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$(1)$
December 27, 1831 - Plymouth
Because of poor weather, Her Majesty's Ship Beagle, a Cherokeeclass 10 -gun brig-sloop of the Royal Navy, had to remain docked for more than one month. On December 27, she finally left Plymouth with a crew of 76 men and passengers, including Charles Darwin, aged 22. The main objective of the expedition was to map the South American coast, particularly Patagonia, Tierra del Fuego and the Falkland Islands, and to survey weather conditions, tides, and winds.

## (2) December 27, 1831 to February 28, 1832 - Tenerife, Canary Islands, Cape Verde

The Beagle's crew were prevented from landing on the Canary Islands, by fears of them bringing the cholera from England. Then, the Beagle sailed to Cape Verde; it was at this moment that Darwin had his idea of writing a book about his journey, which would then be published in 1839 under the name "Journal and Remarks" before becoming "The Voyage of the Beagle". After a quick stop on St. Paul Rocks in sharkinfested waters, and another on Fernando de Noronha Island, ravaged by drought, HMS Beagle arrived at Bahia, in Brazil, on February 28, 1832.
(3) February 28 to July 5, 1832 - Bahia, Brazilian Forest, Rio

Darwin was in awe of the lush brazilian forest, and surprised by the constant insect buzz that could be heard on the ship from several hundred of yards from the shore. During the next two weeks, he had plenty of time to explore the surroundings before sailing to Rio de Janeiro where he could collect other plants, insects and animals.
(4) July 5 to November 27, 1832 - Monterideo, Punta Alta, giant fossils, Buenos Aires

En route to Montevideo, Darwin could observe porpoises, penguins and natural fireworks. He then sent his first batch of specimens to England, apprehending the reaction of the British scientists. After having explored the shores of this region, Darwin committed to the study on fossils of extinct species, and started to question creationism. In Buenos Aires, he took some time off to go to the theater, before sailing to the Tierra del Fuego.
(5) November 27, 1832 to April 26, 1833 - Tierra del Fuego,

Fuegians, Falkland Islands, Montevideo
The Beagle sailed to Tierra del Fuego, at the southern tip of the American continent. There, numerous storms forced the crew to halt. They celebrated Christmas next to Cape Horn, where they encountered Fuegians, inhabitants of Tierra del Fuego, whose customs were radically different. On March 1st, 1833, the ship anchored on the Falkland Islands, more hospitable than Tierra del Fuego: Darwin noted that the species living there were different from the ones he had observed in South America. On April 26, the ship returned to Montevideo.

## 6. April 26 to December 6, 1833 - Monterideo, ground

 explorations, samplesThis period was mainly used for ground explorations and brought its share of discoveries and anecdotes. Darwin settled in the small town of Maldonado to observe various species of birds and reptiles.

At the end of July, he sent his third batch of specimens composed of 80 birds, 20 quadrupeds, skins, plants, geological samples and fish. Robert Fitzroy allowed him to take Syms Covington as his assistant, and both would continue collaborating until 1839 , even after the expedition was completed.

> 1 December 6, 1833 to June 10, 1834 - Patagonia, biodiversity, Tierra del Fuego, Rio Santa Cimz, Pacific Ocean

After having crossed an impressive flock of butterflies on the east coast of South America, HMS Beagle anchored in Puerto San Julian on January 9, 1833. Darwin, Fitzroy and other men of the crew started exploring the land. After an 11-hour walk, they still hadn't found any water; worse yet, they wouldn't find any freshwater source in a week! Darwin found the skeleton of a Macrauchenia patachonica next to the harbor, an extinct pachyderm with a neck similar to the llama's. This triggered new questions in Darwin's mind, who was wondering what was the cause of the extinction of such species.

