



Includes
a HUGE
fold-out
tree!

UP in the Canopy

Explore the rainforest
layer by layer

James Aldred

Illustrated by
Good Wives and Warriors

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Royal
Botanic
Gardens **Kew**

The Shrub Layer

The shrub layer lies just above the forest floor. Plants here have large, spreading leaves designed to trap every last scrap of sunlight that filters down through the dense understory from above. Sheltered from the strong winds that tear through the forest higher up, some lower-level shrubs keep the same foliage for many years. These old leaves often have communities of other small plants growing on their surface. Growing amongst the shrubs are also many tree saplings. Some of these are surprisingly old for their small size, growing very slowly and often spending decades waiting for a suitable break in the canopy to appear above them.

Peering up through the dark understory, you see the sunlit canopy high above. It seems a very long way away. The air down here is heavy and humid, and you are already drenched with sweat. You take a sip of water. It's going to be a long climb!

Great-Billed Hermit Hummingbird

This tiny, great-billed hermit hummingbird flits between flowers. Its wings are beating 70 times a second and are a blur as it hovers in the air, pushing its long beak into the flower to sip the nectar inside.

Small Sapling Tree

When a large tree falls over, the space it leaves behind creates a 'light gap'. Small trees that have been patiently waiting for this opportunity now rush to grow in the sunlight. However, light gaps can take years to happen, if at all. If a gap doesn't appear before the sapling's energy reserves run out, the young tree (like this sapling Brazil nut tree) will die.

Army of Ants

A colony of nomadic army ants, made up from almost 15 million individuals, surges through the forest. As they march to new grounds, anything in their path, including other insects, frogs, and even lizards and snakes are caught, chopped up or eaten alive. The colony can get through as many as 500,000 animals a day.

White-Plumed Antbird

More than 200 species of birds specialise in snatching up insects who are trying to escape the marauding army ants. 'Antbirds', including this white-plumed antbird, often join together in large mixed flocks that follow the ant swarms in search of fleeing crickets and cockroaches.

Spectral Bats

With a wingspan of up to one metre, the spectral bat is the biggest carnivorous bat in the world. It has huge canine fangs and kills rodents and sleeping birds with a crushing bite. Spectral bats live in small colonies, and the males will carry prey back to the roost to feed their young.

Heliconia

These heliconia flowers use bright colours to attract hummingbirds. In return for a tasty sip of sweet nectar, the hummingbird pollinates each flower it visits by transferring pollen between them.

Blue-Backed Manakin

Manakins have some of the most elaborate courtship displays of all birds. By jumping up and down and hopping back and forth in a well-practiced dance routine, these two males hope to attract the attention of a passing female.

Pale-Winged Trumpeter

Looking like small black turkeys with white bottoms, these trumpeter birds use ear-splitting alarm calls to warn others of danger.

Three-Toed Sloth

Sloths don't do anything quickly. This is an **adaptation** to their energy-poor diet of leaves.

Unlike monkeys, they can't outrun predators, so their fur is covered in green algae to help them stay hidden. This three-toed sloth has evolved special grooves along each strand of hair for the algae to grow in.

Warrior Wasps

This giant nest belongs to a colony of warrior wasps. Their powerful stings are only used as a last line of defence – the wasps prefer to beat their wings as a loud warning to scare intruders away. Like a drum, the nest amplifies the noise which sounds like a troop of marching soldiers.

Spider Monkeys

Spider monkeys use their tails like an extra arm or leg to help grip branches as they climb. Their useful 'prehensile' tails give them the appearance of large spiders as they swing their way through the treetops in search of juicy fruit to eat.

Eagle Nest

This enormous bundle of sticks is an eagle nest, or 'eyrie'. Nestled inside is a huge, white harpy eagle chick – already the size of a turkey at just a few months old. Nests like these are used year after year and grow bigger with each season until they are eventually blown down by a storm or collapse under their own weight.

Iguana

This green iguana is resting in the sun while slowly digesting its lunch. Thought to be the largest lizard in the iguana family, males can reach up to 2 metres from nose to tail. They have excellent eyesight, and are always on the lookout for predators like the harpy eagle.

