Ecuadorian Adventure, 2007

Friday July the 20th

Our holiday started with an overnight flight from Seattle to Miami. We had half a day to spend before our flight to Quito, so we caught the bus to Miami Beach and walked along South Beach. We saw the Art Deco lifehouses and the sunbakers who were not allowed to sit in their shade (they had to rent umbrellas for $20 per fifteen minutes instead), and I went for a swim. We then walked through Little Havana and had lunch in a Cuban sandwich bar before going back to the airport to meet John and Charles. Our late night entry into Quito was a shambles, with the American Airlines staff telling us that Lydia's luggage had been left behind because "it didn't fit in the plane", but they promised it would arrive the next morning, just after we left Quito for the Galapagos.

Saturday July the 21st

Our Frequent Flier had time zone confusions, so we were up an hour early for our flight to the Galapagos. We flew from Quito to the island of Baltra, where we drove to the ferry to cross onto Santa Cruz. Just during the ferry transfer we saw Brown Pelicans, Galapagos Sea Lions, Sally Lightfeet and Red Billed Tropic Birds. We drove across Santa Cruz to board our boat, watching marine iguanas and Sally Lightfeet bask on the rocks, Darwin's Finches flitter around chasing flies, Brown Pelicans watching Blue Footed Boobies dive deep into the water for fish and a Great Blue Heron idly picking at the seaweed.

We were in the amazing Galapagos Islands, made famous by the 1835 voyage of the HMS Beagle. Charles Darwin was invited on the Beagle as gentleman company for Captain Robert FitzRoy, and was not the official naturalist. When he first saw the islands he wrote "nothing could be less inviting than the first appearance". The islands are most arid and barren, volcanic outposts. They are also actually extremely poor in biodiversity, as only a few species have been able to reach and thrive on the islands. In fact, over the past 3.5 million years since the oldest island formed only 400 colonisation events have occurred, one every 12 000 years. The rate may be even slower than this, genetic testing shows that marine and land iguanas are 15 million years apart, therefore they either represent separate arrivals or they arrived 15 millions years ago when none of the current Galapagos Islands had formed and the sea mounts reached the surface.

Instead of being rich in biodiversity, the Galapagos are rich in endemics as the long isolation allows each arrival species to evolve to their new environment. We saw the most famous endemics that afternoon, when we drove across Santa Cruz to the moist highlands to see the Galapagos Tortoises. The tortoises were large and still. Enormous rocks with a prehistoric face hiding under the shadows or reaching out on a veined and wrinkled neck. They reminded me of the skeksis from The Dark Crystal, with a cruel vulture beak and dead grey skin. While they sat like boulders in the mud, when they started to move they looked like implacable tanks.

There are two types of Galapagos Tortoise, the Dome-shelled tortoises of the cool moist highlands, and the Saddlebacks of the low arid lands. Each has evolved to its environment. The Dome-shelled is larger (with shells over a metre long the males reach 300kg) and they have short limbs, to be able to keep their heat better. The Saddlebacks are smaller (around 50kg on average) and have long limbs and a saddle on their shell so their neck can reach up higher. This allows them to be able to reach up high and eat the Opuntia, a type of cactus that has evolved into tree-like proportions, and it also gives rise to the name "Galapagos", Spanish for "saddle". While the two types of tortoise live separate lives most of the year, in order to lay eggs the female domed tortoises need to descend to the lowlands to lay their eggs. Galapagos tortise eggs become male if they are incubated under 28.5 C and female if they are incubated above 28.5 C, so if the females stayed in the cool highlands all the eggs would hatch into males.

As well as being shaped by the islands, the Galapagos Tortoise has altered the islands in return. The Opuntia has grown so tall in order to escape the Saddleback, reaching far greater heights on islands that have the tortoise. The Galapagos tomato seeds now need to spend time in a tortoise's digestion system before they can germinate.

