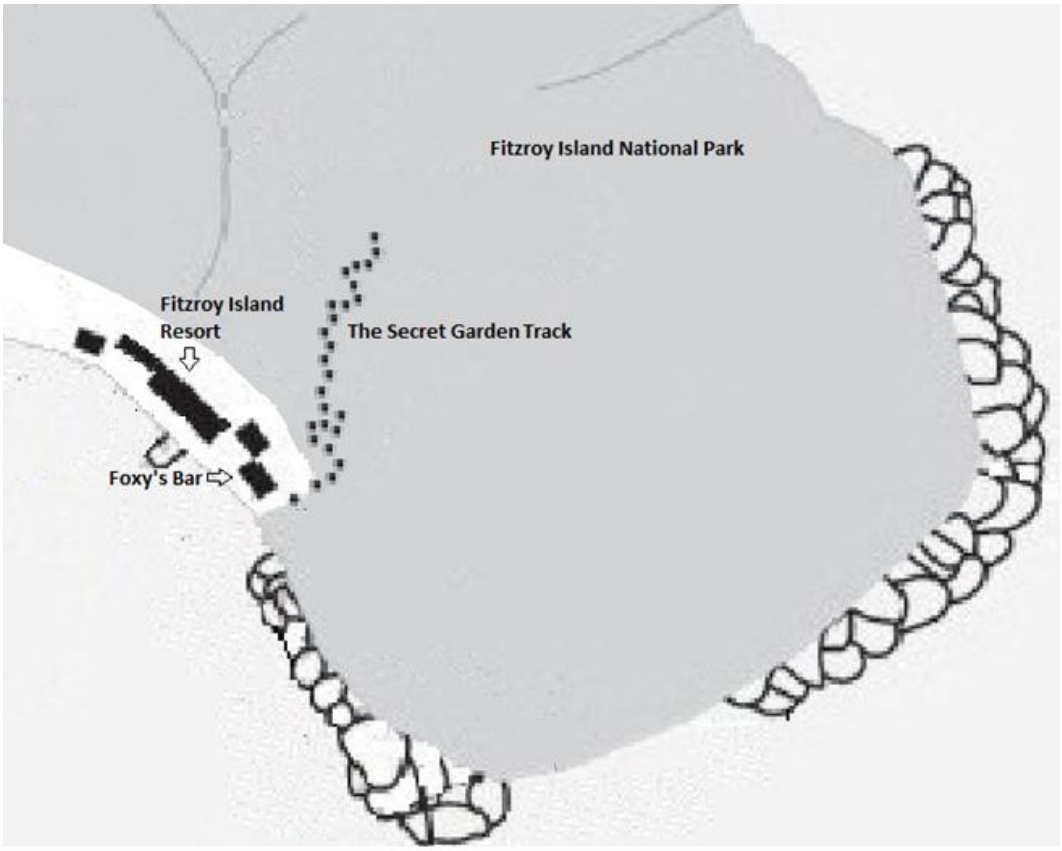

The track may not be exactly as it appears in this diagram

Take only photographs; leave only footprints

The Secret Garden: Rainforest Ecology at its Finest

Rainforests are incredible places. They cover a mere 6% of the Earth's surface and yet it is estimated that between 40% and 75% of all living flora and fauna are indigenous to their ecosystems. This includes two-thirds of the planet's flowering plants! A single hectare of rainforest can contain up to 42 000 different species of insects, 807 species of trees and 1500 species of higher plants. It is estimated that millions more have yet to be discovered, hidden in the deepest regions of the world's rainforests. These organisms live in a balanced ecosystem where individuals actively contribute to their surrounding environment. Their collective efforts are responsible for the splendour we see today. Because of their high levels of biodiversity, people expect rainforests to grow in nutritionally rich sediments. In fact, rainforests are the opposite. The soil is so nutrient-poor that it is almost barren. It is the collective effort of the plants and animals within all working together that create the abundance of life you see before you. Should any of the individual species making up the collective community be removed, the entire ecosystem could disappear from the loss of their fundamental relationships. The Secret Garden is a prime example of highly successful ecology at its best.

It is always recommended to stick to the walking track, bring water and wear insect repellent.

1. **Vines**

Visual Sighting: various vines intertwined alongside track (marker on the left hand side)

An incredible 90% of the world's vines grow in tropical rainforest ecosystems. Some vines begin life amongst the debris on the forest floor; others begin amongst the branches. The seedling's location is dependent on where the bird, bat or other animal 'deposited' their seed - which is a nice way to say "wherever the animal pooped it out". Once established, the vine quickly grows to the canopy so that it can access daylight. Once they can harvest that much-needed energy source, vines spread to other trees; threading them together in a large support network. This enables the vine to reinforce their host trees by providing a brace against strong winds. This is particularly important as most rainforest trees are typically shallow-rooted and top heavy; making them vulnerable to the impact of strong winds. But intertwined vines can also be detrimental. Should one host tree collapse, the well-established vine network will mean the weight of a fallen host is distributed amongst the surrounding trees; often causing others to collapse in its wake. It's the rainforest version of dominoes.

Vines can be detrimental to the health of their hosts in other ways as well. Vines ultimately compete for sunlight against their host plant; this is a competition they often win as they are able to dedicate a greater portion of their growth to leaf production as opposed to establishing a strong trunk. Trees that are heavily-burdened with excessive vine growth often have a reduced growth rate and produce significantly fewer fruits and/or seeds than their vine-free brethren. Vines also compete with their hosts for water and nutrients. Liana vines (long-stemmed, woody vines) often twist so tightly around the limbs of their host that they have been known to make some branches snap beneath their weight. Breaking limbs and felling hosts open gaps in the rainforest canopy. This phenomenon creates opportunities for saplings to establish themselves- without this opportunity most saplings perish. It is estimated that only one tree in 10 000 saplings will survive to reach the canopy.

Vines play an important role in rainforests by providing both food and shelter for animals. Their interlaced growth patterns provide canopy 'roads' to those that are not able to fly or glide great distances. This effectively opens greater portions of the rainforest to smaller creatures. It also minimises their travel time as they no longer have to descend to the ground in order to move across the forest. This ability to affectively 'modify' the distribution (and therefore the abundance) of animal populations identifies vines as ecosystem engineers. They create, alter and maintain vital habitat. Their ability to affect population densities within the rainforest surpasses the influence of most other elements you will encounter within the rainforest.

2. **Skinks**

Visual Sighting: forest debris habitat (marker on the left hand side)

Skinks are Australia's most successful family of lizards. 202 species are found in Queensland alone. As you walk along the track you should keep an eye peeled for their small forms propped against rocks and throughout the leaf litter. Fitzroy Island is home to countless skink species but the most commonly encountered is the large Major Skink, the striking Rainbow-Sided Skink (with a distinctive orange-red streak along its side) and the bespeckled Bar-Sided Skink. They dart about through the forest floor searching for small invertebrates to eat. Their typical prey includes flies, crickets, grasshoppers, beetles and caterpillars. But some will eat worms, millipedes, snails, slugs, woodlice and even other lizards. In turn, an unwary skink can fall prey to larger predators such as the monitors, snakes and of course, birds. In response to the threat of being eaten, most skink species have a long, detachable tail. This is especially useful against predators that attack from behind. This defensive move is called 'caudal autotomy' and it occurs in two separate forms. The first, intervertebral autotomy, is when the tail distinctly breaks between two weak vertebrae. The second (less-common) form, intravertebral autotomy, is when the skink deliberately fractures its own vertebrae (rather than utilising the space between bones) in the mid-section of the tail. In both cases the skink actively encourages the break by rapidly contracting muscles around the fracture plane. This swift movement works to both expel the vertebrae and simultaneously split the skin and muscle (to complete the ejection process). In the case of intra-vertebral autotomy the skink also activates specialised muscles around the caudal artery to minimise blood loss. Once

dropped, the tail will spasm in an attempt to fool the predator into focussing its attack on the wriggling, bloodied limb; thus allowing the skink to escape. The tails do this because the neural network is pre-programmed to direct the muscles in various frequently used movement patterns.

It can take up to four months to grow a new tail – and the end result is not an exact replicate. Skinks are not able to regenerate bone so the new growth is formed with cartilage. The newly formed skin has a different texture and colour and is generally considered to be 'less attractive' than the original. It's not known whether this impacts the skink's dating abilities. But without its tail a skink is especially vulnerable. Not only does it no longer have a distraction device, but the tail plays a pivotal role in locomotion, balance and energy storage. Many lizards will store fat deposits within their tails to help them weather the leaner months. It's like constantly carrying a packed grocery bag with you. For this reason, many will return to their dropped tail (if the predator opted not to eat it) and actually ingest it themselves. We've all heard the saying 'I'm so hungry I could eat a horse' but eating yourself is something else entirely! This remarkable display of self-cannibalism is actually an attempt to resupply their body with vital energy resources. It's actually pretty smart. Some take it even further. Some skinks have learned to deliberately attack a rivals' tail so they can sit down and enjoy a nice tail/ fat deposit meal. Brutal. Following the loss of the tail some skinks have been observed modifying their behaviour and restricting their movements specifically so they don't exhaust their depleted energy reserves. As the tail is so vitally important, skinks tend to only use this form of defence when they feel it is absolutely necessary – so please don't try to prompt a tail drop!

3. Tree Scars

Visual Sighting: tree with small scar (marker on the right hand side)

There are many potential causes of tree scarring. Disease and infection cause deep scars from the lesions that developed on the bark. Fire makes indentations within the tree itself. As the scar heals, bark may partially cover it. Other times the extent of the injury may be so severe that the bark is unable to regrow in the affected area. Typically, these scars will form on the trunk of the tree. Another common natural cause for scarring is a lightning strike. But by far the most common cause of tree scarring is breakage. When one tree is damaged by another falling tree, the resulting impact can leave severe damage. This is particularly so in cases when the main trunk was affected. Deep scars that penetrate the bark and reveal the wood (like on this tree) leave the tree exposed and vulnerable to damaging elements such as moisture and fungi. If fungal organisms successfully attach to the bark they can begin to break down the wood and gain access to the tree's nutrients. This renders the tree extremely vulnerable to decay and disease. The more heartwood is exposed in the scarred area; the higher the risk of developing further complications. Fortunately for this tree, its scarring is minimal.

4. Nutritional Recycling

Visual Sighting: fallen logs left alongside track (marker on the left hand side)

Rainforests are expected to be regions with nutritionally high soil owing to their lush canopies, giant trees, rich undergrowth and assortment of creatures living within. In fact the opposite is true – rainforest soil is virtually infertile. Very little essential nutrients are found within the soil itself; those that are generally don't remain for long. In fact, it's only the top soil that has any nutritional virtue. In this environment nutrients and carbon are locked inside the living vegetation. It's only when a plant dies that the nutrients within are discharged back into surrounding area. A similar effect is experienced when leaves decay. The sudden influx of nutrients includes nitrogen, phosphorous, potassium, calcium, sulfur, magnesium, iron, carbon, oxygen and hydrogen. Plants need these in substantial quantities in order to grow and be healthy. To a lesser degree, plants also require boron, chlorine, manganese, zinc, copper and molybdenum. Decomposers work hard to recycle these precious mineral back into the environment. This process is known as nutritional recycling. Very few of the nutrients actually penetrate the deeper soil. This is owing to the rapid rate of consumption by the surrounding living organisms. Decomposers include termites, fungi, bacteria and other microorganisms. Warm temperatures coupled with high rainfall increase the speed of decomposition. Decomposers convert the fallen organic matter into inorganic

carbon that can then be used by the surrounding plants. Nutrient recycling is essential because the growth rate and biodiversity of the surrounding forest is directly related to the availability of nutritional resources on the ground. Trees and plants cannot survive if they are unable to perform the necessary chemical reactions to both secure and release energy. For this reason trees, branches and leaves that fall within a National Park are left to break down where they lay (unless they lay on the path and then they are bunted to the side!).

Rotting materials are not the only useful organic material to be found in the forest. Faeces and sweat play an important role too. These materials might not seem so enchanting to us, but they are crucial to rainforest critters. Rainforests are typically characterised by periods of high rainfall followed by dry spells. During dry weather it is difficult for animals to find ready water. Insects such as butterflies, beetles and flies suck the moisture out of faeces and the flesh of a rotting fruit in order to survive. Think about that next time you look at a butterfly- that animal has likely been drinking poop. Faeces are in high demand for their energy value but they can also be rich sources of nutrients such as calcium salt. In fact, back to the delightful habits of butterflies - some species will even try to drink the sweat of the back of your neck. Tasty...

5. Ants

Visual Sighting: granite boulders and forest debris habitat (marker on the right hand side)

While they can be a pain if they penetrate your hotel room, ants play a pivotal role in the rainforest ecosystem. They account for up to 94% of arthropods (invertebrates with an exoskeleton) and 86% of the canopy biomass (biological material derived from living or freshly deceased organisms) found within a rainforest. Ants are responsible for clearing more than half of the fallen food resources from the forest floor. With their zeal for penetrating the furthest regions in their quest for tucker, this enthusiastic cleaning crew are vital in maintaining a healthy ecosystem. Ants consume and remove dead animals, fallen fruit and seeds with gusto. By removing the materials from where they fell (and bringing them back to their nests), ants actually create nutritional 'hotspots' where plants and microbes thrive. This filters into the soil and assists in delivering a nutrient injection vital for maintaining healthy substrate. We all know that ants are not the only ones that will remove waste products but research has revealed that they are far superior at it. No other animal is able to perform the same role to the same degree. Ant loss will result in in reduction of soil diversity and a marked increase in decomposing elements left to rot on the forest floor.

In addition to their architectural role as decomposers and nutritional redistributors, ants will consume pollen (aiding in pollination), fungi (and fungal spores- again, aiding in the reproduction process) and microscopic flora living on leaves. The nitrogen levels found in ants are comparable to those of plants and herbivores. This suggests that ants consume a significant amount of the rainforest's limited nitrogen and carbon. In some plants actively bribe ants to take an interest in their health and wellbeing. Roughly 1/3rd of tropical plants excrete small quantities of nectar from areas other than the flower. These sweet deposits can be positioned on the leaves, stems or even on the outside of the flower itself. The point is to attract ants, acting as a 'payment' (bribe) for defending the plant against grazers. These are not the only symbiotic relationships that ants enjoy. Sap-feeding aphids such as Green Fly and herbivores such as the Common Oakblue Caterpillar are known to 'bribe' certain ant species by excreting a honey-like substance in exchange for protection and continued grazing rights. Green ants vigorously protect Common Oakblue caterpillars. They even carry the caterpillar back to their nest at night for safety. The Green Ant is arguably the dominant ant species on the island. Also called Weaver Ants or Citrus Ants they are known for their unique nest building behaviour. Workers unite to sew individual leaves together using larval silk. The result is a tell-tale green 'football' hoisted high in the trees – see if you can spot any during your walk today. A single Green Ant colony can consist of more than a hundred nests, spanning numerous trees and contain more than half a million workers. These ants are highly territorial and workers aggressively defend their territories against intruders. Large colonies consume significant amounts of food and workers continuously kill unwary arthropods that venture too close to their nests. Trees that host a Green Ant nest can benefit from the situation as the workers hunt and kill insects that are potentially harmful pests; leading to decreased levels of plant predation from herbivores.

6. Predators of the Canopy

Visual Sighting: branches and leaves of the canopy (marker on the right hand side)

Look up! In a rainforest it is easy to keep your eyes at eye-level but so much rainforest life takes place both above and below! Keep your eyes peeled for the distinctive female Golden Orb Spider; a beauty that often grows to the size of your outstretched hand. In comparison, males of this species only grow to a maximum of 4-5mm. What a shrimp! Golden Orbs have a tendency to weave their web across the track so watch your step before you march unwarily into it! Golden Orbs are so named for the golden thread of their silk. These spiders feast on a barrage of flies, beetles, grasshoppers, moths, butterflies, cicadas and even occasionally snakes, birds and microbats if they are unfortunate enough to get caught. In short, she'll eat anything. So again, watch your step because some of them get big enough to eyeball a person... Golden Orbs often has to contend with a host of free-loaders living in their web and stealing their food. Rude. This includes males as well as other smaller species such as the Silver Drop Spiders. By stealing, these lazy spiders don't have to expend their own energy in creating a web. If their presence becomes too great an annoyance to the Golden Orb she will try to chase them away; the attempt is not always successful. She must be careful. If too many smaller spiders congregate on her web she runs the risk of being attacked herself or having her spiderling babies attacked. Basically, these are the worst kind of free-loaders imaginable. Some females will discreetly abandon a web to relocate away from too many unwanted squatters. The Golden Orb has other predators to be wary of as well. Several birds will readily swoop to snatch her from her web. In response Golden Orbs design their webs with protective 'barrier' threads. These threads are even stronger than those of the main body of the web itself (which is saying something as the normal thread is stronger than steel). Her thread is also incredibly flexible, capable of stretching to 40% its natural length before breaking. So it's basically elastic Kevlar. The spider will sometimes shake her web and use the vibrations to distract potential predators. On the island some Golden Orbs have been known to shot a quick burst of silk from their abdomen as another form of distraction. There are two known species of Golden Orb on Fitzroy Island – the Giant Golden Orb (whose legs are decorated attractively from behind with striking yellow joints) and the Australia Golden Orb (whose body is considerably darker and missing the distinctive joints). These are gentle giants that like to live and let live (unless you are prey) so if you see one, observe it from a distance and let her be.

