



SAVE PLANET 

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Note from Mr. Majid Al Mansouri

It is He, who made you trustees of the earth,
And exalted some in rank over others.
In order to try you
By what He has given you
Indeed your Lord's retribution is swift
Yet He is forgiving and kind.



Verse from Holy Quran –Surat Al Ana'am

Ayah 165 (6:165)

Climate change today is threatening our planet and in fact our very survival on earth .All countries and governments are concerned as we humans have contributed to this malaise. To find solution to any problem, we must first fully comprehend it. Hence Environment Agency – Abu Dhabi (EAD) in association with The Energy Research Institute (TERI) is adapting and bringing this save planet series of books on Climate change to children in the UAE with a hope that students as future custodians of our environment learn about what ails our mother earth, how each one us impact the environment through our actions, so that they are in a position to make appropriate decisions on matters that affect the health of our planet.

Climate change is expected to have direct and indirect impacts on earth. Scientists predict that we would lose nearly one third of our biodiversity, Sea levels would rise flooding low lying areas, face severe fresh water shortages , desertification , health issues such increased incidences of infectious diseases, heat strokes, forest fires, hurricanes and extreme and strange weather patterns to name some .

While governments are trying to fathom this new reality and looking at ways and means to tackle this global issue, it is becoming clearer to all, that only a concerted and collaborative action from each and everyone can actually help save this unique planet. United Arab Emirate too is aware of its responsibility and that is why despite being a country which is endowed with vast reserves of petroleum, a non renewable resource, and the one which contributes to climate change, it is working hard to establish the first carbon neutral city MASDAR in the coming few years and invest more on developing the renewable source of energy in the country. In addition, the country is also aiming to educate its future generation, through imbibing sound knowledge, imparting skill and helping to develop right attitude towards the environmental issues so as to prepare them to face any eventualities in the future.

We hope these books would be read by all students and would help them to understand the issue of climate change and the role that they can play in helping to save this unique planet.

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There's change in the air

The earth was never as warm as it is today. According to the Intergovernmental Panel on Climate Change, the years from around 1996 to 2007 were among the hottest since 1850. And the blame is on us.

Many creatures, many problems, one source

Global warming is causing the ice in the Arctic and Antarctic regions to melt faster than ever. If this continues, the tip of the Arctic, the earth's ice cap, will have no ice in summer by 2040! People like the Inuit are losing their livelihood. Even monuments like the Parthenon that have stood the test of time for hundreds of years, are now under threat from acid rain, caused by increasing greenhouse gases that human activities have unleashed into the atmosphere.

Just drowned

As glaciers melt, more water flows into rivers and seas. And so, sea levels are rising. In 1998, some islands in the Pacific atoll of Kiribati went under water. Thankfully, no one lived on these islands. But there are others, where humans and animals live that are under threat from rising sea levels.

Will we be on that list soon?

The World Conservation Union (IUCN, from its earlier name International Union for the Conservation of Nature) was founded in 1948. It is the world's first global environmental organization. It regularly releases the Red List on the status of animals and plants. It places its findings under several categories like:

- Extinct (EX):** Found only in cultivation or in captivity
- Critically endangered (CR):** Facing extremely high risk of extinction in the wild
- Endangered (EN):** Facing a very high risk of extinction in the wild
- Vulnerable (VU):** Facing high risk of extinction in the wild
- Near threatened (NT):** Close to threatened in the near future
- Least concern (LC):** Widespread and abundant
- Data deficient (DD):** Inadequate information to make a true assessment of its risk of extinction
- Not evaluated (NE):** Not studied