The Beagle failed to sail back up the Rio Santa Cruz in southern Argentina; instead, she crossed the Strait of Magellan and entered the Pacific Ocean on June 10.
(8) June 10, 1834 to February 4, 1835 - Valparaiso, Andes, Chonos Aichipelago

The Beagle reached Valparaiso on July 23 and remained more than 3 months in this part of Chile to observe the foot of the Andes mountains. Because of the gold fever in this region, Darwin discovered many mines in the mountain. Nonetheless, fauna and flora were scarce. Darwin then got ill and remained weak for a whole month. Fitzroy, depressed, almost abandoned the expedition. If he had, Darwin would have missed the decisive step of the Galapagos, which was the next step of the journey.

The crew arrived in the Chonos Archipelago in the middle of december They discovered recent tracs of human life in a region deemed uninhabited. A few days later, the mystery was solved: the crew encountered sailors that had deserted a whaler ship, sometimes 15 months ago. They had no idea where they were. All were rescued and welcomed aboard the Beagle.

## 9 <br> February 4 to September 7, 1835 - Andes, Lima, Galapagos

 IslandsOn February 20, while he was studying marine rocks washed ashore, Darwin witnessed a volcanic eruption, then an earthquake. The Beagle then returned to Valparaiso, looking for explorations in the Andes. Darwin discovered remains of lava there, which allowed him to prove the volcanic and marine origins of these mountains. He was also surprised to note the difference between the Atlantic and Pacific slopes of the mountains, each of them with different species of fauna and flora, separated by a natural barrier.

On July 19, the Beagle arrived in Callao, the harbor of Lima, Peru. Darwin landed in the middle of a revolution, which compromised the planned explorations. The crew then decided to set sail to the Galapagos Islands, which would prove to be a critical step for the theory of natural selection.

10 September 15 to October 10, 1835 - Galapagos Islands, fauna, flora, samples, adaptation

Darwin spent one month on the Galapagos Islands, an archipelago made of dozens of volcanic islands. Darwin collected many different plants, animals and shells there; but then, he had a revelation: most of these species were unique in the whole world, and existed on one given island of the archipelago, but not the others. It looked like each species born on an island would have adapted to their environment, such as the mockingbirds for instance, whose beak was different in
shape or length depending on their island. Darwin concluded that these birds all came from a common continental strain, before being isolated on each island. Such isolation led them to develop different life modes and diets. This discovery was the basis of his reflection about natural selection, about living beings adapting to their environment.

11 November 15, 1835 to March 14, 1836 - Tahiti, New-

## Zealand, Australia

After 5000 km in the Pacific Ocean, the Beagle arrived in Tahiti on November 15. There was a reception for the queen onboard; then, after a month, the ship sailed to New Zealand, and reached her destination on December 21. Darwin did not really appreciate this seemingly uncultivated country, because it was impossible to launch excursions; plus he was starting to be homesick. On January 12 though, he visited Sydney, whose bright roads and big houses reminded him of London.

## (12) April 1st to May 9, 1836 - Cocos /slands, Mawritius

Darwin studied the origins of the coral-made Cocos Islands, in the Indian Ocean - he would then publish a book about this subject upon his return to England. On April 29, the ship reached Mauritius, a former French island, taken by the British. There, Darwin observed the sugarcane fields and the white clouds that seem to hang to the forest slopes of volcanoes. Ten days later, the Beagle set sail to the Cape of Good Hope.
13. May 31 to October 2, 1836 - Cape of Good Hope, St. Helena,

Bahia, Falmouth
Darwin met Sir John Herschel in Cape Town, an English astronomer who had been mapping the southern sky since 1834. At that time, little did they know that both of them would be buried side by side in Westminster Abbey. On July 8, the Beagle arrived on the shores of St. Helena. Next to Napoleon's tomb, Darwin observed this windy, wet and volcanic island. On Ascension Island, he received a letter from one of his sisters, announcing the interest of distinguished British scientists in working with him.

After a short stop in Bahia, a few years after the first time they were there, the crew started their return voyage to England: on October 2, 1836, HMS Beagle arrived in Falmouth, after spending four years and nine months around the globe.