Other canopy predators include the strikingly-beautiful Green Tree Snake – the blue variety has also been seen on the island. Green Tree Snakes are active during the day (the only species on Fitzroy Island to be so), and rest at night. They tend to sleep in hollow trees, logs, foliage, or within rock crevices. On Fitzroy Island they hunt for lizards, skinks, geckos, birds, bird eggs and melomys (a small, native mouse). While they are essentially harmless to humans, some tree snakes will defend themselves by producing a horrible odour. It's enough to make your nose hairs curl. There is also the chance of a bite (but their bite is not considered dangerous). Sometimes when approached, the snake inflates its body and neck to make it seem larger, a tactic used to scare prey. In general tree snakes will make a quick escape when they realise they are being watched. That said, they aren't always the smartest snakes and they have been known to fall from the trees and crash-land on unsuspecting passer byes- speaking from experience here; it hurts when they hit you. Though frankly I think the incident gave the snake a far bigger fright than myself because it darn near grew legs to run away. Green Tree Snakes are not the only species of snake on the island. The Brown Tree Snake is a nocturnal species with two small, grooved fangs located at the rear of the mouth. Though venomous, the venom is difficult to convey into a bite on a human due to the placement of the fangs and their grooved rather than hollow architecture. Brown Tree Snakes use their venom to subdue the birds, lizards, bats, frogs, arthropods and melomys they devour. These animals can be easily positioned in the rear of the mouth for a fluid venom delivery, as I discovered when I tried to rescue a fledgling Sunbird from the jaws of a Brown Tree Snake. Don't try this yourself; it was a spectacularly stupid move on my behalf (I smacked it with a thong- I was pretty mad as I had been watching the progress of the chick its entire life so finding a snake chewing on it was not cool). And it didn't save it- the snake spat it out, but it already had the tell-tale fang punctures across its abdomen and didn't make it through the night. The snake came back and ate it. In comparison to the tree snakes, pythons do not have fangs or venom; not even mild venom. Instead a python can have over 100 teeth inside its mouth that they use to grasp and retain prey while they slowly coil around and squeeze the life out of it. Group hug anyone? Carpet Pythons (also called Diamond Python) hide efficiently amongst the branches but they can also be found amongst the leaf litter. Carpet

Pythons are capable of reaching lengths up to 3m. However it is the Amethyst Python, or the 'Scrub Python' as they are also known, that is the heavy-weight champion on the island. Look through the section on the Summit and Lighthouse Historical Hike and you'll learn an interesting tale of a particularly hungry Scrub Python. Capable of growing 8.5m long, like all snakes their jaws are hinged so that Scrub Pythons are capable of swallowing animals much larger than their heads- even the Orange Footed Scrub Hens are not safe when one of these are about! As a nocturnal species they actively hunt melomys, bats, flying foxes, birds and of course - their fellow reptiles. Watch our Yellow Spotted Sand Monitors! Pythons can be found nestled across a variety of terrain from trees to rock faces, forest floors and even around buildings. You may be lucky enough to spot one basking in the sun.

While it is easy to demonise snakes for being scary, snakes make up a significant proportion of the middle-order predators that keep the natural ecosystems working. Without our tree snakes and pythons, their prey species would increase unchecked until they reached unnatural levels and start to disintegrate the perfect balance of the rainforest ecosystem. In turn, the Yellow Spotted Sand Monitors and Major Skinks (yes- this skink will kill and eat a snake three times its size!) that prey on the snakes would also struggle to find food.

7. Moss

Visual Sighting: moss encrusted boulder (marker on the right hand side)

Moss is classified as a true plant which means that it has its own chlorophyll and can perform its own photosynthesis. Individual mosses grow in close proximity to each other in clumps or mats. They always grow in damp, shady locations because they are highly vulnerable to drying out. Simple leaves cover their thin, wiry stems that not only perform the vital photosynthesis but allow the plant to absorb water and nutrients. This function is traditionally performed by the roots of other plants. Mosses do not have roots but instead are able to anchor to substrate through a series of thread-like rhizoids (picture sewing stitches and you have a general idea of how they work). Mosses additionally do not create flowers or seeds but rely on water for reproduction- the flagellates (tail) of the male moss sperm swim to find a female and create wind-dispersed spores. Moss play a subtle but important role in the ecosystem as their growth promotes localised water-retention, acts as a stabiliser on mobile surfaces and most importantly provide shelter and humidity for a variety of minute invertebrates.

8. Lichen Boulder

Visual Sighting: lichen covered boulder (marker on the left hand side)

Unlike moss, lichen is not a true plant. Instead, lichen is a community of fungi and a photobiont organisms (fungi's photosynthesis-performing partner) working in symbiosis. The most common photobiont found in lichen is green algae. The fungus protects the algae, enabling it to survive in sunny climates where it would ordinarily perish from lack of water. Safe inside the lichen, algae cells are able to withstand life outside of a constant water presence. Occasional rain is enough to enable the algae to store 'food' to last through the next dry spell. As the alga activates photosynthesis they convert atmospheric carbon into oxygen. This tiny little organism in front of you is actually creating the air you are breathing. In addition, lichen absorbs pollutants (including heavy metals) from the air and, thanks once again to its handy algal cells, converts atmospheric nitrogen into nitrates- a component that is paramount for growth. With each rain nitrates are leeched from the lichen to penetrate the dirt below. This allows the nearby rainforest plants to benefit from the lichen's hard-earned gains. During the day-to-day, the presence of lichen enriches the soil by trapping water, dust and silt. If the lichen dies its organics compounds are converted back into nutrients to replenish the soil. Incredibly, the cells of the photobiont are actually killed during the nutrient exchange between the fungi and the algae but the lichen survives as the photobiont cells reproduce as rapidly as they die.

The absence of a root system allows lichen to grow on bare rock as you can clearly see from this covered specimen. Lichen is also capable of growing in sterile soil and even on man-made object such as statues. That said, you will commonly find lichen growing on trees. There are three different forms of lichen: Crustose Lichen, Foliose Lichen and Fruticose Lichen. The Crustose form a rough 'crust' over the substrate as they grow. They are typically a greyish-green hue but can occasionally be yellow or red. Foliose Lichen grow flat; although they have a bumpy appearance. They grow with a distinct upper and lower surface. The final lichen, the Fruiticose Lichen, almost look like they are made from hair. They are often found growing from trees or shrubs. These grow upright and have no noticeable upper or lower surface.

9. Termites

Visual Sighting: rotting log habitat (marker on the right hand side)

Termites are vital nutritional recyclers as they feed on cellulose and soil. Tropical rainforests are warm and wet places with tall trees and an abundance of debris. As a decomposer termites are one of many (earthworms and fungi to name others) creatures that consume the dead organic matter (leaves, roots and fallen branches) and convert it back into nutrients. They are able to eat this material as they have an alkaline adaptation in their stomach allowing them to extract cellulose and other elements. Termites hold the record for the highest alkalinity levels within a living organism (their pH is 12; neutral pH is 7). Even with this adaptation however, the termites cannot digest the cellulose directly. They rely upon symbiotic bacteria and protozoa living within their intestines to supply most of the enzymes needed for cellulose digestion.

Termites are rarely seen as they mostly live within the soil or surrounding vegetation; only a few species construct mounds. You might spot some small mounds if you look about you- most tend to be either attached to a tree trunk or breaking the monotony of the forest floor. Within the colony the termites abide by a strict and complex caste system where they are divided into workers, soldiers and reproductive termites. The worker caste is the largest group. It consists entirely of immature termites that perform all of the hard labour in the colony. This group clean, maintain and repair the nest, gather food and water; care for the young and construct new tunnels/galleries as the colony grows. Members of the soldier caste are larger in size but fewer in number than the workers. Their job is to guard the nest site and protect it from attacking ants and the island's Short Beaked Echidnas. In some species termite soldiers lack jaws but have a large gland at the front of the head that shoots defensive chemicals like a crazy squirt gun. The soldiers are unable to care for themselves so they must be fed and groomed by the workers. The reproductive termites is the king (male) and queen (female) who are the produced the entire termite family and therefore started the colony. The termite's caste system is regulated by pheromones. The king and queen each produce special pheromones that circulate throughout the colony and inhibit workers of the same sex from moulting into reproductive adults.

10. Hairy Mary

Visual Sighting: spikey vines and palms growing near track (marker on the right hand side)

Hairy Mary **–** or *Calamus australis* – is a species of climbing palm endemic to Queensland. The first specimen was collected from Fitzroy Island by Botanist Alan Cunningham in 1819. As their name suggests, climbing palms physically manoeuvre their way to the top of the canopy by clawing up the limbs of their neighbours. They use a series of sharp hooks to grapple their way upwards. Their slim frame grows to a maximum of 2cm diameter. Once they are well established they lose the sharp spines in favour of a 'glassy' surface. Their fruit is consumed by fruit doves that then spread the seeds to the next location. On the island this role is performed by the Emerald Doves, Bar-Shouldered Doves, Rose-Crowned Doves, Pied Imperial Pigeons, Wompoo Fruit-Dove and the Peaceful Dove. Be warned- this is not a plant that you want to come into contact with; especially on the thin, hooked tendrils. They can deliver an extremely painful tear to the flesh that will bring tears to the eye and a few choice words to the lips.

11. Creepy Crawlies

Visual Sighting: forest debris habitat (marker on the right hand side)

The rainforest is home to an assortment of 'creepy crawlies'. With a possible 42 000 insect species to choose from, it is difficult to pick which particular insects we should focus on here. Each plays their part in maintaining the overall health of the ecosystem. But let's choose some of the more colourful characters to get to know better. Stick Insects are herbivores that graze on the leaves of the surrounding trees and shrubs. Their constant munching stimulates the trees to sprout new growth. In return, the Stick Insect consumes the tree's nutrients. They absorb most into their own body but convert the remaining portion into useful fertiliser for the forest floor. This recycles the nutrients and makes them available to other plants to consume. They can however be detrimental to the rainforest trees if too many of them congregate in the one area and strip the foliage. Their predators – birds, skinks and parasitic wasps- are vital to keeping the Stick Insect population at a manageable level across the island. Of course the Stick Insects don't see it that way. They rely on a combination of camouflage (in which they will slowly rock their bodies back and forth in an attempt to emulate a stick waving in the breeze) and a chemical defence (excreted from their abdomen) for protection. Depending on the species, some chemicals create an unpleasant odour while others can cause a burning, stinging sensation in the predator's mouth and eyes. Other species rely on a wing display to startle would-be-predators. Both males and females have wings but the females cannot fly as their wings are too small to support their body weight.

Another common sight in the rainforest is the Rhinoceros Beetle, so named for the distinctive horn sported by males. There are almost 200 species of Rhinoceros Beetles in Australia; and all belong to the scarab beetle family. Larvae is fat, 'C' shaped and lives in soil, dung or even decomposing plant material. There they forage and decompose the vegetation; actively converting the plant matter into compost. The larvae grow until it is ready to pupate. It will pupate underground inside a specially made cell lined with its own faeces that makes a tough, waterproof exterior. You have to be impressed with its mad house-building skills. Inside this protective pooh casing the larvae undergoes a complete transformation and morphs into an adult after a month. Adult beetle can live for four months. As adults they feed on the soft bark of young seedlings. In the rainforest world many of the trees do not survive to reach the canopy; some fall early victims to this beetle's strong jaws. Not only is this beetle visually exciting but their social lives are pretty entertaining too. When threatened, a Rhinoceros Beetle will make a loud hiss- the sound is produced by rubbing the abdomen against the ends of the wing covers. It's a bit disarming but this really is a case of bark being worse than its bite. Females emit a hormone to attract and excite males; when she is ready to mate the males will line up to win fair heart. They physically compete for her approval by jousting with their elongated horns; whichever beetles manages to dislodge the other from the branch is the winner. Provided the female was impressed of course!

Another common rainforest creepy crawly is the cockroach. There are many different species of cockroach. While they are extremely distasteful to find in your room, out here cockroaches are vital to maintaining the overall health of the rainforest ecosystem. They live in colonies inside rotting wood and act to speedily decompose logs and other fallen debris; reconverting the nutrients back into the rainforest top soil. Wood Cockroaches are particularly apt at this. Like termites, they have special micro-organisms living inside their gut (flagellate amoebae) that help digest the woods' cellulose. Some species are even able to break down decomposing organic matter faster than termites! In addition, cockroaches play an important ecological role as pollinators; they are directly responsible to fertilising numerous rainforest plants. Think of them as ugly little cupids (although if you have ever seen a Wood Cockroach you'd have to admit they are a wee bit endearing to look at; not at all like their hideous cousins). But if appreciating cockroaches is really not your thing than here is another fact that you will definitely welcome – cockroaches play an important role as a food source for rainforest predators. They are consumed with gusto by vertebrates and invertebrates alike; providing the core of predator diets (that's how many cockroaches are running around here!) It is unfortunate that cockroaches don't always recognise where their rainforest domain ends and human lodgings begin; but find a nice hungry skink and they'll happily oblige with pest control!

Speaking of rainforest predators, watch the forest carefully and you may spot a carefully camouflaged Praying Mantis lying in ambush. This phenomenal predator is capable of turning its head 180˚ while it scans its surroundings! A young Praying Mantis prefers to eat moths, butterflies, crickets, grasshoppers, flies – basically, anything small enough to catch, hold and eat. They use their barbed front legs to snatch unwary prey; their hooks hold onto the wriggling bodies while their large mandibles deliver a powerful bite. They strike with such speed that it is almost imperceptible to the eye. As a mantis grows, so too does its appetite. Large Praying Mantis have been observed hunting skinks, geckos, scorpions, small birds, melomys, frogs, spiders (including tarantulas) small fish and even snakes!!! These guys are the rainforest gladiators – and they wouldn't have it any other way. In return, a poorly timed attack can result in their demise. Tarantulas, bats, birds, spiders, frogs and large lizards will happily much down on a Praying Mantis that overplayed its hand. Here on Fitzroy Island they can also fall prey to Parasitic Wasps.

12. Epiphytes

Visual Sighting: A green valley of Bird Nest Ferns growing on every surface (marker on the left hand side)

The Bird Nest Ferns that you see here are an example of an epiphyte- a plant that grows using a host for stability. They survive by collecting leaf litter and other debris falling into their centre. This is then broken down with the help of microorganisms to feed the plant. Bird Nest Ferns and other epiphytes create habitat for insects, nesting birds, insect larvae (living inside the pooled water) and even frogs in some cases! Caste your eyes around as you keep moving along the track and you'll see that epiphytes are a common sight in the rainforest.

In the world of air plants, bigger is not necessarily better. Epiphytes such as the visually stimulating Staghorn and the Bird Nest Ferns before you can grow so large (or so many can be growing on one space) that the limb of a host plant can physically break under their weight. Another danger of growing too large is that the centre of the epiphyte collects so much debris that the insides begin to rot; leaving the plant highly vulnerable to decomposing as well. This is particularly dangerous after excessive rainfall as the Bird Nest Fern is designed to hold onto every drop of water that falls within.

13. Tree Nodules

Visual Sighting: tree with large, obvious protrusions (marker on the left hand side)

Abnormal growths, or lumps, on tree branches and stems are usually galls. Some trees are more susceptible to certain types of galls than others- not all galls are caused by disease. Insect activity (especially by wasps) is a major source of galls on tree branches and foliage. Other than potentially harboring damaging insects, galls generally do not harm the tree. Fungal infections and bacterial diseases may be carried to the tree on the wind, injected into the tree by insects or from the ground. Bacterial crown galls generally appear at the base of the trunk near the top of the roots. They can also appear higher on the trunk through the branches and limbs. These galls are round and spongy at first, then turn hard inside with a cork-like exterior.

14. Fungi

Visual Sighting: fallen logs breaking down alongside track (marker on the left hand side)

Unlike green plants, fungi lack chlorophyll and therefore must obtain their nutrition from other sources. There are three main forms of fungi: parasitic, mutualistic and decomposers. Parasitic fungi are not common but will absorb their nutrients directly from the host plant. Mutualistic fungi simultaneously penetrates and engulfs the tiny rootlets of the surrounding trees and shrubs. Surprisingly, this doesn't hurt the plant; in fact both the fungus (mushroom) and the plant derive benefit from this symbiosis. For its part the tree obtains nitrogen, phosphorous and other precious nutrients directly from the fungi while the fungi absorb moisture, sugar and carbohydrates from the tree. Trees without fungi typically don't fare as well as those that have them laced around their roots. Mutualistic fungi are recognised as ecosystem engineers for the efficient way in which they

control nutrient recycling within the ecosystem. The final type of fungi- decomposer fungi- only lives in dead organic material. This includes leaves, grass, faeces and dead wood (amongst others). These species have an important role in the ecosystem where they break down and decompose dead plants and animals thereby returning important nutrients to the soil and the rainforest. This action benefits plants that get their sustenance from the soil's nutrients; but it is the aid it delivers to xylophagous invertebrates (herbivore critters with a diet that consists primarily of wood) that get decomposing fungi recognised as another ecosystem engineer. Decomposer fungi actively create habitat where the xylophagous invertebrates previously could not survive. All in all, fungi are pretty useful organisms within the rainforest habitat.

15. The Canopy

Visual Sighting: solid foliage canopy above (marker on the left hand side)

Rainforest plants are typically graded into several vertical layers – the overstory, canopy, understory, shrub layer and ground level. The overstory is the occasional tree that grows that much higher than the canopy. The rainforest canopy is the primary layer of 'roof' fashioned by the foliage. It is created by the trees whose combined branches and leaves form a dense and distinct layer. The understory is recognised as the space between the canopy and the forest floor. The understory is divided into two parts; the lower portion is characterised by shrubs and saplings. This is called the shrub layer. Finally there is the ground level which is the forest floor itself.