There were once 14 different subspecies of tortoise. Over 100 000 tortoises were harvested by sailors because they were easy to collect and they could be kept alive on deck without food or water for months, giving them fresh meat throughout the voyage. This harvesting drove three subspecies extinct. A fourth might be extinct; there is only one Pinta tortoise – Lonesome George. He is only 90 years old and he could easily live for another hundred years, so they are searching for another Pinta tortoise on other islands, but genetic testing indicates that he may actually be an Espanola tortoise, making the Pinta extinct. The other 10 subspecies are now healthy. The Espanola tortoise dropped down to fourteen individuals, but captive breeding and release has built the numbers up to over 1000.

As well are Galapagos tortoises we watched Golden Warblers bathe, and saw some of Darwin's Finches, egrets and the introduced Ani. There are fifty one species of land birds in the Galapagos Islands, with a very high proportion (43%) being endemic – twenty two endemic species and three endemic subspecies. The proportion of endemics is even higher when the thirteen vagrant species (observed once, but not colonised) are counted out, 66%. The observed vagrant species show that while colonisation events are improbable, they do occur. Yet the 22 endemic species represent only seven different colonisation events – a rail, a hawk, a dove, a martin, a flycatcher, a mockingbird and a finch. Two endemic owl subspecies, the Barn Owl and Shorteared Owl, came from two separate colonisation events. The expansion of a well suited immigrant is reflected by the success of goats on the islands. In 1959 two females and one male were released on Pinta. By 1970 the population had expanded to 100 000 and it took until 1986 to eradicate them.

Not all vagrants are so lucky though, it was only those vagrants that reached the islands in large enough numbers at the ideal time that were able to flourish. The ones that did diverged from the mainland populations, as the islands are far enough away that additional individuals arriving to keep up gene pool flow is extremely unlikely. Because

the small islands are close enough that most birds will travel in between them, almost all endemic successes have stayed as a single species (with flightless reptiles the story is very different, with seven separate endemic species of lava lizard, six endemic species of gecko and three endemic snakes on different islands). The mockingbirds (separated into four species) and the finches (separated into thirteen species) are the exceptions to this rule, for different reasons. The mockingbirds are very reluctant to fly across water, so the four different species and two subspecies are all found on separate islands, with travel rare enough to allow geographical divergence.

The finches were different. Unlike the other colonisation species they have highly specialised diets, so to take advantage of an array of unexploited food sources they had to diverge by adaptive radiation. So the finches show different species living together on the same islands, but with beaks adapted to unique food supplies. On every island with more than one finch species, the finches have at least a 15% difference in beak size, with small and large forms to specialise in different food supplies, while the same finch species on islands with only a single finch tend to have medium-sized beaks to inefficiently take advantage of a variety of foods. The larger islands that support multiple Finch species show a very high level of divergence in eating behaviour, with seed eaters, blood drinkers (the Vampire Finch pecks Boobies to draw blood to drink, and kicks eggs against rocks to break them), insect eaters and tool users (the Woodpecker Finch breaks off spines from cacti to delve under the wood to find beetles). Interestingly there is actually a fourteenth species of Galapagos Finch, the Cocos Island Finch, which was seeded onto the Cocos Islands from the Galapagos and not from the mainland.

While these finches are one of the most striking examples of adaptive evolution, Darwin didn't actually include them in "The Origin of Species". The finches all look pretty much the same (we certainly couldn't spot the difference) and he thought they were just variants of the one species. It was only when he brought his specimens back that a specialist told him they were separate species, and he saw how only evolution could adequately explain their existence. Unfortunately his finch collection was poorly labelled and he wasn't sure which were from which islands, so he played it safe and left them out of the book, concentrating on the mockingbirds.

After watching the tortoises and finches we walked down a hollow lava tube, the long winding tunnel caused by the surface of a lava flow solidifying while the centre flowed on, and then had a cocktail in town before heading back for our first night on the boat.

Sunday July the 22nd

Overnight the board left Santa Cruz and sailed to Rabida, a soothing rocking while we slept. Today was our day to play with Galapagos Sea Lions, an endemic subspecies of Californian sealion. The sealions covered the beaches, basking in the sun, sleeping and kissing. The adults ignored us completely even when we walked within a few feet of them. From close up we could watch the big males exert their dominance with loud grunts and spittle flying from between their sharp fangs.