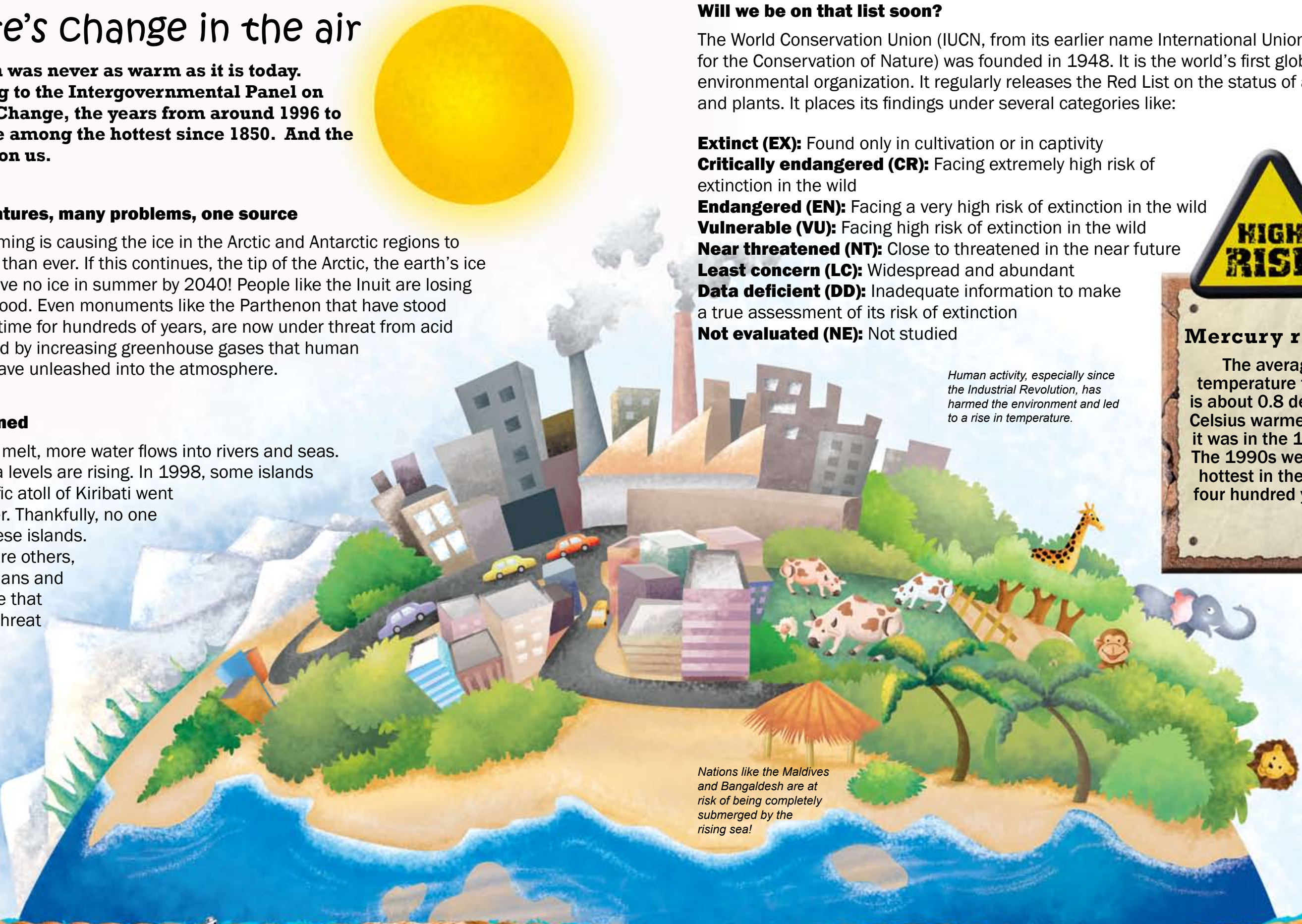
Human activity, especially since the Industrial Revolution, has harmed the environment and led to a rise in temperature.



Mercury rising

The average temperature today is about 0.8 degrees Celsius warmer than it was in the 1880s. The 1990s were the hottest in the past four hundred years!

Nations like the Maldives and Bangladesh are at risk of being completely submerged by the rising sea!



Polar bear: melting homeland

The vast icy expanses of the Arctic on the North Pole are home to the world's largest carnivore, or meat-eating animal, on land – the polar bear. Apart from the Arctic, the polar bear is found in the US (in Alaska), Canada, Russia, Greenland, and Norway.

Yo! That's me!

The polar bear is the largest member of the bear family. It is 8–10 feet tall. An adult male weighs 400–600 kg, almost twice as much as the female. This bear's body is well suited to its icy habitat. The thick fur is oily and waterproof, which allows the bear to shake it dry after swimming. The polar bear has huge, paddle-like feet that help them walk on ice as well as in swimming.

On an average a Polar bear requires about 2 kgs of fat per day to survive. A ringed seal provides up to eight days of energy for a polar bear.



Polar bears don't drink water. They get all the liquids that they need from the animals that they eat.



Seals are the polar bear's primary prey. Typically the polar bear only eats the fat and leaves the rest of the carcass for scavengers that include arctic foxes, ravens, and younger bears.



Quite at home!

Though polar bears are born on land, they spend most of their time in the sea, hunting for their favourite food—seals. Their sharp and jagged teeth help in breaking apart the meat of seals. But seals are mostly found under the ice-covered sea. How does the bear catch it? Actually, there are air holes in the ice, where seals come up to breathe. It is here that a polar bear sits patiently to

Not so white!

The polar bear's fur is not white. It is actually hollow and reflects light. It also traps the sun's heat and keeps the bear warm.

Will global warming spare the polar bear?

The polar bear has roamed the icy Arctic region for ages, but the mighty creature is in danger now. In 2006, the IUCN added the polar bear to its 'Red List' of the world's most endangered animals. According to the IUCN, there are only 20,000–25,000 polar bears in the world. The greatest threat comes from global warming, which is melting the Arctic sea ice, where polar bears hunt seals, their primary food source.

Penguins: Will the happy feet march into extinction?

They are birds that can no longer fly. With wings morphed into flippers, they swim under water at high speeds, and waddle on land. They live in the coldest regions of the earth—mostly in Antarctica, but also in South America, Southern Africa, and the Australian island state of Tasmania.



Melting of ice caps due to rising temperature in the Antarctic Peninsula removes the sea ice that once held back the movement of the glaciers. As a result, glaciers are flowing into the ocean, six times faster than before, making sea levels rise!

The long and short of penguins

There are about 20 different species of penguins—the largest is the Emperor Penguin, which is about 3 feet 7 inches tall and weighs 35 kgs or more. The smallest penguin species is the Little Blue Penguin, which stands at around 16 inches and weighs 1 kg.

Warmth of my friends

Penguins are a lot like us, not just in walking on two legs. They use a sign language by waving their flippers and moving their heads to 'talk' to other penguins in the group. The father penguins are generally responsible for keeping the eggs warm before they hatch. When it gets very cold, all the dads huddle together to keep themselves and their eggs warm.