The canopy is a fascinating world of its own, accounting for an estimated 70% of all rainforest life. Evergreens dominate the biodiversity. The canopy is rich with vines, epiphytes (including beautiful orchids), moss and lichen. Predatory birds such as the island's raptors perch atop the tallest branches and peer for prey. Doves, kingfishers, butterflies, snakes and other creatures thread their way through its concentrated structures. They live alongside a variety of insects and arthropods in their own entirely self-sustaining ecosystem. Most never touch the forest floor but spend their entire lives in the canopy. Water can be found in hollows or epiphytes; although many animals received the majority of their moisture from the leaves or animals they consume.

Most rainforest trees tend to grow straight; they only branch out once they have obtained a significant height. Then they spread out to claim their fair share of the canopy (or in most cases, they'll try to take more than their fair share). Each tree grows so closely to its neighbour that their combined foliage can block sunlight from reaching the forest floor. Notice how much cooler it is in here?

16. Birds

Visual Sighting: various rainforest debris (marker on the right hand side)

Birds play an important role in the rainforest ecosystem. They seek shelter in the density of the canopy, consume nutrients through the fruits and insects, pollinate flowers, are preyed upon by large snakes (and other large animals like the Golden Orb Spider) and disperse seeds away from the parental plant for propagation. Their faecal deposits create the next generation of rainforest plants competing for survival. In return the rainforest ecosystem provides the birds with ample food and a warm home in the winter (avoiding the cold temperate zones). Up to 27% of the world's bird population live in rainforests at some stage of the year.

One of the most common birds spotted around Fitzroy Island is the Orange Footed Scrub Hen. A comical bird with their undignified gait and extremely noisy vocalisations, they feed primarily on insects and beetles but will consume some fruits and seeds at a pinch. They spend the majority of their day searching for food amongst the forest floor by using their powerful legs and claws to upend the earth. This act enables a rapid topsoil turnover which in turn provides the soil with vital oxygenation. Their faecal matter aids in fertilising the top soil. They are lazy parents; instead of building a nest and tending to the care of their fledglings, Orange Footed Scrub Hens opt for a far easier method. They compile giant mounds from the gathered rotting plant matter, soil, sand and any other organise compound they can get their feet around. They lay their eggs inside this mound and simply

strut away; entrusting the heat produced by the sun and decaying organics material to keep their eggs warm. Chicks have to dig their way to the open; from the moment they hatch they are entirely self-reliant as their parents have no interest in them. Talk about welcome to the world!

The Wompoo Fruit Dove is another common bird but you would be entirely forgiven for not knowing what it actually looks like (for the record it is a beautiful species with purple, green and grey markings). As a bird of the canopy, Wompoos rarely venture close enough to allow a sighting. More often than not you are aware of their presence because of their characteristic call- '*wollack-wa-hoo*' and '*wompoo*'. Though the birds will consume insects and other arthropods, their main function in rainforest ecology is as a seed disposer (basically, they're an ecological pez dispenser). In the bird world, it pays to be a big mouth as they are able to digest the large fruits and seeds that their smaller brethren just cannot get their beaks around! Wompoo Fruit Doves chose not to migrate through the winter, but stay in the region and change their diet to whatever is fruiting at the time. They will eat the fruit of vines, trees and palms in turn; devouring all and 'reposting' seeds.

Another of the great 'movers and shakers' of the rainforest ecosystem is the Pied Imperial Pigeon. This elegant black and white bird is a regular visitor to Fitzroy Island during their annual September-March migration from Papua New Guinea. They are an ecosystem engineer; credited with introducing Native Nutmeg to the region. One Pied Imperial Pigeon was tracked on its journey through Australia. It covered 65.5km in 78 days, flitting from one rainforest to another. These birds 'deposit' an estimated 190 seeds each day. This makes them a crucial rainforest element in terms of forest regeneration. If they were lost there would be a steady decline in rainforest biodiversity and significantly fewer saplings in the forest. In return, the birds not only eat a hearty amount of fruit but also gain a useful breeding ground in which to nest.

17. Ground Hunters

Visual Sighting: perfect ambush habitat by large buttress roots (marker on the left hand side)

The forest floor is home to a vast array of wildlife; many too small to even notice until you start to really look. This is where many of the rainforest fauna live in a constant game of cat-and-mouse. The food chain is prolific as each animal kills, and is killed, in its turn. There are numerous hunters that stalk the ground, hidden amongst the leafy debris. Here is a selection of some of the best (and worst!) of the Secret Garden's ground hunters.

Let's start with everyone's favourite animal- the tarantula. Yes, we have them on Fitzroy Island. Fortunately, sightings are few and far between. That is, unless you're me and you find a tarantula crouched at your feet while you're sitting at your desk. Not even kidding; that actually happened. But most people are lucky enough not to see them at all. That's because tarantulas live in burrows dug into the earth where they hide during the day. They creep out at night using slow, deliberate movements to creep up on would-be-victims before pouncing. They mostly eat invertebrates such as insects and beetles- in fact tarantulas have been identified as an important form of biological control over beetle populations – but they will target bigger game such as the larger skinks, geckos, frogs, giant millipedes, other spiders and even young bird hatchlings. As ground hunters tarantulas have no need for a web in order to catch prey. Instead they spin a few small silk strands around the entrance to their homes that act as a doorbell. These vibrate as unsuspecting creatures shuffle over them and alert the spider to the presence of potential dinner. Tarantulas snatch prey with their appendages, inject paralysing venom before dispatching their unfortunate victims with their hollow fangs. They secrete digestive enzymes that liquefy their victims' bodies; allowing the spider to slurp them up like a ghoulish thick shake. After a large meal, the tarantula may not need to eat for a month.

As you can imagine, tarantulas have very few natural enemies. This is largely because they have a very short temper and are, quite frankly, terrifying when their blood is up. They are like the spider version of the hulk and no one wants to mess with that. However the parasitic Pepsis Wasps are a formidable exception. These gladiators will go into combat seeking to paralyse the tarantula with a well-placed sting so that it can inject its eggs inside the spider's body. When the eggs hatch, the wasp larvae gorge themselves on the body of the still living spider. Another, less gruesome, threat to wild tarantula populations is collection for the pet industry.

Believe it or not some people are crazy enough to want to cuddle them. Good luck with that. It is estimated that 10 000 tarantulas are collected from the wild and sold as pets every year in Australia. As you can imagine, this has a negative impact on the vital wild populations. If Fitzroy Island lost its tarantulas the bug population would explode and the harmony of the Secret Garden's ecosystem would fall out of balance. So we like our tarantulas here; we just don't want to meet them face to face.

Another (less terrifying) spider is the huntsman. Fitzroy Island is known to be home to at least two species of huntsmen - the Giant Green Huntsman (which grows as big as your outstretched hand) and the Grey Huntsman. Not going to lie, the Giant Green Huntsman can be a little unnerving to meet in your living room. But it actually has a really gentle nature. Grey Huntsmen are a little more erratic; although fortunately for us the Grey Huntsmen of the tropical north are not as aggressive as the species found in southern Queensland (which actively charge at you gnashing their teeth). So all in all, huntsmen may be a little freaky to look at but they are gentle giants. Unlike the tarantula which uses silk around its home, a huntsman has no need for silk at all except for around their egg sacs. They hunt at night using a combination of vision and vibration to locate prey. Like the tarantula before them, huntsmen are incredibly effective natural bug control agents. They sit almost perfectly still and rely on camouflage; once the prey ventures too near the spider will pounce. However the will occasionally run after prey using their lightning-quick reflexes to mow them down like a miniaturised cheetah. They eat spiders, insects, beetles and occasionally small vertebrates (like reptiles or young melomys). They hunt at night and spend their day curled up behind loose bark, inside rock crevices, in split logs, under rocks or fallen wood and of course, underneath the leafy debris strewn around you. Their flattened frame allows the large spider to squeeze into small gaps and hide. Huntsmen must be wary of birds, larger reptiles, parasitic wasps, nematode worms (internal parasites) and egg parasites which include wasps and flies.

Another thoroughly charming rainforest occupant is the Giant Centipede, capable of growing up to 16cm. Are you wearing shoes with exposed toes? I bet you wish you weren't. Just a friendly reminder- stay on the track and don't venture off because even a few steps can bring you into contact with some members of the rainforest population you would rather not meet. And on that note- the Giant Centipede lives in sheltered places such as under logs, leaf litter, bark and rocks. This is because they lack the waxy outer-cuticle of insects and spiders and are therefore vulnerable to dehydration. During the day they seek out cool places to hide. They hunt at night, stalking their way through the foliage and searching for prey. Giant Centipedes are amongst the largest invertebrate predators found on land and as such, they play a crucial role in the ecosystem. They will eat insects, beetles, lizards, frogs, small melomys, bats and even birds. You may be happy to discover that centipedes and spiders are the rainforest version of the Bull Shark and the Salt Water Crocodile (on a slightly smaller scale of course). These two enemies both prey on, and fall prey to, each other every day. Some snakes and beetles will eat centipedes as well. Imagine trying to floss all those legs out of your mouth. But their main contribution as a rainforest ground hunter is in actively contributing the constant nutritional recirculation through the bodies of their meals. Once a prime target has been acquired, the centipede will quickly subdue its victim using its rear modified 'claws' (called forcipules) to curve over its head (hats off for flexibility!) and deliver the venom. Centipedes use their strong mouth parts to hold prey until the venom takes effect. Their venom is toxic to mammals, birds and insects, and it can make a person ill. Its potency is enough to overcome small prey; though it generally cannot overpower a large animal. That said, you'll be thrilled to discover that with most animals, the rule of thumb is: the weaker your physical form, the stronger your venom and vice versa. Using this theory, the centipede should have incredibly weak venom because their physical attributes pack a serious punch. But just to make them extra cuddly; centipedes don't follow the rules and actually have both. Happy thoughts indeed.

Have you met the rainforest scorpions? For once, this is an example where Australia actually has the best kind of dangerous animal- our scorpions aren't deadly! Stings are annoying and painful, but not deadly. How about that? Australia finally caught a break! We have Dwarf Forest Scorpions here on Fitzroy Island. They grow to a maximum of 3cm. However it is entirely possible that we have the larger Rainforest Scorpions too; they can grow to 8cm. As their names suggest, these arachnids live in forests. They use their large claws to anchor themselves into minute cracks and crevices in rocks, logs and tree bark. Dwarf Forest Scorpions live in colonies typically located up to 40m above the ground. They will eat anything as long as it is smaller than themselves –

beetles, insects, spiders, frogs and reptiles all line their stomach at one time or another. Scorpions are mostly nocturnal but they can be active during the day, especially during prolonged wet weather. Despite having bad eyesight, scorpions can readily distinguish light from dark. They appear to have excellent low light sensitivity which enables them to avoid harsh sunlight as well as navigate the darkened forest by moonlight. They sense their way around using sensory hairs and slit organs on the legs, pedipalps and body. These pick up vibrations and scents via a series of mechanoreceptors and chemoreceptors. Scorpions also have special organs on the underside of the body called pectines which pick up textures and scents along the ground. Usually the scorpions are content to keep to themselves but during the rainy season males start looking for a female and may unintentionally wander into a room. If this happens, just call Reception for help and remember; for once the Australian version is the good one!

Another nocturnal ground predator is the beautiful Slatey-Grey Snake. Capable of growing to lengths up to 1.5m, this is a strong and muscular snake. It's considered harmless to humans but this reptile is a ready biter if provoked so it's best to observe them from a distance. They'll also produce an 'interesting' (polite way of saying 'foul') odour from their anal glands when they feel threatened... a.k.a. they 'pop off'. Slatey-Grey's are able climbers but they generally choose to forage along the forest floor. They will eat eels, frogs, fellow reptiles, melomys, fish and eggs. All in all, our ground hunters are a formidable group. As hunters positioned at the high end of the food chain, they play an essential role in maintaining the balance of the ecosystem. Without them, the rainforest would cease to function and all that you see around you would be lost.

18. Cluster Fig

Visual Sighting: tree with unusual surface lumps set 3m back from the track (marker on the left hand side)

Cluster Figs are a visually striking tree, their knarled and 'cauliflowered' appearance is a result of their unusual fruit that spouts from the tree trunk rather than a limb. These fruit are home to the Fig Wasp. A pregnant female wasp will enter the fruit through a minute hole located near the crown. As she pushes deeper inside the fig she pollinates the flowers, then lays her eggs and dies; all within the fig cavity. Young males are the first to hatch. They chew their way through the flesh of the fruit to reach the outside world, but leave the larger females trapped inside. But they don't leave without leaving a thoughtful gift behind - they drop polite little sperm packages back inside the holes then scarper before the females can tell them what they think of their less-than-chivalrous behaviour. The females are not able to chew their way out of the fig without the male's assistance so after a period (when they are sure the girls are no longer bearing a grudge and have made use of the sperm packages) the males return and create a larger hole for the ladies to squeeze through (she is pregnant after all!) As the female pushes her way out of her nursery fig she inadvertently brushes against pollen, coating her with granules which will pollinate the next fig. Females then have less than 48 hours to locate another fig tree to begin the process again. This constant cycle ensures that both species – the wasps and the figs- will continuously exist as they are both providing essential assistance that is fundamental to the other's survival. Once the fig ripens, birds, bats and mammals consume the fruit (dead wasps and all), then disperse the seed to a new location.

19. The Understory

Visual Sighting: plants growing alongside track (marker on the left hand side)

As previously outlined (see stop #15), the understory is the dark, humid space that stretches between the forest floor and the canopy. As the canopy generally blocks the sunlight, plants growing in the understory are characterised by large leaves in order to increase their capability for photosynthesis. Most generally do not grow above 3m high with the exception of vines (which catch a ride) and the trees of the canopy themselves. Every tree that currently resides in the canopy began life as a young seedling here in the understory; but they are not considered to be a 'true' understory plant. They spend their years, sometimes for decades, as stunted juveniles awaiting a chance opening in the canopy above (from a tree dying) so that they can quickly grow into

the gap. In comparison, true understory plants will live their entire lives at this layer. They are shade tolerant plants; usually bushes, shrubs, herbs, small trees and large woody vines. The understory generally exists at a higher level of humidity than other rainforest layers. Very little solar radiation penetrates the canopy which means that the ground does not experience the rapid heating/cooling cycles experienced in rainforest layers. As such, the lower rainforest levels take longer to 'dry out' after rain; effectively increasing the atmospheric humidity. This phenomenon actively encourages the growth of epiphytes such as moss, ferns and orchids. It also increases the ability of fungi and other decomposers to flourish; once again providing the driving force for nutritional recycling. Without this all important process, the soil would be barren and the rainforest would simply not exist. It also means that the understory is a preferred habitat for many of the rainforest flora and fauna. The 'shrub layer' contains over 84% of rainforest orchids; a major contributor to creating habitat niches for the rainforest's various insects and beetles. This layer is dominated by invertebrates as they forage, hunt and break down nutrients into the top soil.

20. Hollows

Visual Sighting: beautiful fallen hollow tree with epiphyte (marker on the left hand side)

It takes 100- 150 years for a living tree to form a hollow; their sizes can range from a 2cm opening to a gape of >75cm. Depths can be anything between 10cm and 10m. In general, young trees do not form hollows because they are too resilient to the numerous contributing elements that create cavities. The older a tree, the more occasions it has experienced wind, heat, fire, lightning and rain. It is also more likely to have come under attack from various decomposer agents such as fungi, bacteria, termites and wood-chewing beetles such as the island's Carpenter Bees. The bark and outside of the tree may remain healthy while any injuries to the inner bark (as referenced in the earlier mention of tree scars, see #7) allows potential decomposers to penetrate the tree's armour. Once the initial hole is made, wildlife will use a combination of claws, jaws and beaks to clear space and open the recess further. 28% of Australian reptiles, 17% of birds and 42% of mammals utilise hollows for shelter and protection. These include bats, birds (such as the forest's Kingfishers), snakes, frogs, skinks and echidnas. Many invertebrates seek the shelter and protection of hollows as well. Elements such as the size, shape, depth, natural insulation levels and position on the tree can affect which animals will seek to make a home within the cavity. Hollows provide shelter from poor weather as well as a secure location to safely raise young. Not every hollow-using animal will live in a hollow permanently. Some use them on a temporary basis such as the island's Short Nose Echidnas.

Thanks in large to the efficiency of decomposers, this process is significantly sped up once a tree has died. During the decomposition process vital hollows are opened, providing necessary habitat in a fraction of the time it would take to form in a living tree.

21. Wait-A-While

Visual Sighting: well established palm surrounded by other Wait-A-Whiles in various stages of growth (marker on the left hand side)

The infamous Wait-a-While, *Calamus muelleri*, is so named because the large thorns can easily ensnare a person (or animal); forcing them to stop and spent time physically extraditing themselves from the plant. This is the same reason that you will sometimes hear it called 'Lawyer Vine'. These sharp prickles provide a highly effective form of defence against grazers as well as extremely useful climbing tools as the vine-like palm seeks to establish itself. Like its cousin the Hairy Mary, While-A-While was first collected on Fitzroy Island. Scottish born naturalist John McGillivray collected the first specimen when he explored the island in 1848. Wait-A-While and Hairy Mary are often confused with each other however the true Wait-A-While has larger fronds and its stem is thickly covered with delicate spines rather than hooked claws. The Hairy Mary also has a slight purple tinge on

new fronds, a feature that is absent in Wait-A-While. As with its hairy little cousin, the fruit of the Wait-A-While is consumed with gusto by rainforest birds such as the doves and pigeons.

22. The Dry Creek Bed

Visual Sighting: empty rocky creek bed, notable for the smooth boulders and very little debris (marker on the left hand side)

Fitzroy Island is characterised by a number of natural freshwater springs, the result of underground creeks that originally originate in the Tablelands. The water travels in an underground aquifer until it arrives at Fitzroy Island where it encounters an upwelling that drives it to the surface. The most famous example of this on Fitzroy Island is Kings Waterhole which wells up near the Resort and is the source of the islands' water supply. However a lesser example is the creek in the Secret Garden. For the majority of the year the creek remains underground- if you listen carefully you can hear it as the water does rise near the surface. After torrential rain the creek temporarily reopens, clearing forest debris from its path and surging precious aquatic nutrients along the forest floor. Long Finned Eels are amongst the inhabitants that live in the creek when the water flow allows.