The reason for the rich numbers of Galapagos Sea Lions on a few small islands on the equator comes from the Humboldt Current. Named after Alexander von Humboldt, the Prussian naturalist who invented the contour map and first proposed that South America and Africa were once joined, it is responsible for the richness of the whole western South American coast. It is 160km wide and 3000km long. It moves at 3.7km/hour, bringing cold water from the Antarctic, forcing the upwelling of nutrient rich water through the warm but sterile surface. The current is deflected by the bulge of Peru out to the open ocean where it makes it to the Galapagos Islands before dying, providing the rich feeding grounds off the islands. All this changes during El Niño though, when the warm current from the equator displaces the Humboldt current, turning the water off the islands into a sterile desert with the rich water trapped deep below the surface. This forces a collapse in the population of Sea Lions, penguins (lost 77% of their population) and marine iguanas, but an explosion in land iguanas, finches and mocking birds, as the El Nino brings more rainfall for the terrestrial species. Seabirds get a double hit - less fish in the ocean and huge number of mosquitoes on land, driving them away from their nests.

The Galapagos Sea Lions and Galapagos Tortoises show the two opposing evolutionary forces that act on the Galapagos Islands. Gigantism is common on islands, as a large body size allows easy gathering of food during rich times and storage during lean times, and predators are few. Yet Bergmann's Law is the observation that closely related animals tend to be smaller towards the tropics, in order to be able to shed heat easier. So we see animals like the Galapagos Tortoise and Flightless Cormorant, the largest of their types, and the reduced size of the Galapagos Sea Lion (compared the Californian Sea Lion), the Galapagos Fur Seal (the smallest marine mammal) and the Galapagos penguin (the second smallest penguin).

As well as the sea lions we saw baby Brown Pelicans being fed by their parents, sticking their beaks so far down their parents' throats that we felt for sure they would be causing real damage. The adults weren't thrilled about it either, they soon flew off again after being pestered by fledglings the same size as them. We saw American Oyster Catchers (which only became residents of the islands five years ago), hermit crabs, and Frigate Birds. We went for a walk inland into the arid part of the island and saw a solitary Galapagos Hawk sitting on a rock and came to a cove where Sally Lightfeet feasted on a dead pelican down on the rocks below. I then snorkelled with marine iguanas and tropical fish, being surprised when sea lions sprang up in my face and darted away, while Lydia had to stay out of the water as her contact lenses were in her lost luggage.

We had a nap after lunch while the boat sailed to James Bay on Santiago. Here the Galapagos Sea Lion pups were feeling particularly frisky. Some spent the time suckling milk or sleeping, but the others wanted to play. Rather than being scared of us, we had to run back when they tried to climb over us or chase each other and us in a game. They came right up to us and investigated our snorkel gear, all the time making extraordinary noises and grunts. I snorkelled again, and this time saw a score of Pacific Green Turtles within a metre of me.

After snorkelling we walked to the other side of the island. On the rocky volcanic shelves we saw dozens of basking marine iguanas, lined up in rows to soak up the sun, in an effort to get warm enough to swim down into the water and collect algae. As the only marine lizards, iguanas are not adapted well enough to life in the water to be able to survive long periods in the ocean to gather algae. It is not breathing that is the problem – when Darwin found the marine iguana he tested its ability to hold its breath by weighting an iguana with an anchor and throwing it overboard attached to a rope. It was still alive when he hauled it up thirty minutes later. Their problem instead is holding enough heat in their body for them to use their muscles to swim back to shore. The young iguanas are forced to take the slim pickings down at the water's edge, and it is only the large males (who can grow to 1.3m long and 9kg) that can retain enough heat to swim down to 12m to eat the best algae fields. While marine iguanas have not solved the eat problem, they have adapted to the excess salt by concentrating it in small glands by the nose and constantly sneezing it out while sun baking, so standing next to the rows of marine iguanas we got splashed with small puffs of brine. Interestingly, marine iguanas and algae actually represent an inverted food pyramid, with the biomass of marine iguanas greater than that of the algae they eat, because the algae are able to grow so fast in the rich waters that the biomass added per unit of time is great enough to support the large population of marine iguanas. In order to survive the El Niño, when the sterile warm waters stop the algae from growing, the iguanas are able to resorb their bone mass and shrink by up to 20%.