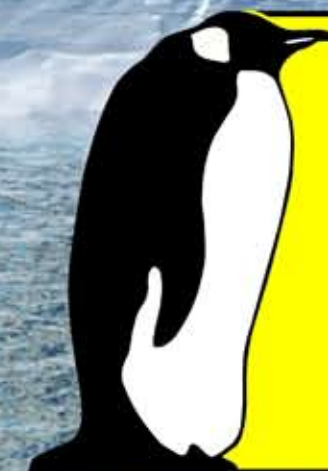
Penguins constantly face threat from other predators and living on ice is dangerous at times. As a result many penguin species don't go back to the ice or dry land to sleep. They take little naps in the water instead!



Emperor Penguins rely only on vocal calls for individual recognition between parents, offspring, and mates.

Not so happy after all

The march of the penguins may be halted after all, as 12 penguin species are considered 'at risk' or endangered. They are mostly threatened by global warming, habitat destruction, oil spills, and pollution of the seas. Global warming is not only causing the Antarctic ice to melt but warmer ocean temperatures are causing a decline in krill—the penguins' main food.



Heady feeling

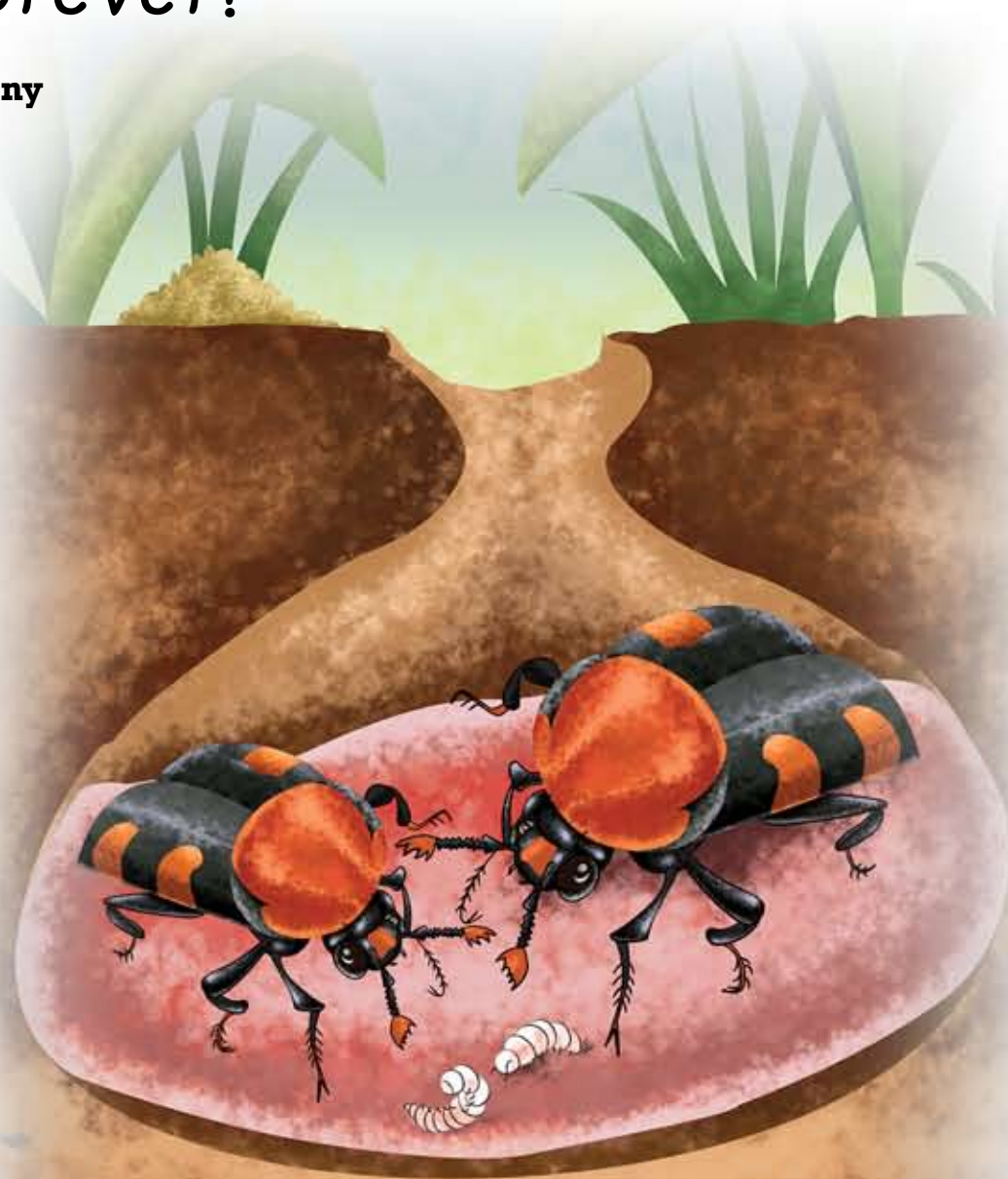
Did you know that penguins don't drink water, but eat snow. They swallow ocean water when they catch fish. A special gland in their nose takes the salt out of the ocean water.

American burying beetle: buried forever?

No creature is too tiny to be unimportant to the health of our planet. Not very long ago, the American burying beetle could be seen across North America, from east of the Rocky Mountains right up to south Canada. Today, scientists are worried about its uncertain future.

Smart coat, that!