23. Queensland Parks and Wildlife Rangers

Visual Sighting: the platform (marker on the right hand side)

During the 1950's an act was passed turning Fitzroy Island into a National Park. This protected all of the flora and fauna both on the island and in the surrounding waters. Queensland Parks and Wildlife Service vision statement is to:

'Maintain Fitzroy Island as a relatively undisturbed coastal landscape where visitors can enjoy a relaxed, quiet atmosphere and undertake a range of nature-based activities. The key focus on this island is to protect the natural, cultural and World Heritage values of the island as well as maintaining the island's high scenic appeal through appropriate visitor management.'

Other aims include managing pest plants and animals and allowing access to the National Park via the designated walking tracks. Rangers are regularly on the island and continuously strive to improve conditions for visitors whilst maintaining ecologically sound work practices - this includes partaking in annual controlled burns of various sections of the island. For more information visit www.nprsr.qld.gov.au

Conclusion

The Secret Garden is a special environment. The complexities of the interspecies relationships within are the driving force for the entire rainforest ecosystem. Every plant, animal and even microorganisms such as bacteria play a role in supporting the life cycle of another being. Without the creepy crawlies participating in the numerous ecological processes across the forest; this rainforest would not stand here today. Likewise, Fitzroy Island would not exist in its current splendour without its numerous and ecologically important wildlife. They may not be the warmest, cuddliest of creatures but each plays its role to perfection here. This is the main reason why the Government strictly regulates chemical use on the island; some everyday household items (such as bleach and some forms of pest control) will have adverse effects on the environment by potentially upsetting the population balance of individual animals. So the next time you see a critter that you are not too fond of- just pop it back into the forest and remember: without it; this rainforest would not exist at all.

Self-Guided Nudey Beach Plant Adaptation Walk

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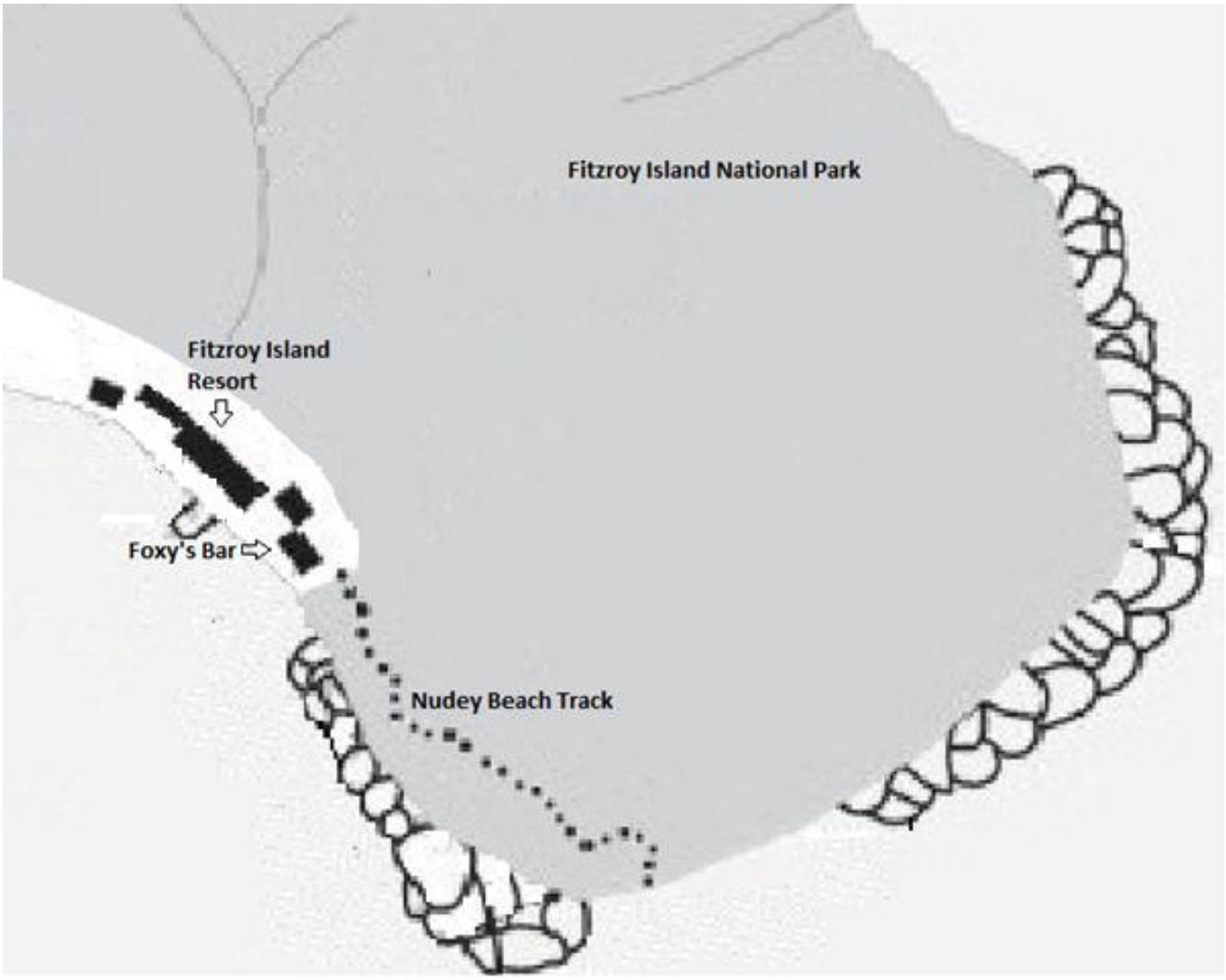

The track may not be exactly as it appears in this diagram

Take only photographs; leave only footprints

Nudey Beach Track: A Look into the highly competitive world of plants

Plants are not particularly kind to each other. In fact, in the green world most things are a competition and life is a constant battle of one-upmanship in order to survive. Fitzroy Island has nutritionally-poor soil, high salt water content and the hot winters tend to sap away a plant's meagre water supply over the dry season. What little nutrients and water are to be had are in high demand. Not every plant can dominate their surroundings by being biggest or the baddest; so each have developed little tricks that enable their continued survival. You will learn a few of these adaptations on your journey to Nudey Beach today.

1. **Vines**

   Visual Sighting: smorgasbord of vines growing alongside track (marker on the left hand side)

   Vines are a common sight along the Nudey Beach track. Once the seed sprouts the young vines work quickly to establish themselves within the forest. A seed already positioned in the branches has a distinct advantage over its forest-floor-growing counterparts as they are already partially-elevated toward the sunlight. Seeds that land amongst the forest debris have one trick to use to their advantage. Their sprouts snake their way toward the darkest portion of their surrounding horizon. This method allows the vine to locate large trees where they can begin to inch their way up its trunk and into its branches. They only have a brief window of opportunity to establish themselves; those that fail to attach to a larger tree will die. Once anchored, they quickly begin to climb toward the sunlight. They must keep a careful grip on their host for support. Different vines use different methods to do this- some have sucker roots to stick to the bark. Others use tendrils (specialised climbing apparatus) to wrap around smaller sections such as twigs and branches before gradually twisting the body of vine around its host. Vines with stem-derived tendrils are generally more successful at grasping larger trellises. Vines tend to be narrow and flexible with the heightened capability of growing at exceedingly high spurts. The ultimate aim of the vine is to reach the canopy and begin photosynthesis at an accelerated rate. As the plant is has no need to rely on self-support, it has an advantage when competing with other forest plants such as young trees and shrubs. Why bother growing strong enough to support your own weight when you can cheat your way to the top?

2. **White Starfish Orchid**

   Visual Sighting: tiny green spider-like plant growing on the bark of the Cluster Fig (marker on the left hand side)

   This exquisite plant growing on the Cluster Fig is a leafless epiphyte. It is so easy to walk past without even registering that you are looking at a minute spider-like plant. Like all epiphytes (plants using other plants or materials as a 'base' from which to grow) it takes nothing from its host but stability. The flat roots contain chlorophyll so this remarkable plant is able to generate its own photosynthesis reaction. White Starfish Orchids grow in the summer and spring and lie dormant during the cooler months. It flowers sporadically throughout the year but incredibly all the White Starfish Orchids in the same immediate area will bloom simultaneously. There must be an air-carried pheromone that triggers their synchronised, unstructured bloom pattern. Flowers last between two hours to two days and have a nice, sweet smell.

3. **Buttress Roots**

   Visual Sighting: tree with distinctive buttress roots (marker on the right hand side)

   A common feature seen across the tropics is the distinct buttress roots of certain trees. Instead of penetrating to deeper soil layers, buttress roots create a widespread shallow root network across the surface. Most shallow roots would prove insufficient to support the weight of the taller trees however buttress roots provide a tall tree with enough strength and stability to withstand the impacts of severe storms. Yet their ability to withstand cyclonic winds is not their greatest contribution to the well-being of the tree. The greatest advantage to the buttress root system is that it allows the trees to control an efficient uptake of nutrients. This is the key to survival within the nutritionally poor and highly competitive environment. Buttress roots allow trees to maximise their personal allowance and actively compete with the rapid uptake of other plants. Basically buttress roots are the Benedict Cumberbatch of adaptations (in that they can do anything). These roots aid in water uptake and storage, increase surface area for gas exchange and collect leaf litter for added nutrition. In addition to the already mentioned features, buttress roots reduce soil erosion and simultaneously maximise nutrient acquisition during heavy rains. In short: they are the bees' knees.

4. **Epiphyte – Bird Nest Fern**
   Visual Sighting: Bird Nest Fern growing low on tree by stone steps (marker on the left hand side)

   As you saw earlier on the track, there is one category of plants that have evolved not to need soil at all. These are the epiphytes (meaning 'air plants') and they account for up to 25% of all tropical vascular plant species (vascular plants are terrestrial –land living- with their own specialised tissue used to conduct water and minerals through their system). Epiphytes wrap their specialised root system around a host tree; either on its trunk or along its branches, and live of the water and debris that fall around them. They take nothing from their host other than stability. You often see them growing on rocks and other hard surfaces as well.

   The epiphyte you see before you (look upwards) is a Staghorn Fern. This fern has tuft roots that are supported by short rhizomes. The fern itself consists of two different kinds of fronds- basal and fertile. The basal fronds are the kidney-shaped base that shields the vulnerable root system from damage while the fertile fronts are the leaves; they perform the vital photosynthesis as well as reproduction. The fern survives by collecting nutrients from falling debris and rain; it is able to store moisture safety inside the basal fronds during the dry season.

5. **Lichen**
   Visual Sighting: boulder covered in lichen (marker on the left hand side)

   With their tiny stature and slow growth rate (many lichens grow at 0.5mm per year), lichen is at a distinct disadvantage to compete for sunlight. Instead they have created a special niche. Lichen grows in regions that other plants cannot. Lichen has been found in deserts, inside the Arctic Circle and at altitudes far too high for other flora to survive (the European space agency recently discovered that lichen can even survive unprotected in space!) Another trick that aids competition is that unlike most plants, lichen can tolerate irregular and extended periods of severe drought by entering a metabolic period of stasis. This means they halt all biochemical activity and effectively 'wait out' the tough period; becoming active again once conditions have improved. Lichen not a parasite and does not harm its host. It merely uses the tree or rock as a form of substrate. Some lichens use chemicals to decompose the substrate over extended periods of time- this aids 'weathering' of rocks.

6. **Liana Vine**
   Visual Sighting: woody vine encircling host (marker on the right hand side)

   An additional plant characteristic of the forest is the liana vines (see also Secret Garden track stop #1). Unlike other vines, liana is not a species but a description given to a specific type of plant- just like the terms 'shrub', 'bush' and 'tree'. Liana vines are long-stemmed, woody vines that can twist so tightly around the limbs of their host that they have been known to make some branches snap beneath their weight. Broken limbs and felled hosts help to open gaps in the canopy.

7. **Leaf Structure**
   Visual Sighting: leaves of the surrounding flora (marker on the left hand side)

   Many trees around you have similar-shaped leaves. Many have a graceful elongated 'tail' design that funnels water flow. Some of these plants are actively channelling the water toward their own root system while others are simply looking to direct water off their leaves as soon as possible. The reason for that is simple- in the tropics excess water encourages bacteria and fungus to grow. These can be dangerous. Around 200 bacteria species can infect plants and cause tissue decline. They become more active in hot and humid conditions (e.g. over the summers here). The bacterial pathogens invade the plants' tissue and restrict its ability to channel water and nutrients through its system. Infected plants show signs of wilting or drooping. Another sign of a

bacterial infection is leaf spot. Leaf spot is caused when the attacking bacteria inject a toxic chemical to kill plant cells. The plant responds by purposefully killing the cells surrounding the bacteria; this remedy works like a 'fire break' to isolate the infection. Once the bacterium is successfully contained the affected portion of the leaf falls away, leaving a tell-tale hole.

While many species of fungi are good for plants, thousands species are harmful. Fungal infections are the most likely cause of an infection encountered in the forest. Fungal spores are tiny and light. They are highly mobile and can be transported on the wind or in rain, or via animals, insects and human beings. Once it penetrates the trees dermalogical defence, fungi attacks the organic material to break it down. Symptoms include leaf spot, mildew, wilting leaves and rotting or dead roots. As the disease takes hold the tree is subjected to a barrage of decay in the form of oak wilt, root rot, butt rot, heart rot and sap rot. Once the structural integrity of the tree is compromised it is incapable of supporting the weight of its own branches. Trunks become hollow and unstable, increasing the trees' risk of falling over.

As you can see, redirecting water can be a useful adaptation. However shape is not the only useful adaptation on the leaves. You'll notice that many of the leaves have a waxy coating. This is because plants are like us- they sweat. In the case of plants though it's called transpiring and it sounds ever more elegant than talking about sweaty plants. The leaves are dotted with stomata cells; specialist cells that open when the plant is hot. They release moisture (water vapour) back into the atmosphere. The trouble is; the plants around here don't know how many months will pass before it rains again. They want to avoid transpiring where they can. Many have developed a waxy surface which actively blocks stomata pores from opening. This restricts unnecessary water loss. Not a bad trick really. A final feature readily found on coastal plants is slightly curled leaves. By curling the leaf the plant reduces the quantity of surface area exposed to the sun at any given time. This limits the sun's ability to heat the leaf: another successful method of preventing unnecessary water loss through transpiration.

8. Paperbark (Melaleuca)
Visual Sighting: papery red tree (marker on the right hand side)

There are 300 species of Melaleuca in Australia; most are endemic to this country but a handful are found in Melasia and New Caledonia. Their common name, Paperbark, sprung from the typical Aussie habit of naming something what it looks like. Its bark looks superficially like paper; therefore the tree is a Paperbark. This is exactly the logic that earned the Australian Flatback Turtle its name (you can guess what shape its shell is). Paperbarks have a specialist root system spreading up to 15m deep and providing the tree with increased stability. This feature is especially useful in case of flood or torrential rain (which can create water-logged soil).

Paperbarks are remarkable trees. Their cells are flooded with silica; a useful adaptation for keeping the termites away. This is not the only bug they keep at bay- the oils contained within the bark work as an effective insect repellent. As the bark splits it releases chemicals that are thoroughly repulsive to most insects. This is not the barks only claim to fame. Its texture effectively retains moisture so that the bark does not burn during a bush fire. This means that the tree comes through fire relatively unscathed; the vulnerable inner bark is efficiently shielded despite the intense heat. Despite this extremely handy adaptation, the tree does not escape bush fire entirely unscathed. It will lose its leaves. However, it already has a solution. Little buds collect dormant underneath the bark of a limb where they will remain until the heat of a bushfire stimulates their sudden sprout. The sprouts are additionally feed through a store of starch contained within the thick papery layer of the outer bark. The deep root system allows the tree to tap into the island's underground aquifer in case a bush fire renders the top layers of soil bone dry.

Finally, Paperbarks have one final feature that allows them to be highly successful genus. They don't like to share. The tree actively injects the surrounding soil with chemical enzymes that supress seed germination. This cheeky (but extremely resourceful) method ensured that competition from surrounding plants is kept at a

minimum. In this manner, the nutrients, water and other supplies that fall in its vicinity are taken up entirely by the Paperbark itself rather than a needy neighbour.

9. Salt Water Tolerance and other Vegetative Adaptations
Visual Sighting: surrounding vegetation (marker on the right hand side)

Stop for a moment and listen. Can you hear the ocean? The trees here are exposed to high levels of salt spray, prevailing winds, granite boulders (preventing or delaying natural growth) and live in nutritionally poor, unstable soil that would make it impossible for standard plants to survive. Just to make it more fun, the soil found in coastal areas tends to be highly saline and typically lacking in fresh water. In order to cope with the wash of climatic and environmental influences plants here have several adaptations that have proven key to their success. An increased thickness in the width of the leaves offers protection from the sun and salt spray that can cause dehydration. Leaves tend to be stiffer; this is an adaptation that enables plants to tolerate the destructive capabilities of the salt-spray. Many coastal trees produce large seeds. This increases the size and strength of the young saplings to give their best chance of survival. Many of the seeds are able to survive falling into the ocean; their surrounding fruit and shell withstands salt-induced desiccation and enables the plants to take advantage of coastal currents to propagate further along the coast from the parental plant (no parental plant wants to end up competing with thousands of its own offspring!) If the environmental conditions are especially harsh with excessive salt spray, drought conditions or other equally unpleasant circumstances, coastal seeds actually have the incredible ability to delay germination until conditions improve. A seed could potentially lie dormant for years and then suddenly spring to life when it considers the environmental factors have become favourable.