Close by the marine iguanas were a few sea grottos where Galapagos Fur Seals hid in caves. The Galapagos Fur Seal is actually a sea lion that evolved from a parental species that lives on the southern tip of South America. Evolved to withstand great cold, it is in danger of overheating on the equator, so unlike the Galapagos Sea Lions which bask on the beach, it hides in sea caves during the day and hunts for fish at night.

That night we had many cocktails on board our boat, with a fun party in the Galapagos.

Monday the 23rd of July

Monday we visited Bartolome Island and Sullivan Bay on Santiago. These two islands show how barren and desolate the islands can be before they are colonised. The Galapagos Islands are a series of nineteen large islands, nearly fifty small islands, and many submerged sea mounts. Each formed in a conveyor-belt fashion by the Pacific plate slowly moving over the Galapagos hot spot. This hot upwelling of mantle is now directly underneath Fernandina Island at the western edge of the Galapagos islands, with smaller older islands carried to the east by tectonic shift, and the oldest islands now submerged as sea mounts to the far east.

Bartolome Island was still at the desolation stage. It was barren and rocky, with only a few pioneer plants (the ones able to live on rock and slowly turn it into soil) and lava lizards living on the island. We were still able to see the lava flows, lava tubes, tuff cones and splatter cones from the island's birth. The most surreal vision from seeing these same

volcanic swirls and loops from underneath the water, with white-tipped reef sharks, sea lions and manta rays gliding over shiny magma coils.

Pottering around in the bay on the boat we were able to watch storm petrels hopping on the surface of the water, red swallow tails flying above us, and a solitary Galapagos Penguin sitting on the rocks.

After lunch we landed in Sullivan Bay in Santiago. This shelf of the island was only born 120 years ago from a fresh lava flow, so we were able to walk over the tinny metallic surfaces and see the pahoehoe (ropelike formations from rapidly cooled lava) and aa (rough and ragged formations formed as gas bubbled out of the lave during cooling) lava flows. The plain was cracked and buckled due to the expansion of the rock after cooling, and the high iron and magnesium content of the basalt made it feel like we were walking on an alien planet made from contorted steel. Even this metallic bed was not sterile though, with lichens and lava cactus growing in isolated spots and starting the process of breaking the rock down into soil.

Tuesday the 24th of July

Tuesday morning was devoted to the seabirds of the Galapagos Islands. Of the 140 bird species found on the islands, 89 are seabirds. Two terns (the Sooty and Brown noddy), two boobies (the Blue-footed and Red-footed), two frigate birds (Magnificent and Great), Storm Petrels, Red Billed Tropic Birds and the Waved Albatross all nest on the islands in significant numbers. The Galapagos has the world's largest colony of Red Footed Boobies and 30% of the world's Blue Footed Boobies. Other seabirds have settled permanently and are endemic to the Galapagos, including the Nazca Booby, the Lava Gull, the Swallow-tail Gull, the Galapagos Petrel and endemic subspecies of Audubon's Shearwater and the Brown Pelican. The most specialised endemic is the Flightless Cormorant, which is the largest cormorant in the world at one metre tall and 4kg, and the only one which cannot fly. Its wings have become tiny (unlike the penguin it swims with its feet and not with its wings) and the carina (keel) has become vestigial.