The American burying beetle is just about three centimetres long. It is the largest scavenger beetle in North America. It has a shiny black coat with two pairs of bright orange stripes that go across like bootstraps over the wing cover and stop just short of the spine. Unlike any other beetle, its pronotum, the area just behind the head, also has a blob of bright orange. The face has another orange blob between the eyes.



No beetle other than the American burying beetle cares for its young.

For the kids!

This beetle's life cycle depends on carrion, or dead flesh. A nocturnal creature, it works in pairs to look for food. The couple digs a hole under the carrion and covers the find with soil. Then, they chew a hole in the meat to lay eggs in. The caring parents feed their larvae regurgitated food and keep other insects away.



Be careful not to trample on the beetle when you are on a trek.

a couple of thousand of these beetles left around Oklahoma and on Block Island. It is a victim of habitat fragmentation. The home of the American burying beetle has been damaged by human activity. Agriculture, humans trampling through the wilderness on a trek, pollution, and mining upset it further. Like other insects, this beetle is drawn towards bright electric lights and gets singed.

Can this beetle be bailed out?

The Roger Williams Park Zoo is breeding these beetles. The American Fish and Wildlife Service and the zoo started sending them to Nantucket Island to breed undisturbed. A laboratory colony at Boston University breeds these beetles and reintroduces them in the wild.



Changes in the beetles' habitat has pitched it against other carrion creatures, such as opossums, for food.

Losing ground

The beetle is not picky about its home, equally comfortable in forests as on the treeless prairie. By the 1920s, the American burying beetle was losing the number game. By 1989, it crawled its way on to the IUCN's critically endangered list. Entomologists guess there are just



Doting parents

American burying beetles coat the host carcass with anti-bacterial saliva so that it does not get infected. If the carrion is too small to feed the brood, the couple kills some larvae to feed the others!



Corals: paradise lost?

Have you seen beautiful 'gardens' under the sea and wondered if these are made up of colourful rocks or plants? These are actually tiny, delicate animals called coral polyps, which live in colonies. These creatures build large and intricate structures called reefs, which accumulate from the slow growth of corals.

The little polyp

Corals are spineless animals and are close relatives of anemones and jellyfish. A coral polyp may be tiny as a pinhead or larger—about a foot in diameter. The polyp builds a hard, cup-shaped skeleton using calcium carbonate from sea water. This skeleton protects the polyp's soft, delicate body.

A coral 'head', is usually perceived to be a single organism, but is actually formed from thousands of individual but identical polyps. Each polyp is only a few millimeters in diameter.

Rome wasn't built in a day!

Some corals reefs that we see today began growing as early as 50 million years ago. Most established coral reefs are 5,000–10,000 years old.



10 per cent of the world's coral reefs are degraded beyond recovery.

Can't do without you!

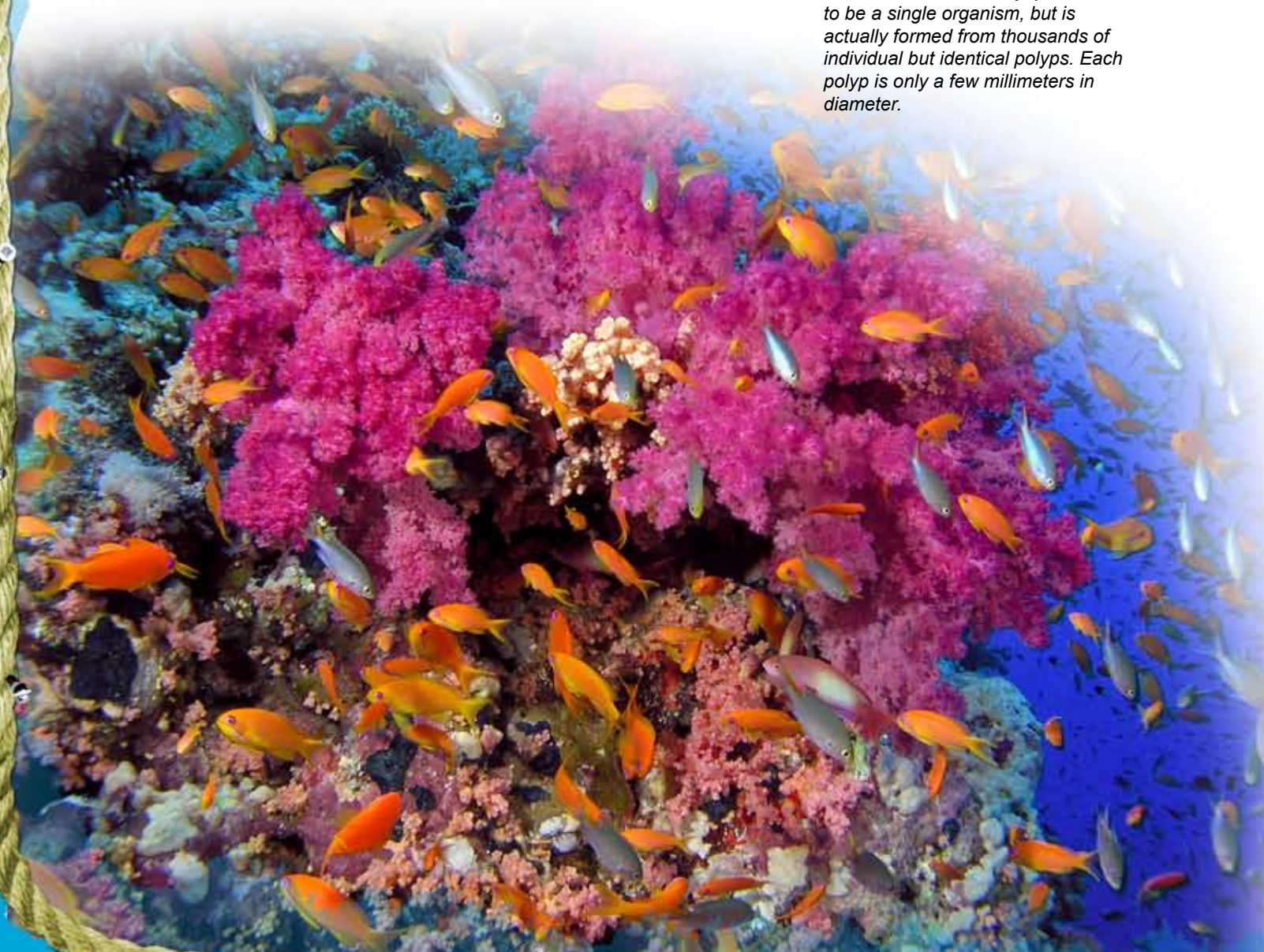
The most important source of food for the polyps are single-celled algae called zooxanthellae, which live within the coral polyps. They use sunlight to make food, providing nutrition to the coral. The coral polyps provide the algae with carbon dioxide and a safe home. Coral polyps, which are generally white, also get their colour from these algae.