10. Alexandrian Laurel Ball Tree
Visual Sighting: Tree with dark chunky bark and large leaves (marker on the right hand side)

This tree is also known as a Beach Calophyllum. Its spherical-shaped seeds and tough shell allows seeds to float long distances away from the parental plant. Alexandrian Laurel Ball Trees typically grow in coastal habitats which means they are constantly exposed to strong breezes, salt spray and other harsh climatic conditions. Their short trunks act as a stabilising base; the design is so effective these trees are able to withstand cyclonic winds when they hit. It is believed that this tree has the incredible capability of self-fertilising. This remarkable ability allows Alexandrian Laurel Bell Trees to colonise a new island without the need for pollination.

11. Golden Orchid
Visual Sighting: small plant growing on rocks ahead (marker straight ahead in the rocks)

At this point of the journey most people are so bedazzled by the sight of Nudey Beach that they miss the beautiful Golden Orchid sitting right by everyone's favourite selfie spot. Golden Orchids are remarkable plants. As an epiphyte they are able to grow over any substrate -as you can see this one is flourishing from a rock. The noodle-like roots system not only systematically stabilises the plant but is also efficient at trapping dirt and nutrients. This is not its only use- as with any plant the roots transfer water and nutrients to the rest of the body - but these can store water in a similar manner to the way that succulent plants store water in their leaves.

But perhaps the most fascinating fact about the orchid is the flower; like all orchids it is a highly complex design that directs would-be-pollinators directly to the pollen granules. What we see as a few minute folds and crinkles in the petals are in fact an infra-red airstrip for insects and pollinators. It guides them to the correct approach to access the nectar but the nectar is only given as reward for first brushing the back against the

specialised lip coated in pollen. In this manner the insects pollinate the plants as they move from one to the next.

12. Pandanus Sapling

Visual Sighting: Clump of young Pandanus trees just before you enter the beach (marker on the left hand side)

As you walk along Nudey Beach you'll see just how tall and impressive these growing trees will become. Walking Pandanus boasts an array of distinctive features that give it a leg up when competing with other plants. First of all, its distinct prop roots (yet to develop on these fellas) afford the tree stability in soft sand and soggy soil. Walking Pandanus actively drop unwanted roots and re-sprout new ones (dormant but potential new roots show as little nodules along the side of the trunk) when they are not happy with their growth rate, stability levels or if they are only receiving limited sunlight. They earned the name 'Walking Pandanus' because they are actually capable of moving 2m in five years! The prop roots also contain specialised cells that dispel unwanted salt from the trees' system.

Walking Pandanus are also called 'Screw Palm' for the distinctive spiral-growth of new leaves. This pattern directs rainwater down the trunk of the tree towards its roots system. The leaves are protected from grazers by a series of spines growing along the edge and the central rib. Funnily enough, no one wants to eat something that will 'bite' you back! Pandanus trees are either male or female. It is too soon with these chaps but the female bares a round segmented fruit. A single fruit can contain between 38 and 200 kernels that are naturally buoyant. This enables the seed to travel via smaller water courses and of course through the ocean in order to propagate away from its parental plant.

Conclusion

This short journey has highlighted the various adaptations that plants use in order to survive their harsh, highly competitive environment. Some, like the vines, cheat their way to the top by hitching a ride with well-established trees while others enter a metabolic state of stasis in order to wait out poor conditions. Some have changed the shape of their leaves to capitalise on water influxes while simultaneously promoting rapid air drying (to prevent infections). Life is a daily struggle and the little tricks used along the way are the reason the forests at Fitzroy Island are so lush despite the tough conditions. And now that you have arrived at your destinations- enjoy Nudey Beach! Named Australia's best beach for 2018 this gorgeous little gem is part of the national park so make sure to bring back every piece of rubbish with you. And just remember- it is nudey in name only so keep your bathers on!

Self-Guided Resort Grounds Plant Use Walk

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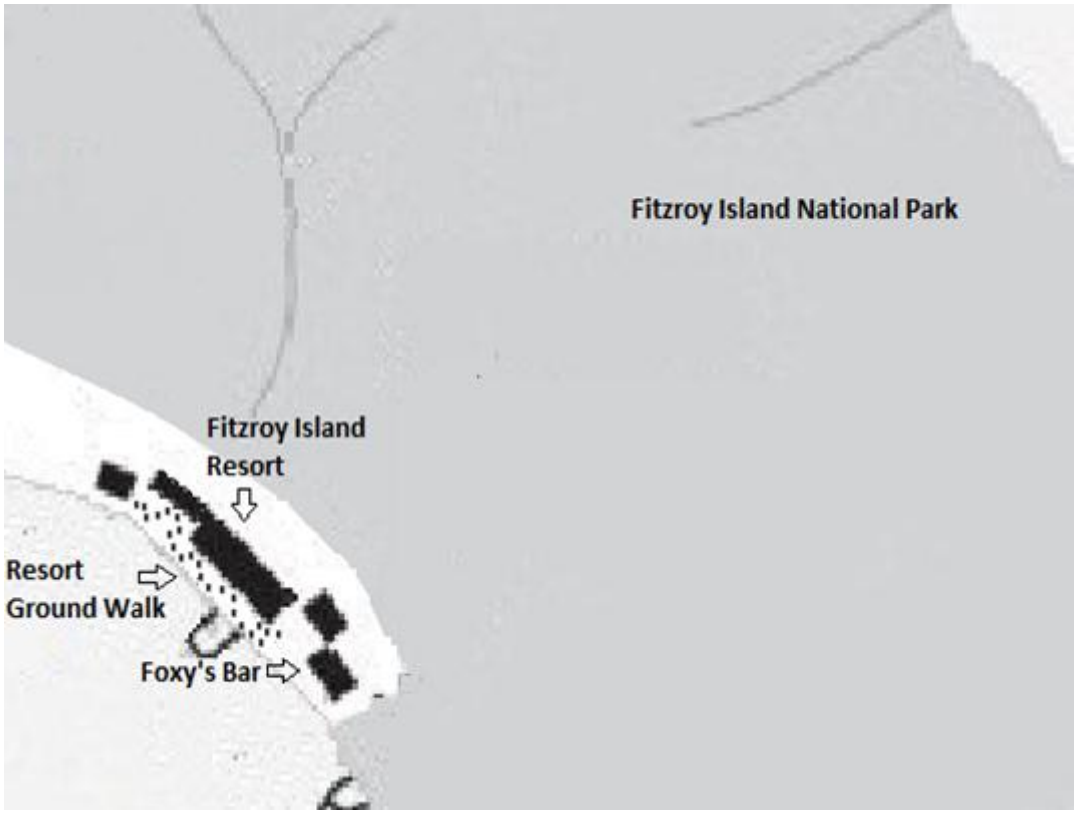

The track may not be exactly as it appears in this diagram

Take only photographs; leave only footprints

The Resort Grounds: A Relaxed Stroll into Traditional and Modern Plant

It is so easy to walk past a tree, bush or shrub without so much as a glance. Often if we do take the trouble to study the flora we are only appraising it based on its visual qualities. However the flora surrounding the hotel are species that have been used for tens of thousands of years as food, medicine and other comforts. Some may have even played a role in your own lives today without you even realising it. This is an easy stroll; but make sure you have water, insect repellent and keep an eye out for cars moving about.

But first a caution. Many of these plants are highly toxic in their native state. Throughout the course of this booklet you will not only discover their varied uses but in some cases you will also learn the fascinating techniques used to extract toxins and render the remnants useful. But you should never, ever try these for yourself. Gaining the skill to work with these plants takes years of training. This booklet is not a step-by-step guide and the information contained within will not teach you how to successfully use these plants yourself. It is here for general knowledge only. If you wish to learn the correct techniques to live off the land it is recommended that you consult an expert.

Seriously do not try these yourself. We cannot emphasise that strongly enough.

1. **Beach Spider Lily**
   Visual Sighting: row of plants following footpath past Zephyr's (marker on the right hand side)

   The Tasmanian Fire Department recommends planting Beach Spider Lily's around a property as they have an extremely low flammability rating. But the fact that this plant does not burn easily is not its only quality- its bulbous roots are harvested for food although it's toxic in its native state. To eat it before it is properly treated will induce vomiting which, it hardly needs saying, is not the best way to spend your holiday.

   The bulb is collected and leeched to remove the toxins. After this it can be safely consumed. They are mostly eaten for their high starch content. Starch has numerous health benefits. Starchy vegetables provide fibre, carbohydrates and are also rich in antioxidants (including vitamin C, beta-carotene, lutein and beta-cryptoxanthin. Say that name ten times fast I dare you). Antioxidants may lower your risk of developing cataracts or other causes of age-related blindness. They additionally actively aid in maintaining healthy bones, hair and skin. Starchy vegetables are also high in B-vitamins, particularly vitamin B-6 and folate (believed to reduce your chance of developing heart disease and stroke). B-vitamins also act as a mood stabiliser; creating a happy mood by increasing the brain's production of chemicals such as dopamine and serotonin, and reducing memory loss. If you're not sold on the benefits of starchy vegetables yet then wait for it - starchy vegetables also provide valuable minerals that your body needs to function efficiently. Their potassium and magnesium may help lower the risk of developing high blood pressure and heart disease. It can relieve premenstrual syndrome symptoms and help ensure bone health. Magnesium may also help ward off migraines. The mineral zinc contributes to eye and body tissue health. The alkaloids contained within the bulb are suspected to have potential anti-cancer qualities. In fact in Hippocrates time (BC 460-370), medical practitioners would use the oil collected from the flower in the treatment of uterine cancer.

   In addition to the vast health benefits found through consumption, the Spider Lily has other medicinal qualities. The root can be boiled into a concentrated liquid form then applied in the treatment of swollen joints, ulcers and even tending to children suffering from nervous afflictions. Some communities use the decoction as an antidote for poison. The bulb is specially treated to transform it into a plaster-like substance and applied to burns.

2. **Jungle Flame**
   Visual Sighting: 'hedge' around Zephyr's restaurant (marker on the left hand side)

   This intriguing plant has many uses across the world. In the tropics it is commonly used as an attractive hedge or screen just as you can see it is being used here to give the Zephyr's garden a touch of seclusion. However in its native lands (India and Sri Lanka) this plant has important medicinal qualities. The roots are eaten to lessen the discomfort of stomach troubles and to cure dysentery while an extraction from the flowers and bark is used to relieve bloodshot eyes, clean sores and cure ulcers. Jungle Flame is used in numerous herbal remedies as the plant contains important phytochemicals that are antioxidative, antibacterial, antidiarrhoeal, antinociceptive, antimutagenic, antineoplastic, gastroprotective, hepatoprotective and have chemopreventive effects. It is used in several different forms – as a decoction, liquid extract, powder or poultice. The leaves can be turned into a decoction and used to rapidly rejuvenate wounds. It does this by increasing the tensile strength and tissue weight as well as increasing the collagen deposition of damaged tissue, thereby accelerating the rate of healing. The decoction can be used to treat hiccups, nausea and a sore throat. A decoction from the flowers is used to assist with high blood pressure, as well as regulating menstruation. The flowers and leaves are sometimes gathered to create a poultice for treating eczema, boils, bruises and swollen joints such as sprains.

3. **Scrub Ebony**

Visual Sighting: tree on the left of the bridge (marker on the left hand side of bridge)

The nondescript appearance of this tree hides its potent capabilities. The rounded orange fruit will blister and burn the mouth and throat if ingested; even though some people report eating it and finding it 'pleasant'. The difference may be determined by the ripeness of the fruit. I personally wouldn't try it; especially knowing its traditional use. Indigenous Australian's used the potency of the flesh to their considerable advantage. They would crush the fruit and toss it into water where it instantly killed the fish (see also #11). Take my word for it and do not try this in our creek. The fish in there are performing roles vital to the ecosystem and killing them can have unforeseen consequences for the island. In addition, the juices of the fruit stain the skin – as I can testify. I discovered this charming feature after prying one of the fruits apart to help with the identification of the tree. It took 48 hours for the bulk of the stain to wash away. I looked like I had a serious case of nicotine fingers! In fact one fingernail had a brown stain for nearly a month. In some places the wood is used to make musical instruments but even here you must be careful - the dust can cause dermatitis.

4. **Cannonball Mangrove**

Visual Sighting: tree with unusual growth pattern sitting right behind the Scrub Ebony (marker on the left hand side of bridge)

This remarkable mangrove is named for its curiously exploding fruit. Starting as a single round ball, the fruit consists of between 12 and 18 individual seeds. When the fruit drops into the water the seeds erupt into an irregular puzzle; earning the fruit the nickname 'Monkey-puzzle nuts'. This tree exists across the world and each Country has found different uses for it.

In the Philippines the wood is utilised in boat and building construction while the tannins are extracted from the bark and used to dye fishing nets, ropes and other textiles. The Chinese use the wood to build musical instruments and furniture, particularly furniture given as part of a bride's dowry. Fijians use the timber for fence posts, beams, poles and firewood while Vietnamese favour using the wood for delicate statue carvings. In Thailand people separate the flammable oil from the fruit to use in fire lanterns while those in Indonesia go a step further. They mix the oil with flour and the resulting concoction is used to make face masks and treat pimples. It additionally works as a mosquito repellent that simultaneously reduces the discomfort of insect bites and dysenteric fever. The thin bark is dark outside and red inside. It is used as a tanning agent it dyes cloth a deep amber colour and treating fishing nets. In some parts of Java it is rare to find a tree with its bark intact. In some regions the root is extracted as a remedy against cholera and dysentery; although the exact recipe is a carefully guarded secret. Throughout Australia the Rirratjingu people of northeast Arnhem Land use the pretty pink timber for ornamental carvings while the Iwaidja people of West Arnham Land use the limbs to style long-stemmed smoking pipes, decorative boxes and other furniture pieces.

Turn back towards the ocean for the next plant, Raging Thunder hut on the left, resort on the right

5. **Palm Cycad**

Visual Sighting: plant behind the Raging Thunder hut (marker on the left hand side)

This impressive cycad is a remnant from the Jurassic period – they were there when Stegosaurus, Diplodocus and Allosaurus dinosaurs roamed the earth. These plants are so ancient they are either male or female. Australian Aboriginals would combine the soft innards of the male flower stalk with urine in a paperbark container. They would drop hot stones into the concoction to create an anti-sceptic that was specifically applied to deep tissue wounds such as spear wounds. The female cycad produces a deeply toxic 'fruit' (it's generous to call it a fruit). The flesh of this fruit was responsible for poisoning every 19th century explorer! One feast will bring on diarrhoea and vomiting; which you think would be enough to put you off. However, if someone continued to eat it the toxins gradually build up and bring on a condition known as the zamia staggers.

Putting it mildly, zamia staggers is tumours through the kidneys, liver, intestine, brain and it pretty well melts the spinal cord. It's a nasty way to go. And yet incredibly, Aboriginal women found a way to take this highly toxic fruit and make it edible. Traditionally you would not find a solitary cycad like this one but a collection of cycads living close to each other. The rule of thumb was that the women would collect around 2/3rd of an available food source. They were always careful to leave enough for the plants to propagate; leaving ample plants in the future to feed future generations (see also #9). After collection the fruits were roasted, then broken into segments and aired. These were pounded into smaller portions then placed carefully into a specially woven bag that effectively acted as a colander. It retained the fruit inside while it was positioned into a freshwater stream, leeching the toxins into the water. The women had to be very careful where they did this- if their camp was downstream then they had just poisoned its water supply and everyone would have to move. It was a highly efficient way to make an entire camp mad at you. After the toxics were gone the fruit was mashed into a pulp and baked over hot coals to make damper. This was a colossal effort – but it was well worth it. In the days before refrigerators food had a very limited shelf life. This was particularly true during humid tropical summers. Damper on the other hand could last up to a week and a half; taking the pressure off for finding food during the leaner times. In some parts of Queensland tribes used this special recipe as a test for girls to prove they were ready to become women. They had to make the damper and eat it themselves. If they got sick, they were not ready for womanhood.

Cycads fruit in abundance following a fire. If a local corroboree (gathering) was coming up people would purposefully burn the scrubland so that they had an abundance of fruit (therefore an abundance of damper to feed everyone with). Sometimes that fruits naturally would appear in huge quantities outside of corroborees. At these times the women could gather the excess fruit and store it inside woven baskets. These baskets were covered in bees wax to render them waterproof. The fruit would be stored inside the basket, suspended in water. This storage meant the damper could ne made months after the fruit was picked.

Once abundant throughout Queensland, Palm Cycads have become endangered due to the wide-scale eradication efforts from farmers whose livestock have developed zamia staggers.

6. Cardwell Cabbage

Visual Sighting: waxy shrub on beachfront, opposite the beach cabin (marker on the left hand side of road)

A prolific beachgoer, this shrub has multiple uses across its native range in Eastern Africa, Southern Asia, Papua New Guinea, Australia and the Pacific Islands. As its name suggests, the leaves can be steamed or eaten raw like a cabbage. However, be warned before you start munching – it tastes awful. The people of the Maldives only0 ate it during famine. Indigenous Australians' were not so particular and appeared to enjoy (or tolerate) the taste. The leaves contain saponins and coumarins which both have health benefits. Saponins boost the immune system, provide antioxidants and support bone strength. Saponins also produce fat-soluble molecules that actively aid the body in maintaining healthy cholesterol levels. You see, cholesterol produces bile which is necessary to aid with digestion. Saponins chemically react with bile making them bind together in an act that prevents the cholesterol from being reabsorbed in the bloodstream. The cholesterol is then ejected with the rest of the bodies' waste. Cholesterol medications use the same method.