We had seen seabirds throughout the Galapagos Islands, but we went to North Seymour to visit their breeding site. The entire flat island was covered in nests, mostly Blue Footed Boobies, Magnificent Frigate Birds and Great Frigate Birds, but we also saw the Nazca Booby and Red Swallow-tail Gull nests. The Blue Footed Boobies take their name from their clumsiness on land and their awkward courtship dance - "bobo" means stupid in Spanish. The Blue Footed Booby males offer sticks to females during courtship in a very similar behaviour to that of mainland Boobies, even though Blue Footed Boobies on the Galapagos no longer make nests with twigs (the Red Footed Boobies do). We watched the juvenile Boobies practise their stick behaviour, they were not very good at it and looked puzzled as the sticks flew from their beaks. Other juveniles tried the "sky pointing" and "foot waving" courtship behaviour, in a very amusing display.

Unlike Blue Footed Boobies with a single egg, Nazca Boobies always lay two eggs. The one that hatches first pushes the other egg out of the nest. It isn't clear why this occurs,

either an evolutionary relic from times when Nazca Boobies had a rich enough habitat to raise two chicks, or an insurance policy in case one egg fails to hatch.

We watched the magnificent acrobatics of Frigate birds, able to swoop and harass other birds until they regurgitate on wing, plunging down to catch the half-digested meal before it hits the water. This aeronautic skill is essential for Frigate birds as they have a tiny uropygial gland and can't waterproof their feathers, so unlike other sea birds entering the water would cause them to drown. The most prominent feature of the Frigate Birds on North Seymour, however, was not their flying but the bright red throat pouch on the males. To attract a mate they inflate their scarlet pouch with air, making it nearly the size of their entire body and forcing their necks to bend backwards.

Sadly North Seymour was the end of our Galapagos voyage, so we had to make our way back to Baltra. Our final vision of the Galapagos was of the ferry terminal, where all the benches were occupied with sleeping sea lions.

We flew from the Galapagos to Guayaquil. Guayaquil was founded in 1538, and is now the biggest city in Ecuador with 3 million people. The city was very festive, perhaps because we arrived on Bolivar's birthday, or perhaps because the following day was the anniversary of the founding of Guayaquil. We walked to the central park, with its statue of liberal devoted to Simon Bolivar and the founders of Ecuador, and the Parque Bolivar where excited kids watched iguanas mating in the plaza. We saw the main Cathedral, originally built in 1547, but now a reconstruction after it burnt down. Our guide bought lottery tickets at the door and prayed inside for them to win (he was a terrible guide and acted like a tout). The waterfront of Guayaquil is beautiful, with lots of people running around and a perfect path to meander along. We saw the Presidential Procession as the President arrived in Guayaquil for the following day's celebration, and we climbed the 480 steps up the Las Penas, the old town. We had dinner at an excellent seafood restaurant which did the most amazing mushrooms in garlic and wine sauce, but we had to leave early as Lydia felt ill.

Wednesday the 25th of July

Wednesday we left Guayaquil and began our eight hour climb into the Andes. The Andes are the world's youngest mountain chain and the world's longest mountain chain (7245 km long). In the sky above us we saw Turkey Vultures gliding. Unlike other vultures, Turkey Vultures hunt by smell making them the first carrion birds to the site. Andean condors, the largest bird that can fly at 1.5m long and 3m wingspan (12kg), rely on sight and often use the sight of Turkey vultures spiralling down to detect food.

Up in the Andes we visited Ingapirca, "the Inca Wall". The site actually predates the Incas, being set up as a religious complex around 900-1000 CE by the Cañar people. The Inca first came to the area between 1470-1480, in what was a peaceful alliance (further north the Inca influx caused war). The oldest part of the complex is the Cañar Temple of the Moon, and the burials from this time were of people in the foetal position inside a pot, while the newer portion is the Incan Temple of the Sun, with burial in tombs. The

corridor between the two was set up for the sun to travel down on the longest day of the year. All up around 200 people once lived in the temple complex, with many more in the surrounding farmland to support it.

Today a small farming village lives near the site. The farms all grew corn and had a few Alpacas. The Alpacas were mostly for the wool (they sold scarves for only $2), for meat the Guinea pigs was the main source, which lives in kitchens off food scapes, serving as both garbage disposal and main course. We had lunch there, a large meal of corn prepared in four different bland ways.