At home in warm waters

Coral reefs are found along the coasts of Polynesia, Africa, India, UAE, Qatar, north-west Australia, Florida (USA), to the Caribbean, and down to Brazil. There are also coral reefs in the Red Sea. The Great Barrier Reef, off the coast of north-eastern Australia, is the largest coral reef in the world. It is over 2000 km long.

The delicate balance

Corals are fragile and extremely sensitive to changes in the environment, including the presence of chemicals or change in temperature. Many coral reefs around the world are dying due to global warming, pollution of the seas, and damage by humans. Scientists have predicted that by the year 2030, more than half the world's coral reefs in the world may be destroyed. Many governments have enacted laws to protect the reefs.



Right whale: wronged for being right

The right whale would not be happy to know how it got its name. It has more blubber than most whales, which makes it move very slowly, and float when it is dead. So whalers thought it was just the right whale to hunt!

Hey, that's huge!

The right whale has about 270 pairs of baleen plates in its mouth, which filter food from water. Right whales can be about eighteen metres long and weigh about a hundred thousand kilograms! Forty per cent of its weight is fat, which slows it down to barely nine kilometres per hour. You would know the right whale because it has light callosities, or skin patches, on the dark skin around the two blowholes, the small eyes, and the chin. The blowholes are far apart, so the 'blow' is V-shaped. The right whale has flippers instead of dorsal fins.

Right whales eat as they go along, mouth open to let prey in!



Right whales are carnivores and eat crustaceans like krill and copepods.

Not the right thing to do

The right whale is hunted by just two creatures: the orca, or killer whale, and humans. Humans kill it for blubber and meat. Till about a century ago, whalers went out in wooden boats and used harpoons. Then came bigger, stronger mechanized boats. By 1750, the North Atlantic right whale was almost extinct. By 1937, there were so few right whales left that governments got together for a total ban on right whale killing. But illegal whaling continued for decades.

Whaling has reduced the right whale to the status of an endangered species. In the northern hemisphere, less than a thousand remain. The southern hemisphere has about three thousand to four thousand right whales.



The right whale is an easy target because it often swims near the shore.

Save Moby!

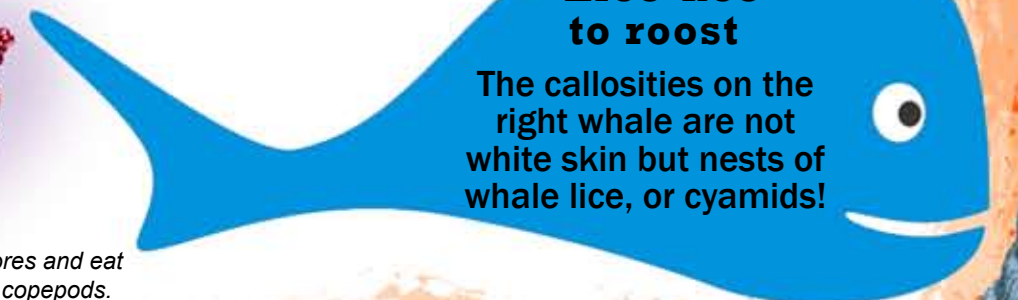
The slow right whale often dies after colliding with ships. In 2006, the National Oceanic and Atmospheric Administration of America floated the Strategy to Reduce Ship Strikes to North Atlantic Right Whales to force ships to slow down in areas where this whale lives. The International Whaling Commission (IWC) has also recognized climate change as a major threat to the species. Climate change will impact sea surface temperature, salinity and ocean circulation. All of this will alter food availability, migration routes, and reproductive rates of the whales.



Orcas are the only creatures other than human beings that can hunt down a right whale.

'Lice'nce to roost

The callosities on the right whale are not white skin but nests of whale lice, or cyamids!



Marco Polo sheep: a faint bleat

When intrepid explorer Marco Polo took the Silk Route to visit Kublai Khan around 1272, he wrote about an impressive wild sheep. The *Ovis ammon polii*, or Tien Shan argali, is called Marco Polo sheep.