## Animals of America

## (AFew Anecdotes)

## Birds



## Hyacinth macau

(Anodorhynchus hyacinthinus) -100 cm
The Hyacinth macaw is the largest parrot of the world, but also the one with the biggest beak, which allows them to easily open nuts. Their beak also works as a third foot to climb and hang onto the trees. The male and female form a lifelong couple and happily spend their time eating, sleeping and flying.

## (Vultur gryphus) - 300-350 cm

 The Andeancondoristhelargestbird of preyinthe world and nests at very high elevations, usually between 3000 and 5000 m , on inaccessible rock ledges. They can fly over very large distances (about 170 km ) withouteven flapping their wings.

## Creat white pelican

(Pelicanus erythrorynchos) - 130-180 cm Pelicans have a dull pale-yellow gular pouch under their beak. This pouch allows them to scoop fish and feed their brood. It also helps regulate their body temperature.


(Alces americanus) - $160-230 \mathrm{~cm}$ The moose (in North America) or elk (in Eurasia) is the only deer able to browse aquatic vegetation: they can even dive underwater (to a depth of 5 meters) and hold their breath for one minute. It is one of the most impressive animals in North America-the largest males weigh more than 700 kg .


## Pale-throated sloth

(Bradypus tridactylus) - 45-75 cm
On the ground, the sloths are clumsy. Their long claws hinder their movement, and they have to crawl slowly, which makes them vulnerable. On the other hand, they are excellent swimmers, moving three times as fast in the water as on the ground, and able to hold their breath for no less than 14 minutes.


## Reptiles



## Ereen iguana

(Iguana iguana) - 150 cm
Green iguanas spend $96 \%$ of their time inactive, $3 \%$ looking for a mate, and only $1 \%$ looking for food. They actually don't need to move to feed, because they can easily find food where they are when it rains, and barely eat in the dry season.

## Coral snake

(Micrurus surinamensis) - 80-100 cm The coral snake's bright colors are a warning for other animals, informing predators that this snake is extremely venomous. Its venom is neurotoxic, which means it paralyzes brain functions.


## Gold tegu

(Tupinambis teguixin) - $100-120 \mathrm{~cm}$
The Gold tegu is one of the largest lizards of South America. They use their tail, which is longer than their body, as a whip - that is, when they do not bite. Gold tegus are omnivorous and can eat herbs and flowers as well as Orinoco crocodile eggs, their favorite meal

## Alligator snagoping turtle

(Macrochelys temminckii) - 65-75 cm Unlike other turtles, the Alligator snapping turtle cannot retract its head in its shell. They however have an impressive hook-shaped beak and sharp claws, and can hold their breath for almost an hour ( 50 minutes) before resurfacing to breathe.



## 17-year locust

(Magicicada septendecim) $-3-4 \mathrm{~cm}$
Unlike European cicadas that spend 2 to 5 years underground, these locusts spend 17 years buried in the soil as a nymph, feeding from the trees' roots. Evolution apparently helped this species to avoid synchronizing with the birth cycles of its natural predators.

## ) Fire ant

(Solenopsis invicta) - 0.6 cm Fire ants attack in large groups. Unlike other species, they don't bite, but they sting. When attacking a prey, they secrete pheromones, creating a sort of chemical path that guides hundreds of ants-ifnot thousands-to theirtarget.


## Monarch (Danaus plexippus) $-8-12 \mathrm{~cm}$

Each year, millions of Monarchs leave Canada and the USA to spend the winter in Mexico. It takes several generations to complete their migration to the south. When spring comes, the latest generation migrates back north. Such a phenomenon is unique at this scale, but also because the American Monarch is the only butterfly that migrates.

## Burying beetle

(Nicrophorus americanus) -2 cm The burying beetle is a necrophagous insect, feeding on small birds' or rodents' carcasses. They usually bury them underground to feed their larvae, but also to avoid competition with other insects such as flies or some necrophagous ants.