Coumarins have anti-flammatory, anti-spasmodic, anti-edematous properties (don't worry- I had to look it up too. It's a medical condition where excess body fluids are retained within tissue or body cavities) and boost vascular tonic effects. The leaves also contain the alkaloid scaevolin which has anti-viral properties. Eating them aid indigestion while drinking an infusion made with the juice helps to combat bad coughs, pneumonia and tuberculosis. The juices extracted from the leaves have been used to combat rabies and herpes simplex virus 1 and 2. In some countries they are used as contraception for women; said to induce sterility for up to seven years.

Aboriginals used the juice from the small, white fruit for multiple medicinal purposes. It is applied directly to bites and stings or can be heated and squeezed into the eyes to combat infection and corneal opacity ranging

from a minor irritation of the cornea to blindness. The warmed pulp is applied daily to act as an antibacterial cleanser for open sores. It is also highly effective against tinea. The broad leaves are heated and applied as a poultice to swollen joints - or placed directly on the temple for headache relief. Other medicinal qualities include the treatment of skin ailments (saphonins lather like soap when mixed with water and so have been used to treat skin complaints such as eczema), elephantiasis and scrotal swellings. The bark has been applied to abscesses, bone fractures and used during menstruation.

The shrub's small stems are hollowed and used as pipes but in some countries they are also used for treating abdominal issues. The shrub is deliberately wounded to produce sap which is applied to sores. Some cultures consume the root; entrusting it to act as an antidote after feasting on poisonous fish and crabs. Others believe the root holds anti-cancer properties while others still apply the bark of the root to skin afflictions. The bark of the tap root is removed and combined with salt, then applied directly to open sores to fight infection. A liquid reduction is extracted from the plant and used in the treatment of beriberi, dysentery and syphilis. On top of all these uses, the shrub has been declared to have anti-diabetic, anti-pyretic (fever) and anti-coagulant (blood clotting) while simultaneously producing a skeletal muscle relaxant. All in all, this is an extremely useful plant to have around – provided you know how to cultivate the medicine properly. Spoiler alert: we don't. We just like to look at it and enjoy the soil stability it provides along the beach front in addition to the salt-spray protection it affords to less salt-tolerant plants growing behind.

7. Mistletoe
Visual Sighting: Brown Damson covered in Mistletoe (marker on the left hand side)

The fruit can be eaten (it is very sweet) but due to its adhesive nature it is almost impossible to spit the seed back out again. It can make or quite an entertaining afternoon. This peculiar mannerism has earned the mistletoe the tongue-in-cheek nickname 'Snotty Gobbles' in some Indigenous communities. This residual viscous substance is the key to the Mistletoe's success. A bird passing a seed needs to wipe its bottom on a branch in order to physically pull the sticky, glutinous strands out of its system. Envision it. I can't wait for the mistletoe to bloom so I can try it.

8. Native Hop Bush
Visual Sighting: small shrub on side of road underneath Brown Damson (marker on the left hand side)

The humble Native Hop Bush is currently the source of an exciting breakthrough in the recognition of traditional ownership of medicinal knowledge. The Native Hop Bush is traditionally used to treat pain and inflammation of the mouth; everything from toothache to ulcers. Fresh material is applied to the affected area every four hours. The Kuuku I'yu people drew the plant's healing properties to the attention of medical researchers who then realised that it contains novel anti-inflammatory compounds and extracts. It is believed that the chemical components (such as clerodane furano-diterpenoid – say that five times fast) offer an improved safety profile in the treatment of dermatitis and psoriasis. Dermatitis is an inflammation characterised by an itchy, red rash. Occasional blisters occur and the skin can thicken. Psoriasis in an inflammation personified with angry, red scaly tissue building up on the elbows, knees and elsewhere. Sufferers can also experience severe dandruff, sore and discoloured nails and arthritis in the joints. Scientists are working to harvest the organic plant matter and extract biological compounds for anti-inflammatory medicines. They are focusing on three scales- the therapeutic anti-inflammatory market, alternative therapies and natural personal care. Herbal cream products could be on shelves by 2021. But long-term drug development could take a decade to be approved. The 50-50 commercialisation agreement that exists between the university developing the treatment and the Indigenous Kuuku I'yu corporation is a credit to both parties in establishing beneficial business relationships and ensuring Indigenous Australians get the physical and financial recognition for their traditional knowledge.

9. **Cordyline (genus)**
Visual Sighting: evergreen in the garden (marker on the right hand side)

This plant is highly valued by New Zealand's Maoris. They dig up the root system (again, careful to take around two-thirds of the available source; thereby leaving enough for the plant to regenerate) and dry the tubers in the sun. The fibrous outside of the root is scrapped and burned, allowing the inside to slowly cook inside a ground oven. It traditionally took 12 - 18 hours to cook properly. Once cooked though the roots are removed from the oven, pounded, washed and squeezed to extract the sugar within. The roots and stems are a rich source of fructose (comparable to sugar beet). It is sometimes consumed alongside the roots of specific ferns; almost like a relish. Should the root be allowed to ferment it could be used to create an intoxicating drink. But the root is not the only portion of this plant to be utilised for food. The young shoots are eaten as a substitute for cabbage and the trunk is collected (killing the tree), dried, steamed (until the pulp becomes soft and both sweet and starchy to taste) and added as a sweetener to porridge and drinks. The leaves are gathered in the summer, scraped to remove the outer cuticles then left to soak in freshwater for 24 hours prior to cooking. As the leaves are rich in fibre they have become an important source for paper, twine, cloth, baskets and thatching.

10. **Green Ants**
Visual Sighting: green 'footballs' high in the trees (marker on the right hand side)

Look into the foliage around you – do you see some green soccer balls waving loftily from above? These are the nests of the Green Ants; an incredibly useful animal to have around! Many ant species rely on a chemical defence produced in their abdomen; in the case of Green Ants these chemicals have a pleasant citrus taste! This is why these ants are also known as Citrus Ants (or Weaver Ants as a reference to their nests). Fruit is seasonal, but a tasty ant is available all year! Aboriginals would bite the green bottom off, releasing the citrus through the mouth – but killing the ant. You don't have to kill them to taste them. Green Ants tend to be aggressive when they are defending their nests and defending food; the rest of the time they are exceptionally placid. If you can encourage an ant to climb on you and trap its head (this is the tricky bit – don't press too hard; remember the aim is to keep it alive) with your thumb. When the ant is stuck and can't escape the abdomen will rise so that the sharp point is facing upwards. Lick it with the tip of your tongue and hey presto – a concentrated squirt of citrus will erupt. Then you can just let the ant go. It can recharge overnight and you can lick it again tomorrow! It's extremely tasty, although far more intense to sample this way. If you get a particularly full one it can be bit like touching your tongue on a battery. The Aboriginals did not just rely on the ants for a nice snack though. They would collect the nests and dunk them into water; the drowning ants release their citrus flavour into the water making a nice cordial. Ten thousand years ago we were not so fortunate as today. The water on Fitzroy Island may look brown (due to tannins from the trees) but it is safe to drink and has a nice flavour. Not everyone had access to fresh water all those eons ago. Sometimes all you had to drink was a dirty mud puddle. If you could find something like a Green Ant nest to sweeten the taste; why wouldn't you?

If you also boiled the water it made a hot citrus tea that not only tasted good but alleviated headaches, sore throats and blocked sinuses. If you could likewise find a nice native bee hive you could add honey to the concoction and use it to soothe the throat as well; it's basically the bush version of drinking honey and lemon. If an infant child had a cough or cold the nursing mothers (or the wet nurse; within the tribe women would take turns minding children to allow the rest to assist with gathering food) would crush the ants and rub the ant-paste over their chests. This meant the baby inhaled the citrus scent like vics vapour rub; clearing the sinuses and relieving their cough.

Since the ants aggressively defend their host-trees, farmers in the Atherton Tablelands have started using them as a natural form of pest-control for their crops. A single colony can have up to 10 individual nests and they are constantly rebuilding every few months to prevent natural decay. The famers purposefully leave food scraps around to encourage the ants to rebuild in the same general area. The ants in return are wonderful bio-control

agent; no herbivore dare approach the crops they live in. It is a wonderful system; right up until harvest. Then I wouldn't want to be that farmer for all the world!

11. Indian Beech

Visual Sighting: tree growing on an angle encroaching on the right side of the jetty (marker on the left hand side of the track by the map)

Also known as the Fish Poison Tree, the inner bark and roots are grated and scattered on the surface of isolated rock pools to effectively remove the oxygen from the water. Stunned fish gradually rise to the surface making it a highly efficient way go fishing. Where natural pools are not available, hunters would use stones and other materials to create artificial pools. The fish enter these pools during the high tide and are isolated within after the water retreats. Should anyone be injured when handling poisonous fish; a black gum-like substance can be expunged from the bark and applied directly to the wound as a natural antiseptic. The bark is also transformed into rope while the wood splits easily and is used for firewood, posts and tool handles. The flowers are applied to gardens to act as compost for plants that require rich nutrients.

The oil and the residue collected from the fruits, seeds and sprouts are toxic to the human body if ingested (inducing vomiting) but many uses. The seed pod contains 25- 40% lipid; nearly half of which is oleic acid. Oleic acid works as an emulsifying or solubilising agent in aerosol products. It is widely used during the solution phase synthesis of nanoparticles where the oleic acid acts as a kinetic knob to control the nanoparticle's size and morphology. The oleic acid renders the oil perfect to use in lamps or simply to be used in soap. But its main use is as a lubricant; it has been developed for use in diesel generators. This is particularly prolific in parts of India where many of the population have limited supplies. Since 1997 several previously un-electrified villages have begun using the oil of the Indian Beech (also known as Pongamia oil) to create their own power grid; generating enough electricity to run irrigation pumps and power electric light bulbs. This discovery provides thousands of India's rural poor access to a cheap, renewable energy source. The remnants left over following the oil extraction are turned into fertiliser or animal feed for poultry and livestock.

12. Walking Pandanus

Visual Sighting: tree with unusual prop roots located behind row of boulders (marker on the right hand side)

This is an incredible tree; nearly every part of it can be used in some manner. Across its natural range different Aboriginal communities utilised the individual parts of the tree for various uses. It is only today with the release of bush tucker information that we are now aware of its multiple uses. Like the Palm Cycad before, Walking Pandanus are either male or female. This one is a male. The male grows what would be generous to call a 'flower' (it looks like a tangle of dead leaves intertwined in the foliage) that has a sweet scent. Traditionally Aborigines mix the flower with coconut oil to rub over their bodies as a perfume. It is considered to be an aphrodisiac.

The female produces a ginormous fruit that looks like a segmented soccer ball. The 'segments' are individual kernels. A single fruit can have been 38 and 200 kernels. Inside each kernel is two nuts that contain 50% saturated fat and 34% protein; a high-energy yield. It is not easy to break into the kernel. The fruit of the Walking Pandanus is particularly potent; when it first ripens it has an appealing warm orange colour and a pleasant odour. However be warned- the fruit of some species have a sweet flavour (in fact in many countries today they are used to flavour sauces and desserts). Not this species. In the case of the Walking Pandanus, the pulp will burn the lips, blister the tongue and induce violent diarrhoea. You've got to feel for the poor soul that discovered that the hard way. You need to break into the kernel to access the nut within. But this is easier said than done. Some of my friends once snapped a hacksaw blade while trying to break into the kernel. Rather than rely on brute force, Aboriginals carefully roasted the kernels. This rendered them brittle enough to easily snap apart using a sharpened bone fragment, stingray barb or even a handy stick. The nut within can be eaten

raw (although this can irritate the mouth) or roasted. They taste similar to an almond. Some tribes would pound the nuts to make a damper. The leftover kernel fibres act as a useful form of dental floss to get that niggling bit of goanna meat out of your teeth. In some parts of Micronesia the kernels are collected and treated for making jewellery. It is possible to eat the stalk of the fruit but this is rather woody and a bit like gnawing on a plank of wood. Not especially enjoyable or recommended but if you're part woodpecker and have always fancied splinters in your teeth; go for it (just not while on the island – it's hard to get dental surgery here). This was not the only use for the fruit. The freshly-dropped seeds could be collected and placed into a specially woven waterproof basket. The fruits were left to ferment in the water contained within; the result was a mildly alcoholic beverage likened to a cider. The pulp left in the liquid is high in beta carotene and vitamin A; preventing deficiencies within the body. It is not known if this drink was first created before or after Aboriginals tasted true alcohol.

If you look into the leaves you can see that they are tightly spiralled. If there's no freshwater nearby and a person was facing dehydration they can eat the bottom two inches (the white bases) which taste like cabbage and are full of hydrolytes. You can reach the white centre by either pulling at an individual leaf or by slashing all the outer leaves away; exposing the white cabbage-like insides. This can be eaten raw, or if you were less worried about hydrolytes and just wanted something to eat, they can be cooked. In some parts the white centre is pounded into a paste and used as an antiseptic for shallow sores and wounds. When a tree is first developing, a person can pluck the bitter inner leaves growing from the centre of the core and eat them to settle stomach complaints such as dysentery, diarrhoea and cramps. Alternatively, a person could crush the inner stems to extract the juice, mix it with water and gargle for a pain relief of toothache and mouth ulcers. As you would expect; mouth pain was a common malady centuries ago before people knew how to really care for their teeth. Many plants were used to temporarily numb the pain; this was particularly important in the case of rotting teeth. If you've ever had a root-canal performed; I'm sure you can appreciate the important of numbing agents. That said, removing this part of the sapling will kill the tree so it was only used when no other alternative medicines were available. The tough outer leaves were collected, crushed, and then bound tightly around the temples to aid with headache relief. The strong, fibrous leaves are perfect for weaving- once you have removed the barbed edges. Women would strip them into smaller segments and take days breaking down the rigidity within. They would achieve this by soaking bundles in water, then twisting them first one way and then the other around the hand. Once the fragment was malleable they could begin weaving the straps into baskets, mats, dilly bags, jewellery, ropes or nets. While it was active the Yarrabah Mission, first founded near Cairns in 1892 (now a township in its own right), was always crucially short of funds. The Mission's women used pandanus leaves to weave each occupant a mattress to sleep on. The entire weaving process can take months.

Hollowed branches are collected and transformed into didgeridoos or fire carriers- the cavernous inside was perfect for smouldering embers to stay alive while the tribe moved camp. Today the branches are heavily relied on through the Pacific Islands for constructing homes, building ladders – they're even used as hard pillows! The sap is used as a glue source and the wood used in compost. The core of the trunk is buoyant; after the outer bark is removed it can be used to make rafts. One of the greatest examples of this comes from this very island. In 1905 the Yarrabah Mission Court expelled 30 residents to live in a community here on Fitzroy Island called Kobahra. Kobahra became Yarrabah's official penal colony. Residents were sent here for varying offenses (mostly if they were deemed a bad influence) and their stay could range from anything between one month and several years. People still tried to escape. In 1911 two girls lashed a raft together and propelled themselves into the ocean. They were picked up by a ship in the Grafton Passage and taken to Cairns. Initially the girls said that their intention was to board a train to Townsville and escape south from there. However, once they realised they were being taken back to Cairns they knew they would be reported as runaways to the authorities. Their story promptly (and intelligently) changed. They claimed they had been planning to reach King's Beach (opposite Welcome Bay) and traverse the mountains to Yarrabah in order to report that the island had run out of food. Like the rest of Yarrabah, Kobahra was regularly short of food and it was a viable reason. They were returned to the island, having avoided detection for the true purpose of their flight, with ample supplies. Kobahra was closed in 1912 due to ongoing issues - including food shortages.

After all that, this incredibly versatile tree still has one more feature that can be employed: the fanciful prop roots themselves. These are used to make dyes, or scraped and pounded to extract the juice. Combined with the sap collected from the base of a banana plant, this concoction is drunk to treat blennorrhoea and conjunctivitis. In the Pacific Islands the young root is heated and crushed to extract the hot juice which is applied directly to treat bites and wounds delivered by fish. The prop roots are also heavily relied on to create basket handles, paintbrushes, skipping ropes and wall support for buildings. All in all, the Walking Pandanus is an incredibly useful tree; you would be hard pressed to find another with such a myriad of uses.

13. **Hibiscus**

    Visual Sighting: glossy green shrubs with showy red flowers lining the path above the row of boulders (marker on the right hand side)

    Hibiscus plants exist all over the world and it is no surprise that many countries have found some sort of use for select parts. In China the oils from the vivid red flowers are extracted and used to soften and soothe the skin while throughout India a concoction from the flowers and leaves are ground into a paste and applied as a natural shampoo to prevent hair loss and dandruff. It additionally leaves a protective layer of oil around the core of the hair follicles. Throughout Africa the petals are plucked and used in an herbal tea while the flowers are dehydrated in Jamaica; boiled, then cooled and drunk with ice. This concoction is called "Jamaican Water" and is popular for its colour, tanginess and mild flavour. With a little added sugar it tastes like cranberry juice. This makes it popular with dieters and people with kidney issues. In the Caribbean the flower is transformed into a jam while people living in Mexico fancy the flowers in a dehydrated state where they are considered a delicacy. Children throughout the Philippines crush the leaves and flowers and strain the sticky juice within. By dipping drinking straws into the remaining residue the children are able to blow bubbles; what child doesn't love blowing bubbles? Finally, hibiscus bark contains strong fibres. Strips are ripped from the plant and left in sea water until the remaining organic material has rotted away. The portion left behind can then be used to make paper. In Polynesia these fibres are also used to make grass skirts.