Handsome hunk!

The Marco Polo sheep is the most majestic sheep in the world. It could have been like any of its cousins had it not been for its impressive, curving long horns. It is a large sheep, with long legs, and wears a thick dark winter coat. In summer, its fleece turns a speckled brown on the body, while the face, rump, legs, and chest are white. The horns curve out in an arch.

High in the mountains

The Marco Polo sheep is found deep inside Central Asia, in the Pamir Mountains that touch Afghanistan, China, Pakistan, Tajikistan, and south of the Naryn river in Kyrgyzstan. It is quite at home at altitudes of 3,000 metres to 5,500 metres. It feeds on the grass, herbs, and the longer rushes, or sedge.

The Pamir Mountains are home to the Marco Polo sheep.



The world record for the longest sheep horns rests with the Marco Polo sheep—about 190 centimetres!

Goodness has no borders

Dr George Schaller, born in 1933, first surveyed the Marco Polo sheep in Pakistan in the 1970s. His work led to more than twenty reserved parks all over the world. He continues to follow these sheep in the Pamirs.



Poor sport

The magnificent horns of the Marco Polo sheep have been its greatest downfall. Hunters from all over the world consider its crown a trophy to vie for. Since the 1990s, several hundreds have been killed for sport. Today, barely six thousand remain. In the hunting season, tourist guides organize hunting safaris with promises of bravado like: 'Marco Polo sheep hunting is one of the toughest and most exciting sports you will ever experience' and 'they are considered to be the number one sheep trophy in the world'. Locals used the skulls to mark sacred shrines in the mountains.

One man unites many countries

Some of the countries that this sheep calls home have come up with national parks where it is protected. They can roam freely in China's Taxkongau Nature Reserve and Pakistan's Khunjerab and Central Karakoram National Parks. Inspired by the untiring work of the naturalist George Schaller, the Wildlife Conservation Society has launched the Greater Pamir Initiative to create a fifty thousand-square-kilometre Peace Park covering parts of Pakistan, China, Afghanistan, and Tajikistan where the flora and fauna will also be protected.



The Wakhi and Kyrgyz tribes kill the Marco Polo sheep for meat.

Nightcap oak: found just in time

In 1995, Australian botanists were thrilled to identify the nightcap oak. Their joy was short-lived. Soon after, they found that it is critically endangered.

A toast to the nightcap

The nightcap oak is a rainforest tree. Its highest branches can grow about forty metres above the ground. Pale, white flowers show

up as summer sets in, around October. After that green fruits, about four centimetres in diameter, appear. They take more than a year to ripen and are ready by the next December. By March, they turn pale brown and are shed.

Soil story

The nightcap oak is fussy about where it grows. It grows on yellow podzolic soils found in the rainforests of southern Australia. These forests get more than 2,500 millimetres of rain every year. In millions of years, the nightcap oak has not been able to spread further.

The woody fruit of the nightcap oak is hard to spot on the tree until it turns a dull golden yellow when it ripens.

The leaves of the nightcap oak change from bright orange, when they are young and new, to dark green.

Old tree, new find

In the 1960s, botanist Bernie Hyland found two light brown fruits. It took him more than twenty years to identify the tree as nightcap oak.

The nightcap oak is not a new tree. Unfortunately, the tree that survived millions of years is on its way out. There are less than two hundred nightcap oaks left. More and more land is being cleared for forests, and trees are being cut for timber. Since this tree grows only in a small area, it may be wiped out soon.

What is being done?

Some of these trees grow in forests under the protection of the Central Eastern Rainforest Reserves (Australia). The Department of Environment and Conservation of Australia is working to save this tree. It has in place a National Recovery Plan. Visitors, who often trample on seedlings by mistake, are being directed to stay within walking areas. They are also trying to prevent forest fires and stop felling of trees in areas where the oak grows.

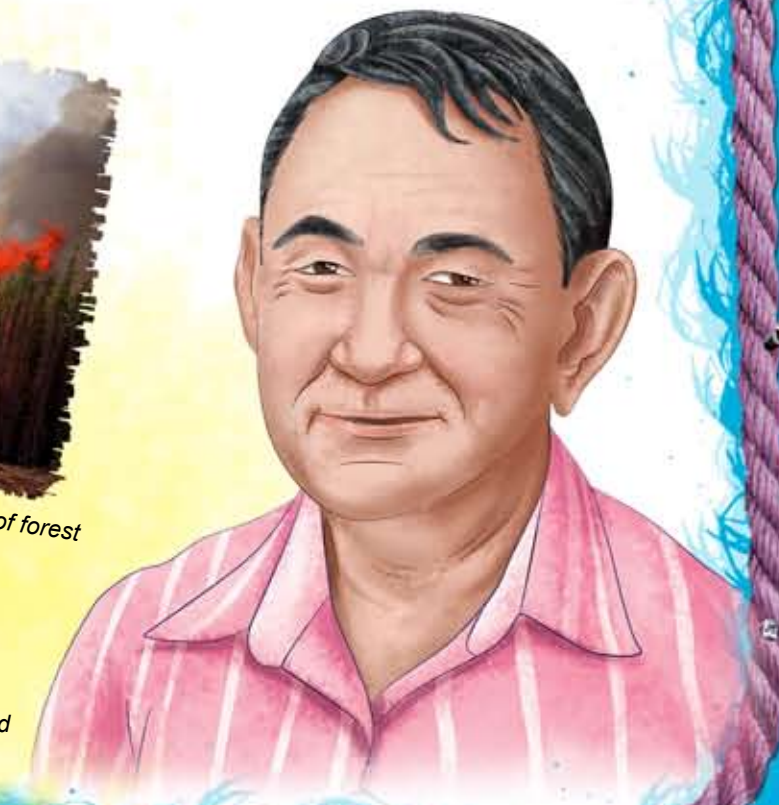
Old tale

The nightcap oak is one of the oldest flowering plants of Australia. Fossil fruits hint that the tree has been around for fifteen million years.