## Birds



## Ostrich <br> (Struthio camelus) - 175-275 cm

The ostrich is the largest bird in the world, but it cannot fly. Their powerful legs allow them to run very fast, as they can maintain a speed of $40 \mathrm{~km} / \mathrm{h}$ for 30 minutes, with occasional sprints at $90 \mathrm{~km} / \mathrm{h}$. They can jump up to a height of 1.5 meters, over a distance of 4 meters.
(Psittacus erithacus) $-35-42 \mathrm{~cm}$ The most studied gray parrot in history was Alex, who could use more than 150 English words properly, and understood about 1000 other words. He could even use these words in a conversation. It is the first animal in the world to ask a question, asking which color he was.


## Lovebird

## (Agapornis) - 13-18 cm

Agapornis means "Loving Bird" in greek. These birds usually appreciate living in groups; however, contrary to popular belief, when one lovebird dies, the other does not let itself die.

## Fooded vulture <br> (Necrosyrtes monachus) -70 cm

 Like all other vultures, the hooded vulture feeds on dead animals' carcasses... and on excrements! This surprising behavior is a key component of its ecosystem, though, as it naturally eliminates parasites and diseases.

## Mammals



## African bush elephant

(Loxodonta africana) - 650-750 cm
The elephant is the only animal in the world that is unable to jump. They are far too heavy (up to 7 tons) in comparison to their muscles, and their skeleton is too fragile. If they could jump, they would break their bones. It is also the only mammal to have 4 knees.
(Giraffa camelopardalis) ( Female giraffes are in heat one day every fourteen days. Since it is a rather short timeframe, the male uses this window of opportunity to taste the female's urine and detects whether it contains sexual pheromons or not - if yes, then the female is supposed to be receptive.


2ion
(Panthera leo leo) - 170-250 cm
Lions are one of the rare felines to hunt in packs - usually, the pack is a group of females, as males are too heavy and too slow to be efficient. A lone male would often feed on dead animals' carcasses. A lion's roar may be heard up to eight kilometers away.
(Okapia johnstoni) The okapis are so shy that they weren't discovered until 1901. At first, they were thought to be related to zebras, but actually, they are one of the last ancestors of giraffes. Speaking of which - did you know that giraffes are the only mammals able to clean their ears with their tongue?

Arthropods


## Chameleon

(Chamaeleo chamaeleon) $-25-45 \mathrm{~cm}$
Chameleons do not shift colors to camouflage; it actually shows their emotions. When chameleons are afraid or angry, the pigments contained in the superficial layer of their skin are released, turning them reddish.
(Crocodylus niloticus) - $350-500 \mathrm{~cm}$ A fearsome predator, the Nile crocodile is believed to have a symbiotic relation with the Egyptian plover: when the crocodile opens its mouth to regulate its body temperature, the "crocodile bird" would fly into it so as to feed on decaying meat lodged between the crocodile's teeth. In return, the crocodile would protect the teeth. In return, the crocodile would protect the
bird's brood, usually located next to the reptile's nest.


Black mamba
(Dendroaspis polylepis) - 250-400 cm
The black mamba is actually not black, but rather yellow-green, or even gray. The inside of its mouth, however, is black. Despite their big size, black mambas are nimble on the ground as well as in the trees. It is actually the fastest snake in the world, able to move between 16 and $20 \mathrm{~km} / \mathrm{h}$.



## (Pterinochilus murinus) $-10-18 \mathrm{~cm}$

The orange baboon tarantula is one of the most infamous spiders in Africa. It is very aggressive and won't back down if bothered, raising its front legs and ready to hit and bite.