14. **Cottonwood**

    Visual Sighting: tree with large 'heart-shaped' leaves located on beach edge (marker on the left hand side)

    The Cottonwood (also known as Sea Hibiscus or Native Rosella) is another tree with multiple uses. Indigenous Australians created a tea from the petals, bark and roots that was used to lower fevers, treat high blood pressure, relieve coughs, kill bacteria, ease menstrual cramps, reduce the pain of childhood and treat hair loss. What a tea!!! Today the Native Rosella is used in jams and sweet foods; you may get a taste if you dine at the Ochre bush tucker restaurant located on the waterfront in Cairns. Young shoots, roots and leaves can be eaten as a vegetable. Fluid collected from the young sprouts is used as an antiseptic for rashes and if you add sapwood the result also works on boils and open lesions. The inner bark can be stripped and used to bind wounds or transformed into nets, ropes and fishing line. Aboriginals cut the straight sprouts and left them to dry in the sun. The dried sticks were perfect for spears, woomeras and firesticks. In other countries the Cottonwood is used for carving, as firewood or to create boats. The wood is malleable and easy to work with so it used to make high quality wooden furniture. The tough outer bark is used to seal cracks in the sides of boats.

15. **Golden Orchid**

    Visual Sighting: Orchid attached to tree in garden bed above row of boulders (marker directly opposite on the path)

    Swallowing the seeds of the orchid can produce sterility in men while the dried roots are perfect for weaving. The stems can be squeezed to extract a juice which is then used as glue; it can also be applied to burns.

16. **Beach Sheoak**

Visual Sighting: tree with needle-like 'leaves' located on beach edge (marker on the left hand side)

The tree can be deliberately wounded to induce sap; this is eaten as a toffee (another year-round treat). Alternatively the sap can be dropped into water to sweeten it like a cordial or – incredibly- dissolved in water; then heated and cooled. The resulting concoction congeals to make a primitive jelly; considered to be a genuine delicacy 100 years ago. Several friends have tried this and their description of the flavour does not encourage me to want to run out and try it for myself. As the most polite of them explained - we are used to far sweeter food today. An infusion of the inner bark and water can be used as a mouthwash to relieve toothache and sore throats – but it was extremely important not to swallow so as to avoid digesting splinters. The wood of the Sheoak, or Casuarina, is used for spears and woomeras, or burnt to produce charcoal. But one of my favourite uses for this tree is the nut. Once again, Sheoaks (or Casuarinas) are either male or female (see also #5 and #12). The two trees here are both females; they produce the seed pods. If the men were out hunting and there was no freshwater source nearby they would simply pop the nut into their mouths. This simple act tricks the body because the mouth recognises that a foreign object is inside it and so it immediately begins to stimulate the saliva glands in an attempt to break it down. Of course, you can't dissolve a nut. So the natural reaction is to start swallowing the excess saliva. This effectively fools the body from registering dehydration- the body realises that it is swallowing fluids and thinks that it is drinking. Of course, it is actually just swallowing its own juices. It's very important to note- sucking on the seed pod does not prevent dehydration itself. But with this simple trick, people can ward off the effects of dehydration for long enough to find a fresh water source.

17. **Golden Cane**

Visual Sighting: clumping cane growing amongst the Hibiscus (marker on the right hand side)

This is a remarkable plant. During the 1980's NASA conducted a Clean Air Study on several plant species as a means of maintaining clean air in the international space station. During the course of their research they discovered that the Golden Cane acts as an effective air filter and humidifier. It removes xylene and toluene from the air at an efficient rate of one plant per 100 square feet of home or office space. Xylene and toluene are chemicals commonly found in household and industrial products. They can cause poisoning if they are ingested, if the fumes are inhaled and/or if they make contact with the skin. All in all, they are handy chemicals to remove from the air around you. In addition a 1.8m Golden Cane transpires 1L water in a single day. Not too shabby hey.

18. **Necklace Pod**

Visual Sighting: young shrub with small leaves located on beach edge underneath Coconut Palm and Walking Pandanus (marker on the left hand side)

This charming plant is known by some as a Coastal Wattle. How it got this misleading name is unknown as the true Coastal Wattle can be eaten while the Necklace Pod will quickly reduce any consumer into a quivering, vomiting mess with simultaneous explosive bowel movements. These are really not two plants that you want to mix up!!! How they came to be known to some as a Coastal Wattle is a very dangerous mystery. Don't make the mistake of trying to eat this one. However, setting aside its potent emetocathartic toxins, the Necklace Pod was used in several traditional medicine recipes. The leaves, roots and seeds are relatively rich in alkaloids. This is their natural defence mechanism against herbivore grazers. Akaloids are bitter-tasting complex molecules containing nitrogen. They are often dangerous to eat but have several useful medicinal qualities. The most famous are caffeine, morphine, codeine, nicotine and quinine. The Necklace pod is rich in the quinolizidine group of alkaloids. Broadly speaking, these have a vast range of pharmacological uses including oxytocic (used in anesthesia), antipyretic (used to break fever), antibacterial, antiviral, and hypoglycemic (low blood sugar) qualities. The dried seed contains up to 2% cytisine which is structurally similar to synthesised drugs used to treat tobacco addiction. But before you reach for the seeds to cure your smoking cravings remember- cytisine

can interfere with breathing to the point of causing death. The cytisine has led to the seeds being used in some areas as a natural insecticide.

Despite the fact the seeds are emetocathartic (inducing vomiting and diarrhoea); Filipino and Malayan people often swallow one or two (sometimes the roots and leaves are also employed) to purge the body of unwanted toxins. And everything else you have in there. This is a far meaner method of purging the body than the old prune juice. Some people rub the seed's oil externally over an injured body part to soothe painful bones. Those living in Eastern Malaysia use the pulverised seeds in the treatment of dysentery and cholera. The ground seeds are even ingested in some regions as an antidote to eating poisonous marine life. Smaller doses are applied to treat the sting of a poisonous fish. This powdered medicine was also used to treat haemoptysis (coughing of blood), painful urination and gonorrhoea (don't ask). Extracting and swallowing the seed oil acts to break mucus up and move infection off the chest.

Throughout the yesteryear a decoction of the seeds and roots was given to treat liver disorders, particularly those producing bile. However you have to be an expert to be able to successfully reduce the toxic seed into a useable form; this plant is far too dangerous if you get it wrong. This scares off (rightfully so!) most interested parties. The wood is hard and heavy and can be used for making small objects.

19. Shell Ginger

Visual Sighting: ginger plants growing to the left of the stairs (marker on the right hand side)

A native to East Asia, Shell Ginger is an evergreen perennial (a plant with vegetative structures that survive year after year rather than shedding its leaves and re-sprouting new growth). It earned its named from the shell-like delicate flowers combined with the fact that this plant is commonly confused with a ginger. Though it is not a ginger, the leaves are used to make an herbal tea which is rich in antioxidants and drunk for its hypertensive (treating high blood pressure), diuretic (expelling excess water and salts from the body) and anti-ulcerogenic (preventing the creation of ulcers) properties. The leaves and rhizomes have also been shown to be effective to fight HIV as well as being anti-diabetic. They contain anti-oxidants and are also effective at combating high blood pressure. The leaf blades are used throughout Asia for wrapping Zongzi- traditional rice dumplings. Brazilians bathe with crushed flowers and leaves as a means of fighting fever while others will digest portions of the root to combat indigestion, flatulence, vomiting, stomach pain, colic and diarrhoea. It is also consumed to treat malaria.

20. Fungi

Visual Sighting: decomposer fungi on rotting wood (marker on the right hand side)

There is an estimated 13 000 individual species of fungi in Australia. While some are poisonous (reactions vary from hallucinations to severe illness to death), others form the basis for several traditional uses. Different forms of shelf and plate fungi were eaten; some as a dietary staple. They could be eaten raw or thrown into a fire and roasted. Some species were tossed onto hot coals to produce a smoke as they slowly burned. The smoke was carefully inhaled to treat coughs, headaches and blocked sinuses. By removing the fungus after it was slightly charred, Aboriginals could scrape fragments off the main body to drop into water. This blend was drunk as another means to treat coughs, chest infections and sore throats. It also broke fever and counteracted diarrhoea. Other fungus were to release juice that blended with saliva and numbed sore mouths. It also released agents to counteract the bacteria causing the issue. This concoction could be rubbed inside the mouth of an infant to treat oral thrush or as a tool to aid with teething. A person has to be sure when eating or using fungus in traditional uses. There are still many cases of poisoning today; reactions vary from irreversible blindness to organ failure and death. So really, don't try this yourself. Stick to mushrooms you find on the market shelves.

21. Oyster Plant

Visual Sighting: collection of attractive purple-green plants with fleshy leaves (marker on the right hand side of path)

This fleshy herb is a classic example of the efficiency of native Australians. Oyster Plants are not indigenous to this country; they come from South America and are highly toxic. They were introduced to the country as an attractive garden plant – however this plant is a clear case of look but don't touch! This plant packs a serious punch. If ripped its fleshy leaves leak latex that causes the skin to erupt in a stinging, itchy rash. Early settlers actually used it as a primitive blusher – women would rip a leaf and smear the latex across their cheek to bring on a 'healthy red glow'. Talk about beauty is pain!!!! As someone who once spent half an hour moving through a cascade of Oyster Plants I cannot recommend the experience. The red rash was spread from my ankles to my thighs and the painful stinging didn't stop for 36 hours. Seriously- don't test this plant.

If that's what it does by touch, you wouldn't expect that anyone would be crazy enough to eat it but someone did. Thanks to them we now know that eating it causes painful chemical burns to the mouth and throat. And yet Aboriginals found a way to take this highly toxic, nasty little plant and use it for the greater good. And what's more; they did it in a matter of decades rather than centuries! They collected the flowers and leaves into a concoction (other ingredients are kept a tightly-guarded secret) and used the combination to treat sores, colds, whooping cough, nasal bleeds and blood in the stools. They made a poultice from the crushed leaves and applied the paste externally to swollen joints to reduce inflammation and swelling. At the start of this booklet we advised to never try these things yourself. This plant is a classic example of why. Not only does it take years of practise and serious skill to be able to transform a toxic plant into something useful; but often we don't know the full 'recipe' as it were. When the Elders first started to part knowledge to the wider society they often held back a key detail; be it an ingredient or a cooking technique. This meant that the general knowledge of how to use plants was out there but the specific knowledge was retained within the family unit. And fair enough too. But it means that we cannot emphasise this enough- never try these things for yourselves.

Of course, back in their native homerange the locals have also found several uses for this herb. A decoction of dried leaves is used to treat hemoptysis (coughing up blood), bacillary dysentery, lymphatic tuberculosis, asthma and psoriasis (an auto-immune disease). When the plant was introduced to Thailand the people there found a way to utilise its potency in the treatment of fever, cough and bronchitis.

22. Spiny Headed Mat Rush

Visual Sighting: grassy shrub near main entrance to garden (marker on the left hand side as you enter garden)

Aboriginal women spent hours harvesting the minute seeds of the Spiny Headed Mat Rush. They gathered them in large quantities and pounded them into a powder to make damper. When the grass is young and yet to become fully established, it leaves taste like bubble gum as a sweet and tasty treat for young and old alike. The flowers contain copious amounts of nectar so they were often sucked like a lollipop or dipped into water as a sweet cordial. Like the Pandanus before it (refer to #12), pulling out the leaves of a mature plant grants access to hydrolytes to prevent dehydration. We only have one here so please don't pull its leaves out! The women had other uses for the leaves as well. Split leaves were tied into bundles and soaked. This rendered them pliable enough to make baskets and other woven goods such as nets. Early settlers used the leaves to make paper.

23. Solitaire Palm

Visual Sighting: palms positioned strategically around garden (marker straight ahead)

The Solitaire Palm is an interesting tree in that it fruits continuously. This means that the fruit, though it has very little flesh (~1mm), is a tasty little treat that is available year round. The Aborigines would simply climb that

palm to collect it. Here on the island we have a much easier way – we wait for the Sulphur Crested Cockatoos to bite off a strand and drop it to the ground. Thanks to these messy eaters many people have sampled this particular treat. It tastes like an extremely mild lemon; some find that it has a slight tomato-like after taste. I personally try not to eat the peel. The inner core of the trunk (called the 'Heart of the Palm') can be removed and eaten either raw or roasted, but this will kill the tree so it was generally only used when there was precious few alternatives available. The hard wood was used by some tribes for carving weapons and clap sticks. If hollowed, the trunk made a handy container or water bucket.

24. Bandicoot Berry

Visual Sighting: glossy shrub on opposite side of path (marker on the far end of garden, slightly to the right)

There are three parts of this shrub that are collected and consumed- the leaves, berries and roots. Tender young shoots are eaten as a vegetable while in Sri Lanka the mature leaves are cooked and eaten with rice as a form of traditional medicine to treat haemorrhoids, intestinal worms and other gastro vascular issues. They bruise the leaves and mix them with sesame oil. This concoction is used to dress wounds and ulcers. The juice is squeezed from the berries and applied directly to warts while the pith act as a diuretic as well as treating acute cystitis (bladder and urinary tract infections) and strangury (painful bladder blockages). In Goa (India) the young shoots are chewed to provide temporarily relief from severe cough while a decoction of the shoots is applied directly to sores. The leaves are roasted and applied to the head (alongside the juices) as a cure for dizziness and vertigo. Some people pound the young leaves and extract the juice to drink as digestive. The same people boil the roots to produce a concentrated liquid. This is used as a cure for stomach ache, colic, dysentery and diarrhoea. In Sri Lanka the concentrated liquid is consumed to treat colic but some drink it to relieve thirst and dehydration.

In Réunion (a small French island in the Indian Ocean) the locals utilise the roots to induce sweating. The Jakuns (of the Malay Peninsula) use a poultice created from the leaves to apply to body pains and alleviate the discomfort. They create a paste from the roots which is applied to relieve skin complaints such as rashes or allergic reactions. The Marma of the Chittagong Hills Tract in Bangladesh combine the root paste with the roots of two other plants to treat swollen glands and boils. In other parts of India the root is medicinally used in the treatment of ringworm, open wounds and sores, ulcers, warts, cystitis, diarrhoea, dysentery, burns, dental complaints, haemorrhoids and fever. In general the roots are considered to have anticancer properties, be rich in antioxidants and have antidiabetic, antidiarrheal, antidysenteric and antispasmodic properties. It should therefore be no surprise that researchers confirmed the plant to have antioxidant, anticancer, antimicrobial, cytotoxic and analgesic assets. In fact, studies into the leaves found they contain 23 known chemical compounds including 11 hydrocarbons (used in fuel combustion), phthalic acid (dyes, perfumes and artificial sweetener), palmitic acid (soaps and cosmetics), 1-eicosanol (cosmetics), solanesol (the starting material in synthesis of high-value bio-chemicals used to treat cardiac insufficiency, muscular dystrophy and anaemia as well as Tourette's syndrome, Alzheimer's disease, Parkinson's disease, ulcerative colitis and attention deficit disorder). The leaves also contain farnesol (present in essential oils and perfumes), three phthalic acid esters (found in food packaging), gallic acid (an organic acid used in several medicines), lupeol (an anti-inflammatory agent), beta-sitosterol (present in many medicines that target pain and swelling) and ursolic acid (used by the body for the regulation of cell growth). And we're still not done yet. With yet further screening scientists were able to isolate more chemicals including carotenoid (a red/orange pigment rich in antioxidants and with anti-cancer qualities) and nine other compounds. Finally, the roots have been identified as containing alkaloids (used in medicine including quinine which is used to prevent malaria), carbohydrates (finally- something normal that we all know), steroids, triterpenoids (used for chemoprevention and in the treatment of mammary tumours), flavonoids (anti-inflammatory), glycosides (found in medicine, condiments and dyes), anthraquinone glycosides (used to relieve constipation), tannins, resins, and saponins (present in detergents). All in all, this is a highly useful bush if you're a medical professional who knows how to extract the necessary components. Around here we just think they're pretty.

Turn back toward the water

25. Strangler Fig

Visual Sighting: large tree obviously strangling the trees around it (marker in front of tree)

Even by the standards of ten thousand years ago, the fruit of the Strangler Fig was considered unpalatable; especially in comparison to other members of the fig family. Its bitter flavour hardly makes amends for the hundreds of tiny seeds contained inside that will stay in your teeth for the next week. Some people have an allergic reaction to the latex touching their skin, and if the juices are transferred from the hand to the eye it can cause serious eye irritation. Australian Aboriginals harvested the bark from the young aerial roots and used these to make fishing line, nets, bags and baskets. The Special Air Services encyclopaedia of survival recommends drying the aerial roots for smoking. Their hollow characteristic enables perfect smouldering and the smoke when inhaled calms the body and provides temporary pain relief from injuries.

26. Black Palm

Visual Sighting: two palms lining the path to the gazebo (marker straight ahead when facing beach cabins)

The hard wood of this proud palm was traditionally used to make spears and clap sticks. Today the wood is used in construction.

27. Tamarind

Visual Sighting: large tree outside of gazebo (marker on the right hand side of gazebo path)

A native to Africa, the fruit is an important food source as it boosts food security, improves the nutrition for villagers, fosters rural development and supports sustainable land care. Mature Tamarinds such as this one can produce up to 175kg of fruit annually. The fruit is rich in acid, sugar, vitamins, phosphorous and – unusual for a fruit - calcium. The combination of phosphorous and calcium means that excessive consumption can have a laxative effect which is most unfortunate as this is one tasty fruit and the most likely to start a brawl in the staff village as everyone likes to eat them. Studies have found that fruit of the tamarind can lower cholesterol in hen eggs. Today the flesh of the Tamarind is commonly cooked and strained to produce a sweet- yet tart- syrup that is used for flavouring food and drinks. It is also present in Worcestershire and HP sauce.