Forest fires have burned down acres of forest where the nightcap oak grows.

Bernie Hyland



Heart-leaved plantain: vanishing weed

Mighty trees are in danger of becoming extinct. So are herbs that you would barely notice, like the heart-leaved plantain. But it is just as important to save these tiny plants from disappearing forever as it is to save big trees.

Not quite bananas!

If you believed that the only plantains are bananas, here's news. Some, like the heart-leaved plantain, are low-growing weeds, or herbs, that have heart-shaped leaves up to thirty centimetres long. The winter leaves are smaller. The plant has small purplish summer flowers that are speared on top of the flowering stem, or spike, about fifteen centimetres long.

Hanging around

The heart-leaved plantain grows round the year in North America. It is semi-aquatic, happy to be around water. That includes places that are waterlogged or swamps. The heart-leaved plantain grows well in rocky areas, pushing its way up through a crack or in deciduous forests.

Death knell

Till some time ago, the heart-leaved plantain was found from Ohio to Minnesota, a wide range sweeping across North America. It can now be found in far smaller patches. One of the biggest culprits is habitat destruction. This means, land where the plant used to grow has been taken over for some other purpose. Rivers and streams along which it grew have been diverted for agriculture and other uses. New species introduced into the region have proved stronger than local plants.

By design

Willie Tsang, a graphic designer, has a range of furniture called 'Save the Plants' to remind people about twenty-one flowers endangered in Canada. The heart-leaved plantain is one of them.

Saving grace

The heart-leaved plantain is endangered. Canada is trying to save it, and bring it under the protection of the Ontario Endangered Species Act. This ensures that the weed cannot be collected. It also protects its habitat. In the Carolinian Woodlands of Canada, efforts of the Carolinian Woodlands Recovery Team of 2004 to save the woodlands may help the herb recover. The Canadian government will also not charge tax from those who keep at least two thousand square metres of their land for the natural species of the area.

The roots of the heart-leaved plantain are thick and long and have been used to make traditional medicine that can fight stomach ailments.



As habitation spread, wetlands dried up and the plant died out.

The heart-leaved plantain is particular about where it grows and the quality of water!



Magnolia: fading fragrance

Had French botanist Pierre Magnol (June 8, 1638–May 21, 1715) been living today, he would have been a sad man. The beautiful magnolia tree, named after him, is losing the battle for survival.

Before the bees

The magnolia is an ancient tree. Scientists have found fossils of the magnolia that are twenty million years old. That's before the bees came into existence! The flowers were pollinated by beetles then. The magnolia is a deciduous tree that grows up to a height of about seven metres. It sheds its dark green leaves in winter, and the white, pink or purple perfumed flowers arrive to welcome the new leaves. The flowers do not have true petals and sepals. The two are more or less combined in 'tepals'.

The world is the stage

In the wild, the magnolia is found in Southeast Asia, in the Americas, and the West Indies. Asia is home to two of every three magnolia trees in the world. Most of the magnolias found in North America and Europe were perhaps carried back from Asia for their beautiful flowers.

The magnolia is an old and tough plant that has survived for millions of years. When a tree that tough dies, it can only signal bad news for weaker species in the world.

Used the abused

Scientists know of 245 wild magnolia species. A 2006–7 count showed that 131, or more than half the species, are threatened. Seven of them are critically endangered.

In many places, the habitat of magnolias has been destroyed for plantations of fruits like banana that are necessary to feed a growing population.

Is anyone listening?

Several species of the magnolia have been cultivated from their wild parents. Now, there are plans to cultivate the ones that are most likely to die out. These will be grown in different parts of the world so that some specimens remain.

The tree has been cut down for its wood. The bark has been stripped for medicine. Without the bark, it is prone to disease.

Common cure

Chemicals in magnolia can fight bacteria such as shigella, staphylococcus, and streptococcus. The extracts from the trees can be made into medicines for depression, common cold, blood pressure, upset stomach, and even cancer!

Even cultivated magnolias in North America have faced problems. Many were damaged by Hurricane Katrina in 2005, and had to be cut down.



St Helena ebony: the struggle of two shrubs

A tiny South Atlantic Ocean island is fighting to save a tree that carries its name. St Helena, where Napoleon Bonaparte lived in exile from 1815 till his death in 1821, was known for the St Helena ebony. Just two of these trees remain in the wild.

The pride of an island

The St Helena ebony is quite sturdy. It can bear a certain amount of drought and so can survive in warmer, lower slopes. Its wood is hard and dark. Its heart-shaped leaves are dark green in colour and velvety on the underside. Each inflorescence, or flower stalk, holds about three creamy white flowers that give way to dull brown seeds. As they age, the flowers turn light pink.

If only!