From Ingapirca we drove to Cuenca. We reached Cuenca on the Festival of Saint Anne, so the streets were packed with people enjoying themselves. In the main square they were letting off fireworks right in the middle of the crowd, with the bamboo guides falling back down to earth on top of us. They also built colourful square plastic cubes and tied small bundles of hay underneath them. They lit the hay and the hot air made the cube gradually rise into the sky as new stars, except for occasionally when the fire leapt up and caught the cube on fire.

Thursday the 26th of July

We spent Thursday in Cuenca. Cuenca is the third largest city in Ecuador (with 500 000 people) and the site of an old Cañari village that was conquered by the Incas and renamed Tomebamba (becoming a major Incan capital, more important than Cuzco). It was in ruins by 1557 and was refounded by the Spanish as Cuenca.

We visited El Sagrario, the old cathedral on Parque Calderon, which is 500 years old (built in 1557) but was restored in 1937 and now looks like new, with fresh plaster covering all the original stonework. Even the original murals looked surprisingly modern, and the wooden pillars were painted to look like stone columns. One statue which really surprised me was that of Joseph holding a baby Jesus, current images always have Mary holding Jesus with Joseph standing next to her. It was a bit like seeing the painting in our hotel of Mary unbuttoning her maternity shirt to breastfeed baby Jesus, an image which is surprising because it is only when you see it that you realise such an everyday scene is never portrayed. The other Cathedral was Catedral de la Immaculada Concapcion, which even thought it was built in 1880 looks far older than the other Cathedral as it is made from stunning marble. Oddly the paintings of God always had the Freemason's triangle behind him, even in Catholic cathedrals.

After visiting the cathedrals we went to see Panama hats being made. This is the original home of Panama hats, the misnomer comes from the massive export of hats from Ecuador to Panama during the building of the Panama canal. To make the hats the palm stems are cut, boiled, dried and woven. The shape is given by hammering and ironing the peak and the brim.

Friday the 27th of July

Friday we drove to Riobamba. We were intending on taking the Devil's Nose railway (La Nariz del Diablo) but it is close due to a strike. The train was built between 1899 and 1908, and requires a complex set of switchbacks and bridges. Since it often derails it is only fair to support the unions in demanding safer working conditions and danger pay.

On our way to Riobamba we passed Volcan Chimborazo. Chimborazo is the highest mountain in Ecudor at 6310 metres. Due to the bulge of the earth at the equator, it is also the most distant point from the centre of the earth. We drove up to the hiking station and then climbed up to the 5000 metre point – a very difficult walk due to the altitude, but okay if you walk extremely slowly. 5000 metres on Chimborazo is 6383.377km from the centre of the earth, which made us higher than if we had been standing on the summit of Mt Everest, which is only 6382.467km from the centre of the earth. On the mountain slopes we saw flocks of wild vicuña.

That night we had dinner in the house once owned by Coronel Juan Bernaido de Leon y Cevalios, one of the heroes of independence and where Simon Bolivar stayed in 1822.

Saturday the 28th of July

Saturday was very boring. We just drove to Baños (we got to see the ash spew out of Tungurahua on the way), had lunch in the charming central square complete with hummingbirds and nice cafes, visited the sulphurous hot baths, and then went on an ultra-crummy "Poppa Luchos" trip to the mountain tops in party trucks. So instead, here is something on Ecuador's history.

The first permanent settlements in Ecaudor began around 4000 BCE from tribes that migrated from Brazil to the coast of Ecuador. They stayed as small communtieis until ~600 BCE when they started to have trade and rulers. Around 800 CE they stated to form nations, Quito-Caras in the north and Cañari in the south. Around 1500 CE the Incas moved north and Tupac Yupanqui fought both Quito-Caras and the Cañari. His son, Huayna Capac, was born in Ecuador and had two sons, Atahualpa, raised in Quito, and Huascar, raised in Cuzco. When he died in 1526 he divided his empire between his two sons, which lead to civil war. After years of war Atahualpa won, but the country was still very weak when Pizarro arrived in 1532.