If soaked overnight the flesh and seed separate easily – the remaining concoction of liquid and pulp are rich in vitamin C and were drunk to alleviate colds. The pulp can be used to massage the head and relieve headaches, tired limbs and sore or aching body parts. The ripened fruit is used to counteract the poison in African yams, rendering them safe for human consumption. In Nigeria the freshly steamed bark and leaves are used in a decoction with potash (potassium rich mined salts) to treat stomach disorders, general body pain, jaundice and yellow fever. It can also be used as a skin cleanser and blood tonic. The flowers can be soaked in water to create a refreshing drink or cooked alongside the young leaves of saplings to eat as a green vegetable.

It was traded during the ancient times which led to a world-wide distribution. Today's largest consumers of the products are Asia and South America.

Conclusion

Isn't nature wonderful? If you look back you can see that you haven't actually travelled far from the hotel lobby and yet the uses of the trees, shrubs and plants between here and there are incredibly versatile. It is testimony to the resilience and resourcefulness of those of yesteryear when a person had to create their own food, medicine and other products as opposed to today when we merely conjure it off the supermarket shelf. If you wish to learn more about traditional bush use or other elements mentioned in this self-guided walk it is recommended to hit your local bookshop. Happy reading!

Bonus Material: Fitzroy Island Organic Tropical Fruits

Few people realise that the tropical fruits found on Fitzroy Island are the result of the period in which Fitzroy Island was home to Yarrabah Mission's penal colony Kobahra. Kobahra was active from 1905 to 1912 when it was finally shut down due to a lack of provisions. Though these beautiful fruits were not enough to sustain life more than a century ago, they now create a delightfully fresh touch to the island to synch the image of tropical paradise.

The Mango, *Mangifera indica*

Description: Mango trees can grow up to 35–40m and are capable of fruiting for 300 years.

Ecology: The fruit is eaten and seeds dispersed by flying foxes.

Edible Qualities: Mangos contain a variety of antioxidants, nutrients, vitamins and fibre. It is one of the most popular tropical fruits today and was just as popular in the ancient times. When they were first introduced to the American colonies in the 17th century they had to be pickled to survive the journey by boat. In Australia the first tray of mangoes is sold at auction for charity to mark the start of the season.

Medicinal Uses: Research is underway to test the effectiveness of the mango phyto-chemicals in preventing laboratory models of prostate and skin cancer. Cuban scientists have found that the extract of the bark from branches can affect the blood parameters in the elderly.

Other Uses: The plants and leaves are used throughout India as floral decorations at weddings, religious ceremonies and public celebrations.

Other information: Be very careful around mangoes as the oils in the leaves, stems, sap and skin can cause contact dermatitis and anaphylactic reactions in some people. The sap will burn the skin if not immediately washed off. It can also stain clothes.

Paw Paw, *Carica papaya*

Description: Papaya is a large, tree-like plant that grows 5-10m tall. It has spirally-arranged leaves that only grow on the top of the trunk.

Ecology: Look closely at the lower trunk and you can see scars from when the tree first bore leaves and fruit. To protect itself from insect attacks the peel of the fruit has a chemical signature to its enzymes that repels insects until it ripens. This high production of antifungal chemicals protects the tree from fungi but not from ring spot- a virus that causes premature moulting and leaf malnutrition leading to the death.

Edible Qualities: The fruit of the paw paw is high in energy and vitamins. It can be eaten raw or cooked and the young leaves can be eaten as a vegetable. The fruit itself is high in pectin and is a key ingredient in jelly. Ground seeds are an effective substitute for black pepper. It is recommended that you eat ripe paw paw in smaller quantities as excessive consumption can turn the skin yellow. But it is far more dangerous to eat large quantities of unripe fruit as this can induce miscarriage and affect infants in nursing mothers. It is thought to be the concentration of latex present in unripe fruits that cause this effect. Studies have found that small doses of unripe fruit will not harm an unborn baby.

Medicinal Uses: With high antioxidant properties paw paw prevents cholesterol oxidation and is believed to be effective as a preventative against strokes, heart attacks and diabetic heart disease. Eating paw paw after a meal aids with digestion and prevents bloating (it is marketed in tablet form). The fruit is believed to

strengthen the immune system against colds and flu. It is recommended that you eat papaya and drink the juice after a course of antibiotics as it replenishes the good intestinal bacteria. The leaves are used to make a tea to treat malaria while the papain-rich latex is used to treat a variety of ailments from rashes, cuts, stings and burns to more serious issues. It has anti-inflammatory properties that can relieve the pain of rhematiod arthritis and alleviate pain from sports injuries.

Other Uses: The stem and bark is used in rope production. The latex is included as a component in powdered meat tenderisers. The fruit has been harvested for use as a hair conditioner but should be used sparingly as the latex content can provoke allergic reactions in some people.

Other information: The seed extract has been studied for the effects of its toxicity which may induce kidney failure. Studies have found that the seeds have a sterilising effect on male monkeys and could possibly have the same effect on men. This was especially evident when consumed in vast quantities - but only in unripe fruits. While filming Indiana Jones and the Temple of Doom Harrison Ford ruptured a disc and was treated using a series of papain injections.

Avocado, *Persea americana*

Description: The tree grows to 20m and ideally grow in well-aerated soils >1m deep. Avocado trees only grow in subtropical or tropical climates and their fruit is climacteric. This means that they technically mature on the tree but they only ripen after they fall.

Ecology: Avocado trees are vulnerable to bacterial, viral, fungal and nutritional diseases due to excesses or deficiencies of key minerals. Disease can affect all parts of the plant, causing spotting, rotting, cankers, pitting and discoloration.

Edible Qualities: The fruit of horticultural cultivars has a markedly higher fat content than most other fruit. 75% of an avocado's energy comes from fat, most of which (67%) is monounsaturated fat. This means avocado are an important staple when access to other fatty foods (high-fat meats and fish, dairy products, etc.) is limited. On a weight basis, avocados have 35% more potassium (485mg/100g) than bananas (358mg/100g). They are rich in folic acid and vitamin K, and are good dietary sources of vitamin B6, vitamin C, vitamin E and pantothenic acid. Avocados have a high fibre content of 75% insoluble and 25% soluble fibre.

Medicinal Uses: One preliminary study found that a high intake of avocado lowered blood cholesterol levels. Specifically, after a seven-day diet rich in avocados, mild hypercholesterolemia patients showed a 17% decrease in total serum cholesterol levels. They also had a 22% decrease in LDL (harmful cholesterol) and triglyceride levels and a 11% increase in HDL levels (helpful cholesterol). A 2013 epidemiological report showed that American avocado consumers had better overall diet quality, nutrient levels, and reduced risk of metabolic syndrome. A Japanese team synthesised the four chiral components of avocado and are investigating is uses in potential anti-cancer activity. Extracts of avocado have been studied in laboratory research to assess potential for lowering risk of diabetes mellitus.

Other Uses: Throughout Iran the avocado pulp is used as a rejuvenating facial cream.

Other information: Some people suffer allergic reactions to the avocado. They fall into two main categories: those with tree-pollen allergy develop symptoms in the mouth and throat shortly after eating. The second allergy is known as latex-fruit syndrome. It is related to a latex allergy and symptoms include generalised urticaria, abdominal pain, and vomiting and can sometimes be life-threatening. Avocado leaves, bark, skin and the pit have all been found to be harmful to animals. Cats, dogs, cattle, goats, rabbits, rats, guinea pigs, birds, fish and horses can be severely harmed or even die from ingestion. The fruit is poisonous to some birds as well.

Cheesefruit, *Morinda citrifolia*

Description: A member of the coffee family, Cheesefruit grow in a variety of habitats ranging from shady forests to sandy shores. It reaches maturity in 18 months and yields between 4 and 8kg of fruit each month.

Ecology: This tree is especially attractive to green tree ants which make nests from the leaves of the tree. These ants protect the plant from some plant-parasitic insects. The smell of the fruit also attracts fruit bats, who play a role in dispersing the seeds. The *Drosophila sechellia* (a fruit fly) feeds exclusively on these fruits.

Edible Qualities: The fruit is famous for being one of the most disgusting smells in the Australian bush but the fruit is meant to be tasty (if you can overcome the rotten cheese smell). The flavour is likened to custard apple mixed with camembert; with a consistency likened to kiwi fruit. It is rich in vitamin C which is one of the reasons that the juice is highly sought after. Both the flesh and the seeds can be eaten raw or cooked and the young leaves are also edible. They are eaten as a vegetable throughout Asia. The leaves can be used to wrap food during the cooking process.

Medicinal Uses: The young leaves and fruit are crushed and inhaled or rubbed on the chest as a cure for coughs, colds, flu, diarrhoea and fever. The fruit is noted for its slight anaesthetic affect in the throat while eaten and can be crushes to apply to sores. The green fruit, leaves, and root/rhizomes were traditionally used in Polynesian cultures to treat menstrual cramps, bowel irregularities, diabetes, liver diseases, and urinary tract infections.

Other Uses: The roots yield a yellow pigment and have been used by Aboriginals as a dye for weaving baskets and mats.

Other information: In 2005, two scientific publications described incidents of acute hepatitis caused by ingesting *the Cheesefruit*. One study suggested the toxin to be anthraquinones (try to pronounce it), found in roots, leaves and fruit while the other paper named the juice as the cause. This was, however, followed by a publication showing that noni juice 1) is not toxic to the liver even when consumed in high doses, and 2) contains low quantities of anthraquinones, which are potentially toxic to liver tissue.

Coconut, *Cocos nucifera*

Description: Capable of reaching 30m in height, a tall coconut palm tree growing on fertile lands can yield up to 75 fruits per year but more often yields less than 30. Unlike other plants there are no tap roots or root hairs but a fibrous root system with strands.

Ecology: The fruits can survive long distances by travelling with marine currents which has led to a wide-spread distribution. Coconuts are found in more than 80 countries worldwide, most of which are considered to be a natural dispersal. Due to their high tolerance, they have become a threat to many mangrove systems by outcompeting the individual trees and replacing entire ecosystems. Australian researchers found that the coconut shells are used regularly by octopus as shelter and a means of defence against predators. This behaviour is also observed in Indonesia.

Edible Qualities: The oil can be used in cooking either in liquid form like vegetable oil or as a solid like butter. The sap from the flower is known as Toddy and is collected twice a day in Asia. If left it will ferment to become a palm wine- or Coconut Vodka. Newly germinated coconut contains an edible fluff the same consistency as marshmallows called a coconut sprout. The sap can be boiled to create sweet syrup or reduced to yield sugar.

Medicinal Uses: Research has found that coconut oil will decrease cholesterol in rats. The peel is suspected to contain anti-cancerous compounds and the juice of the immature coconuts has oestrogen-like

characteristics. In Pakistan the coconut is used to treat rat bites while Brazilians use the husk fibres to make herbal tea to treat inflammatory disorders. The roots can be used in a concoction to treat diarrhoea and dysentery. Aboriginals rub the oil found in boiled coconut flesh into their skin to prevent it from cracking and drying in the sun.

Other Uses: The stiff mid-ribs of the leaves are used to make brooms, mats and baskets. When dry the leaves are burned as the ash can be used like lime to supplement soil. The husk and shells can be used as fuel or charcoal as they are considered a superior source of carbon. The dried half-shells can be used as a floor buffer while fresh husks transform into dishes, bowls, buttons or musical instruments. The oil is used in soaps and cosmetics- including Cocobutter. It is found in shampoo, cleansers and hand-washing liquid to name a few (by-products are used in dynamite.) Ground shell is used as an exfoliate while the trunks are expended as an ecologically-responsible substitute for endangered hardwood species. During the World War II coconut shells were used for emergency blood transfusions in the field as the inside of the coconut is sterile until opened and the milk mixes easily with blood. Modern statistics show that on average three people a year will die from coconuts falling on their heads.

Other information: The oldest fossilised remains of a modern coconut are dated between 35-55 million years and were found in Australia and India. Some people contract dermatitis and/or an anaphylactic reaction from the coconut palm. Throughout the Philippines and Malaysia the coconut palm is farmed using Southern Pig-tailed Macaque's (a monkey) to collect the fruits and compete in an annual competition to find the best harvester.

Starfruit, *Averrhoa carambola*

Description: A wooded tree growing between 5-12m, the Starfruit is an evergreen native to Asia but has spread world-wide distribution throughout the tropics.

Ecology: The sweet flower attracts a multitude of pollinators from moths to ants and virtually every insect in between. These in turn attract birds so the trees are buzzing with life during the flowering period. Caterpillars attack the young leaves and flowers while the fruit is vulnerable to moth larvae, fungi and other infections.

Edible Qualities: Starfruit is rich in antioxidants, potassium and vitamin C. They are highly valued for the crisp, juicy flesh and mild flavour which are likened to a combination of apple, pear and grape. They are recommended to be eaten when they have first ripened and some traces of green remain- although consumption immediately after the green has disappeared is also safe. The flesh is used extensively in cooking while the juice is extracted for use in drinks, sherbet sweets and seasonings.

Medicinal Uses: The fruit has a high level of oxalic acid which makes it an effective laxative while traditional medicine use the flesh to lower fevers and treat various skin conditions.

Other Uses: The high acid content of the fruit makes the juice a tough cleaning agent. It can be used to remove rust stains from cloths and to clean tarnished metals. It can also be used as the agent to set dyes on fabrics. The wood is used as timber although some countries prefer to utilise it as firewood, while others value the appearance and use it primarily as a ornamental tree.

Other Information: The oxalic acid can make the fruit dangerous to people suffering from kidney disorders and can lead to kidney failure, the development of kidney stones and the need for dialysis. Symptoms include hiccupping, vomiting, nausea, confusion and in some cases- death.

Bonus Material: Fitzroy Island Bad Boys

Introducing the two coolest, most hard a** plants on the island- the Beach Sheoak (see Plant Use Walk stop #16) and the Strangler Fig (see Plant Use Walk stop #25).

Ficus virens. **Common names: Strangler Fig or Banyan tree**

Characterised by its large aerial and prop roots, this tree is a genuine bad boy. Like all figs, the Strangler relies on pollination via wasp (see Rainforest Ecology stop #18). The reproductive strategy is one of the strangest and most dependant symbiotic relationships found in nature. Fig wasps are only able to reproduce in the hollow spaces inside the fruit and the fig can only be pollinated by the wasp, which is covered in pollen when it leaves the fruit. Due to the wasp having a short life cycle the fig must fruit often and one type of wasp will only use one particular species of tree. In order to ensure survival, the figs must fruit throughout the year. In doing so they support many animals through lean seasons.

But what makes this tree a genuine bad boy is that, as it names suggests, it literally strangles the life out of others. Birds eat the fruit and gradually break the flesh down throughout their digestive track. The seed is pooped out, generally in the hollow of another tree. As the fig begins to grow it pushes toward the sunlight to take over the canopy while aerial roots simultaneously thrust downwards toward the soil. Once the roots are established and the young plant has access to water and nutrients; it can accelerate its growth and concentrate on dominating the canopy. At the same time it is stealing its hosts sunlight, the Strangler simultaneously entwines it body around the trunk and limbs of the host tree, eventually engulfing it completely. The host gradually loses its energy supply from the sun, its nutrients and water inflow from the soil and all the while it is being slowly strangled. It never stood a chance. As it dies it naturally decomposes and just to add insult to injury- its broken remains feed the Strangler with a flood of nutrients which enables the tree to grow strong enough to support its own weight. But killing one tree is not enough- this tree is the floral equivalent of a psychopath. It continues to grow each year; spreading out more aerial roots and looking for new hosts to engulf. The Cathedral Fig and the Curtin Fig in the Atherton Tablelands are testimony to the sheer size these trees can accomplish given the opportunity.

Casuarina equisetifolia**. Common name: Coastal Sheoak or Whistling Pine**

Casuarinas, or Sheoaks, look like pines but they belong to a different family. It was awarded the common name ‘Sheoak’ by the early settlers who thought that the wood looked like oak but was much harder to work with- so they naturally decided it must be a female! There is so many cool things about this tree- it does NOT like to share! Let’s begin with the ‘needles’- look closer. Do you see the little white bands? Hold the needle in two hands and gentle twist the ends in opposite directions until the needle pops apart. Now hold it up in front of a finger- do you see how one end is pointy and one end looks like a crown? The individual spikes of the crown are the leaves! By counting the number of leaves in a single whorl it is possible to identify the species of Sheoak that you’re looking at. We have had a botanist do that and confirm this is a Beach Sheoak. But back to how cool this tree is- the needle in your hand is called a branchlet- the leaves are so small the sun can’t heat them enough to sweat (refer back to Plant Adaptation walk stop #7); not only that but the cylindrical shape of the branchlet ensures that at any given time, only half the leaves are in direct sunlight. This further reduces the odds of transpiring. Basically- Sheoaks are the Fort Knox of plants. Water is not getting out if they don’t want it to. And it’s not just water they can hold onto. Most trees are incapable to accessing atmospheric nitrogen. They are forced to enter into a symbiotic relationship with fungi in order to exchange nitrogen for carbohydrates (amongst other things). But not the Sheoak. It’s not sharing and it’s not relying on anyone but itself! This is one of the few plants with nodules in its root system that enable it to access nitrogen on its own. This gives it a serious competitive edge. Speaking of competitive - when the branchlets decompose they introduce a chemical component into the soil that inhibits the growth of other plants. All water and nutrients that fall around the Sheoak are for it alone. It is really not interested in sharing or having close neighbours. It doesn’t even like animals. The pollen of the male Sheoaks is dispersed by wind, as are the seeds. The seed pods literally explode into the breeze where the papery-wing allows it to float far from the parental plant. There is no need for insects or other animals to become involved- that is beneath the Sheoak! All in all, this tree packs a serious punch.

Ph: (07) 4044 6700 **Fax: (07) 4044 6790**

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