## Tsetse fly (Glossina) - 1 cm

The tsetse fly could explain why zebras have stripes! According to recent experiments, parasite flies would avoid landing on black and white striped surfaces, preferring plain ones. Evolution is sometimes surprising!
Alone, the cricket is quite inoffensive; but a swarm of billions of crickets can become very dangerous. These swarms appears because crickets secrete a pheromone that attracts other crickets, leading to large concentrations of individualsthatcan causedevastationtoagriculture.
(Termitoidea) -0.5 cm Like ants, termites are social insects: they live in organized colonies where each individual has a precise role, such as soldiers, workers and breeders - and the queen of course.



Eastern imperial eagle
(Aquila heliaca) - 68-87 cm
Eastern imperial eagles have large wings, which allow them to use thermal currents to glide during several hours, over thousands of kilometers. They often work in pairs to hunt, one forcing the prey out of cover, so that the other can capture it.


Japanese crane
(Grus japonensis) - 100-160 cm
The courtship ritual of the Japanese cranes looks like an elaborate dance. Both partners exchange bows, calls, wing plays and jumps, and remain faithful for their entire life. The Japanese crane often appears in myths and legends in Japan and China, where it is associated with longevity and immortality.

## Blue peafoul

 (Pavo cristatus) - $90-110 \mathrm{~cm}$ The blue peafowl is a national emblem in India, where it is venerated. Despite its long train, it is able to fly, but often prefers walking, climbing or running. Hunted by tigers and panthers, the peafowl often raises the alarm for all other animals.


## Sumatran orangutan

(Pongo abelii) - 78-97 cm
Orangutan is derived from Malay words meaning «person» and "forest». Their arms are longer than their legs and they may touch their ankles even when standing. Contrary to their African cousins, they are shy and solitary.


Indian rhinoceros
(Rhinoceros unicornis) - 330-370 cm
The Indian rhinoceros has one horn, which starts to show after about six years. Its skin is firm and tough, looks like natural armor, and is darker than the skin of other rhinoceros. It should not be confused with its African cousin, the white rhinoceros, which is taller.

## Bengal tiger <br> (Panthera tigris tigris) - 230-300 cm

The Bengal tiger is solitary, quiet and shy. It covers its droppings with earth and sometimes hides its prey in a bush or under fallen leaves after killing it, so that other animals cannot steal it. Their unique coat (stripes differ from one tiger to another) allows them to camouflage.


## (2) Reptiles

## 14. Arthropodes



Indian cobra
(Naja naja) - 140-220 cm
The Indian cobra is deaf (all serpents are) but its sight and sense of smell are extremely developed. Its forked tongue collects particles from the air which are then analyzed by a complex structure in its palate. That's why you see the serpents' tongues so often: they are permanently tasting air!

## Flying dragon (Draco volans) $-19-23 \mathrm{~cm}$

 The flying dragon is actually a lizard. Its large ribs work as wings, deployed like a fan to distend its skin, which allows it to glide between trees. After completing its gliding, the ribs come back in place, folding the wings up.

## Charial

(Gavialis gangeticus) - 300-600 cm
The main characteristic of the gharial is its long, narrow snout. It actually restrains its diet, since it exclusively feeds on fish. Gharials have short legs that don't allow them to easily walk on the ground; however, their powerful tail propels them easily in the water

## , Tokay gecko (Gekko gecko) - 20-35 cm

 The male tokay gecko makes strange calls that sound like a dog barking, a cicada singing, or a frog croaking, and is made of two syllables: "to-kay" (hence the name). It can be heard up to a hundred meters away. Depending on the situation, the tokay gecko also produces distress calls or breeding calls.

## Mantis

(Mantis religiosa) - 6-8 cm
The infamous mantis is sometimes a cannibal, as the female occasionally devours the male (if hungry) during mating. This is made easy by sexual dimorphism, as females are usually 2 to 3 mm larger than males. The female eats the male's head first, without even interrupting mating.


## Birds

## Mammals



## Southern cassowary

(Casuarius casuarius) - 120-180 cm
The southern cassowary is the 3rd largest bird in the world (behind the ostrich and the emu, from the same species). It is considered as the most dangerous bird in the world to people. Cassowaries are very aggressive and defend their territory with their sharp talons.