Pizarro defeated the Inca due to their weakened state and his horses, armour, cannon, germs and treachery. He executed Atahualpa during peace negotiations on August 29th 1533, on the grounds that as since Atahualpa was a pagan, Pizarro was not bound to follow the laws of the peace negotiations. From 1533 to 1820 Ecuador was ruled by the Spanish until Bolivar started the war for independence and Sucre achieved a decisive victory over the Spanish on May 24th 1822.

Sunday the 29th of July

We had a very exciting and physical day today. Our whole group ended up going white-water rafting, so we hoped on mountain bikes and rode for nearly two hours to the rafting

site. The bike ride by itself was a bit nervous with tunnels, traffic, potholes and cliffs. We stopped off at one bridge to let Efrain jump off, and at a cable car ride to be jerked across a canyon by dodgy Ecuadorian technology.

We reached the rafting site and kitted up, then practised our moves. The rapids were surprisingly invigorating, after selling them as low water (down to a grade III) and family friendly, we hit every wave at the wrong angle and were knocked around like a grade V. Either our guide was an adrenalin-junkie or we didn't paddle well enough (since we had three first-time rafters and Joel and Stephanie, despite having rafted many times, were completely useless). We had a few near misses, including one where John hauled me back onto the raft, but the climax was a massive flip during the peak of white water. Lydia was trapped under the raft but found the air pocket, while John was upside down with his feet locked in place and couldn't get up to the air. While groping for Lydia I found his life jacket and hauled him up, then our guide flipped the boat back. Climbing into the boat again I saw our crew was in chaos – Stephanie was gone (she was soon picked up by the other boat), three people had lost their oars, and Lydia was floating downstream.

I jumped back out and swam to Lydia, and together we were swept downstream waiting for our boat to pick us up. They didn't manage to catch up before the next set of shallow rapids, so we went over them feet first (getting bruised bums on the way). Finally we got to climb back into the boat, having collected the three lost oars on our travels. Amusingly (to me, Lydia was too cold to be amused), the next broad bend of the river contained a dozen vultures perched on the rocks, so a lot of animals must fair worse on that stretch of water than we did.

In the afternoon Lydia celebrated her new-found appreciation for oxygen and snugness by getting a long massage, while I had a couple of beers with John. We finished up the night with a nice meal in town, before a well-deserved rest.

Monday the 30th of July

On Monday we drove to the jungle lodge on the Napo River. It was on the Napo that a historic decision was made in 1540. Gonzalo Pizarro had left Quito on an expedition with 350 Spaniards and 4000 Indians to search for cinnamon and gold. At the Napo River he commanded his chief lieutenant, Franciso de Orelllana, to go downstream to find food. Orellana went downstream right to the Atlantic mouth and sailed on to Spain. On his return to Spain he told of the attacks by hostile Indians. Mistaking men in grass skirts for Amazon, he named the Indians "las Amazonas" after the female warrior tribe recorded by Herodotus in Sarmatia. This name has stuck to both the river and the jungle.

We were expected a tatty jungle lodge, like the one I stayed at in Borneo, instead it was the very opposite, a luxurious resort better suited to the Caribbean beach than the Amazon rainforest. There was a small town by the lodge which kept a butterfly farm. They grew twenty two local species, including one with the most irredescent metallic cocoon to mimic wasps. The cocoon mimicry keeps them safe until they emerge, which is

when they are at their most vulnerable, as it takes thirty minutes for the blood to pump into the wing veins to open the wings, and three hours for the wings to harden enough to fly. Just outside the butterfly farm we saw a line of leaf-cutter ants carrying sawn-off leaves back to the nest. Leaf-cutter ants don't actually eat the leaves, instead they are in a symbiotic relationship with a fungus that they farm in their nests, bringing in a fresh supply of leaves for it to digest and then eating the fungus. The symbiosis also has a third partner, a species of bacteria that lives on the ants and secretes an anti-mould compound that protects the fungus.