Monstera 'Cheese Plant'

This huge *Monstera* is also known as the Swiss cheese plant. Its large, flat leaves are adapted to soak up as much sunshine as possible, while the holes allow the breeze to pass through without tearing them. It is also an epiphytic plant.

Red-Backed

Poison Dart Frog

The bright colour of this tiny poison dart frog warns would-be predators to leave it alone – it has enough deadly toxins in its skin to kill several people. This male is carrying tadpoles on his back as he climbs high into the canopy in search of a safe place to leave them. A water-filled bromeliad is perfect.

The Canopy

Spreading like an umbrella high above the forest floor, this hidden kingdom is the richest zone in the rainforest. Up to 90% of all jungle life can be found up in the trees, and the volume and diversity is staggering. The tropical canopy is one of our planet's most important producers of oxygen and plays a vital role in creating rainfall and keeping global weather systems healthy.

Pushing up through the dense foliage you emerge into a lush, leafy world, flooded with hot tropical sunshine. Exhausted, you stop climbing and stare around you in wonder. The air hums with insects, and everywhere you look small brightly coloured birds flit between leaves. No two trees look the same, and the fragrant smell of flowers hangs in the air. Never before have you felt so completely and wonderfully immersed in nature.

Bromeliads

Bromeliads like this one have evolved to trap rainwater which runs down the funnel-shaped leaves into the plant's centre. Some of the largest bromeliads can hold as much as 60 litres! These canopy 'ponds' provide a perfect home for aquatic insects and amphibians.

Howler Monkeys

Howler monkeys are the loudest land mammals in the world and can be heard from several kilometres away. Cover your ears!

King Vulture

This king vulture soars high on rising hot air currents called thermals. It eats dead animals and provides an essential service in recycling the forest's energy and nutrients. Instead of relying purely on eyesight like other vultures, the king vulture has a sharp sense of smell to help it find rotting corpses hidden in the forest.

Clouds

The Amazon is vast enough to create its own weather. Trees release moisture as the sun heats the forest canopy. Natural chemicals and tiny particles are sucked up alongside the water and help clouds to form. Towering clouds like these are known as thunderheads. They can drift for hundreds of miles before finally releasing rain in other regions.

Snow-Capped Mountains

What look like distant clouds at first are actually the snow-capped peaks of the high Andes. Looming over the flat Amazon basin far below, some of these mountains are more than 6,000 metres tall. The closest is 130 kilometres away. It's truly amazing what you can see from the top of a tree!

Scarlet Macaws

These two birds will spend their long lives together and their bright plumage shows off their breeding fitness. Their noisy chicks will be born inside a large tree cavity.

Harpy Eagle

The harpy eagle is the world's most powerful eagle, with talons larger than a grizzly bear's claws. It hunts sloths and monkeys in the half-light of dusk and dawn.

The Emergent Layer

Welcome to the emergent layer – the rainforest's best-kept secret!

Like this kapok, some of the largest trees in the Amazon stand head and shoulders above the main canopy. Forming the topmost layer of the rainforest, these emergent trees are exposed to very different conditions to those lower down. The air is a lot drier, and the sun is a lot hotter up here, making it feel more like a desert than a rainforest. Water can be surprisingly hard to hold on to due to the high levels of **evaporation**. In addition, tall trees are often exposed to fierce storms. Lightning strikes are a constant threat, and huge branches the size of entire understory trees are often ripped away by high winds. This is the most extreme environment in the rainforest and any plant or animal that lives here must have special adaptations to help them survive.

Reaching the top of your rope, you are rewarded with far-reaching views, dappled shade and cool breezes that quickly dry your sweaty clothes. The kapok's huge branches sway gently in the breeze, and you take your climbing helmet off to feel the wind in your hair. The enormous branch next to you is the perfect place to rest, so lifting a leg over, you scramble into a sitting position. Settling back to eat a sandwich, you immerse yourself in one of the best views anyone could wish for. You've made it!

Brazil Nut Tree

Like the kapok, this tree stands above most others. The Brazil nut tree has dozens of large round seed pods dangling from stalks amongst its dark green leaves. As hard as iron and weighing up to 1.5 kilograms, each pod contains a dozen or more Brazil nuts.