## (Dromaiidae) - 150-190 cm

 In 1932, Australian farmers literally declared war against the emus, as they were causing a lot of problems to their cultures. Against all odds, the emus won. Later, humans found an alternative solution: they installed fences around their crops to keep those big birds at bay.
(Apterygidae) - 35-65 cm
Kiwis never learned to use their wings to fly. Since they never had any natural predators in New Zealand (for instance, there are no serpents there), they simply remained on the ground Evolution finally deprived them of their wings.

## Little penguin <br> (Eudyptula minor) - 34-42 cm

Unlike many auks, little penguins are nocturnal. They live in vast colonies where several couples regroup next to their nests. In daytime, they look for food, before returning to their nest at nightfall to feed their offspring



## Red kangaroo <br> (Macropus rufus) - 120-180 cm

Kangaroos need only a little water to survive and can remain several months without drinking anything. When they need, they can dig deep wells ( 90 to 120 cm ) to find some water. These wells become a source of water for the other animals in the bush, one of the most arid regions of Australia.

## (Phascolarctos cinereus) - 60-85 cm

 Koalas sleep 19 hours a day on average. They are nocturnal animals and wake up at night to look for food. The word "koala" means "without water". Indeed, koalas never drink: they keep hydrated thanks to the water contained in the foliage that they eat.

Platypus
(Ornithorhynchus anatinus) $-40-50 \mathrm{~cm}$ With a soft, naked and wet skin that looks like leather, and prolonged by a frontal plaque, the platypus's beak is a strange organ for a mammal: no other mammal is equipped with such a snout! Its latin name actually comes from greek words: ornithos for bird, and runkhos for beak.
(Vombatus ursinus) - 100 cm
Even if it doesn't really look like a nimble animal, the wombat can reach a speed of $40 \mathrm{~km} / \mathrm{h}$ during 90 seconds when it feels threatened. Another particularity: its haunches form a "shield" (a very hard cartilage plaque) that allows it to protect the entrance of its burrow. However, is main distinctive feature is the cubical form of its droppings, due to the change in thickness of its intestinal muscles.

(Crocodylus porosus) - 430-560 cm
The saltwater crocodile is the largest living reptile on earth. Like dolphins or some birds, saltwater crocodiles are able to sleep with one open eye, which allows them to keep watching their surroundings.

## Komodo dragon

(Varanus komodoensis) - 260 cm Komodo dragons do not have a good hearing, have almost no taste, nor any sense of smell, and their sight is not that developed, particularly at night. To move and hunt, they use another organ: their tongue. They regularly use it to "taste" the air and know in which direction they can go.


Inland taipan
(Oxyuranus microlepidotus) - 200-360
cm Le The inland taipan is considered as the most venomous ground serpent in the world. Its neurotoxic venom is 25 times as toxic as the cobra's venom. A single bite could kill a hundred people.


## Funnel-web spider (Atrax robustus) $-5-7 \mathrm{~cm}$

Atrax funnel-web spider exclusively lives in the south-east region of Australia and possesses the most toxic venom to people in the world. Funnel-web spiders have an aggressive behavior and live in the vicinity of urban areas, which makes them even more dangerous.

## Phillip Island centipede

(Cormocephalus coynei) - 15-25 cm The Phillip Island centipede has a rigid chitinous exoskeleton which covers its complete segmented body, and possesses a dangerous venom. A nocturnal arthropod, it uses its long antennas to spot its prey: invertebrates, but also little birds and geckos.


## Ciant Cippsland earthworm

(Megascolides australis) - 60-80 cm ThegiantGippslandearthwormisoneofAustralia's 1,000 native earthworm species. They live along stream banks in deep burrow systems. Gippsland earthworm colonies are small and isolated, and the species' low reproductive rates and slow maturation make those small populations vulnerable. No successful breeding has yet been achieved in captivity.


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