We finished off the night with cocktails in the pool. The leeches, piranha and especially the Candirú (a parasitic catfish that has the habit of swimming into the human urethra and lodging itself there with sharp spines) discourage swimming in the river for recreation.

Tuesday the 31th of July

We spent Tuesday in the Amazon rainforest. We canoes out to a wildlife sanctuary, where we were greeted by playful squirrel monkeys and rehabilitated woolly monkeys and Capuchin monkeys. Capuchin monkeys are meant to be the most intelligent of the New World monkeys, and are know to rub their fur with Pipers (a plant from the chilli family) and millipedes, to coat themselves in the toxic chemicals that keep insects away. We also saw captive Macaws, parrots, peccaries, capybara, ocelots and jaguarundi, which had been rescued.

We went on a short hike through the rainforest. We saw Hairdresser bees (so called because they can't sting but they swarm into your hair and pull on it), tiny poison arrow frogs, rubber trees (locals make toy balls from it), Drago's Blood (the sap of the tree is used to treat sore throats), Santo Maria Palm (boiled and used to treat bruises), palms that are used for weaving and termite nests. The poison arrow frogs are my favourites, I've always wanted to see them in the wild. As well as being beautiful brightly coloured animals and incredibly toxic they have really interesting and diverse methods of looking after their young. One species carries a pair of tadpoles around on its back, returning to bromeliad pools to keep them moist, while other species carries the eggs on its back but drops them in a pool when they hatch. The most interesting is a species that deposits a single tadpole in each pool so they don't have to compete for food - if the pool already has a resident tadpole in it the tadpole wags its tail at her to prevent her dropping another. She then returns to each pool and deposits an unfertilised egg as food.

The forest around here was not the old growth rainforest of the deep Amazon, but 25 year old secondary forest, although there were some older iron wood trees that housed bromeliads. The bromeliads are important because even though the forest gets rain regularly, the small pools in the base of the bromeliads clinging to the trees provide the only source of constant water in the canopy. They actually make up a miniature ecosystem with 470 species of small frogs and insects living in them and others, such as Vine Snakes and Crane Hawks, living just outside to prey on the inhabitants. Even the trees, with a ready supply of water at their base, take shortcuts and put down roots into the pool. The pools can hold up to nine litres of water, and are so common that 1km2 of

forest can hold two million litres of water in bromeliads. This provides a significant strain on the trees, such that some have evolved to self-prune by cutting off water to bromeliad-bearing branches, severing both branch and bromeliad in an attempt to save the tree.

After our walk we went back to the boat and drifted down the river in rubber tubes, watching eagles soar above us, river turtles basking and squirrel monkeys playing on the shore.

We had a swim in the pool after lunch, and then visited a local tribal house where they gave us a demonstration of their cooking, skill at the blow pipe and their pottery making (while the kids were distracted playing with a rhinoceros beetle). The most famous craft of the Amazon Indians was the creation of shrunken heads, which were made by cutting off the heads of enemies, opening the scalp and removing the skull and other bones by crushing them and withdrawing them. The flesh was then filled with hot sand, sewn up, and coated with the juice of a local berry to preserve it. As the skin dried and shrank, the head was reopened, a little sand was removed, and it was resealed, keeping sure to preserve the features by reworking the flesh into the sand. When it shrank to 1-2 inches it was finally smoke-cured. Rather than shrunken heads we bought a small pottery bowl and a bottle of Drago's blood.

Thursday the 1st of August

Wednesday we left the jungle lodge for the long drive back to Quito, with only a few hours stop at some hot springs. We had our final group dinner, but Lydia ended up extremely ill. Lydia was feeling well enough the next morning that we were able to spend our final day exploring Quito with John and Charles. Quito was a charming and beautiful city, full of churches and squares. We visited the Catedral Primada, founded in 1535, where an independence celebration was occurring outside under the cherry blossoms of the square. We walked up to the massive Basilica church, built recently but in the old gothic style, and finally caught a taxi up to the massive statue of the Virgen del Panceillo, to look out over the city.