The Portuguese discovered St Helena in 1502. They let goats free on the island. By the time Napoleon was sent to live there, the St Helena ebony was virtually trampled down and chewed up by grazing goats. Hundreds of statues and decorative items were made from its dark wood. It was also used as fuel in lime kilns. Soon, the tree could not be located on the island and was believed to be extinct.

In 1980, two St Helena ebony trees were rediscovered, growing on a rock face.

Last hope

Beginning 1980, botanists from various organizations, including Royal Botanical Gardens at Kew, London, began growing St Helena ebony from the cuttings and seeds of the two specimens discovered in the wild. Three gene banks try to make the new trees sturdy. But the plants are slow in growing. The weak roots get damaged when they are planted back. The new trees may also be weaker, since they come from the same stock.

Fighting for its survival, the St Helena ebony that used to be about five metres tall has now been reduced to a shrub!

Wreath of remembrance

The flower of the St Helena ebony is included in the wreath made by the Royal Botanical Gardens, Kew. It is laid at the London Cenotaph on Remembrance Day so that we do not forget this endangered plant.



St Helena ebony has strong survival instincts. The pollen-producing anthers open before the flower blooms so that pollen brushes the top edge of each petal. So any insect touching the flower helps in cross-pollination.



Machu Picchu: trampled by tourism

Machu Picchu, tucked into the Andes mountains of Peru, is an ancient city founded by the Incas. The city dates back to about AD 1460 to the time of Inca ruler Pachacuti Inca Yupanqui and his descendants. Machu Picchu means 'old peak'.



The ancient city of Machu Picchu is also called 'city in the clouds'.

A mountain retreat

The city had many stone structures. It had about two hundred buildings that included homes for over a thousand people, temples, and granaries. The houses were built of granite hewn out of the rocks. They fitted together like a perfect jigsaw puzzle that needed no mortar. Since they were cut by hand, no two blocks are identical. Some of them have thirty corners! People stopped living in Machu Picchu around the 1530s.

Curious armies

In 1911, archaeologist Professor Hiram Bingham stumbled upon Machu Picchu, a city that covered almost thirteen square kilometres. It was shrouded in clouds and was watered by mountain springs.

Ever since Professor Bingham found Machu Picchu, the number of tourists visiting the city has grown. At first, most visitors were students and archaeologists. Then, the hordes came. In 1992, about nine thousand tourists checked out Machu Picchu. In 2006, about four thousand people visited in a day! Machu Picchu has become Peru's largest grosser from tourism.

The Intihuatana is a uniquely preserved wide pillar and pedestal that were carved as a single unit and are 6 feet (1.8 metres) tall.



Lost and found

The environment around Machu Picchu has been degraded to accommodate tourists. A new eighty-metre bridge connects Machu Picchu with Santa Teresa town, so that more tourists can visit it.

In the 1980s, a rock from the Central Plaza was removed so that helicopters could land at Machu Picchu. In September 2000, the Intihuatana, or holy sundial, was damaged. An industrial crane crashed on it while advertising agency JWT was shooting an advertisement.

Wake up!

Helicopters have been stopped from landing at Machu Picchu since 1990. There are plans to construct a tram line. This would just bring in more tourists. In 2000, the ancient town went on the World Monument Fund's Watch List and will be given help to restore it. Machu Picchu has been a UNESCO World Heritage site since 1983. But things are getting worrying, so UNESCO may put Machu Picchu on the list of Endangered World Heritage Sites.



It is believed that Inca ruler Pachacuti Inca Yupanqui built Machu Picchu as his royal retreat.

The sun is going nowhere!

'Intihuatana' means 'post to tie the sun to'. At midday, on the equinoxes of March 21 and September 21, with the sun directly above, a priest tied the sun symbolically to the stone so that the sun could not disappear.

Parthenon: pockmarked by acid rain

The Parthenon of Athens is one of the world's most admired monuments. It has won the awe of visitors since 5 BC. Today, it is worrying archaeologists.

Herculean feat

Work on the Parthenon began in 447 BC. The legendary architects Kallikrates and Iktinos ensured that most of the work was done in fifteen years. Its main designer was the sculptor Phidias. The ornamentation took another year. It had forty-six outer pillars and nineteen pillars inside, which supported the roof of overlapping marble tiles. The marble had to be transported about sixteen kilometres from the city of Athens.

Up the highest hill

The Parthenon stands majestic over the Acropolis, the highest hill in Athens. In ancient times, the Acropolis was home to the kings. Later, when Athens changed its form of government and did away with monarchy for oligarchy, or the government of a few people, the Acropolis was dedicated to Athena. The current Parthenon stands where an earlier Parthenon was destroyed by raiding Persians around 480 BC.

The rectangular building was constructed of brilliant white marble and surrounded by 46 great columns.



Down the centuries

In 296 BC, the statue inside the Parthenon was stripped of the gold by a general, Lachares. It was used as a church in AD 5 and as a mosque in 1460. Some sculptures were torn down when the church was built. In recent years, poisonous fumes from industries and automobile exhaust have damaged the marble. They have also led to acid rain, which is eating away the stone structure. The marble frieze panels have been transformed by acid rain into gypsum. Loosing much of its details, the exterior of the Parthenon is also beginning to crack and flake off.

The exterior of the Parthenon is beginning to crack because of pollution and acid rain.



The Parthenon housed a nearly 40 foot tall statue of the goddess Athena. The statue, was made of wood, gold and ivory and could be seen from a distance of many miles.

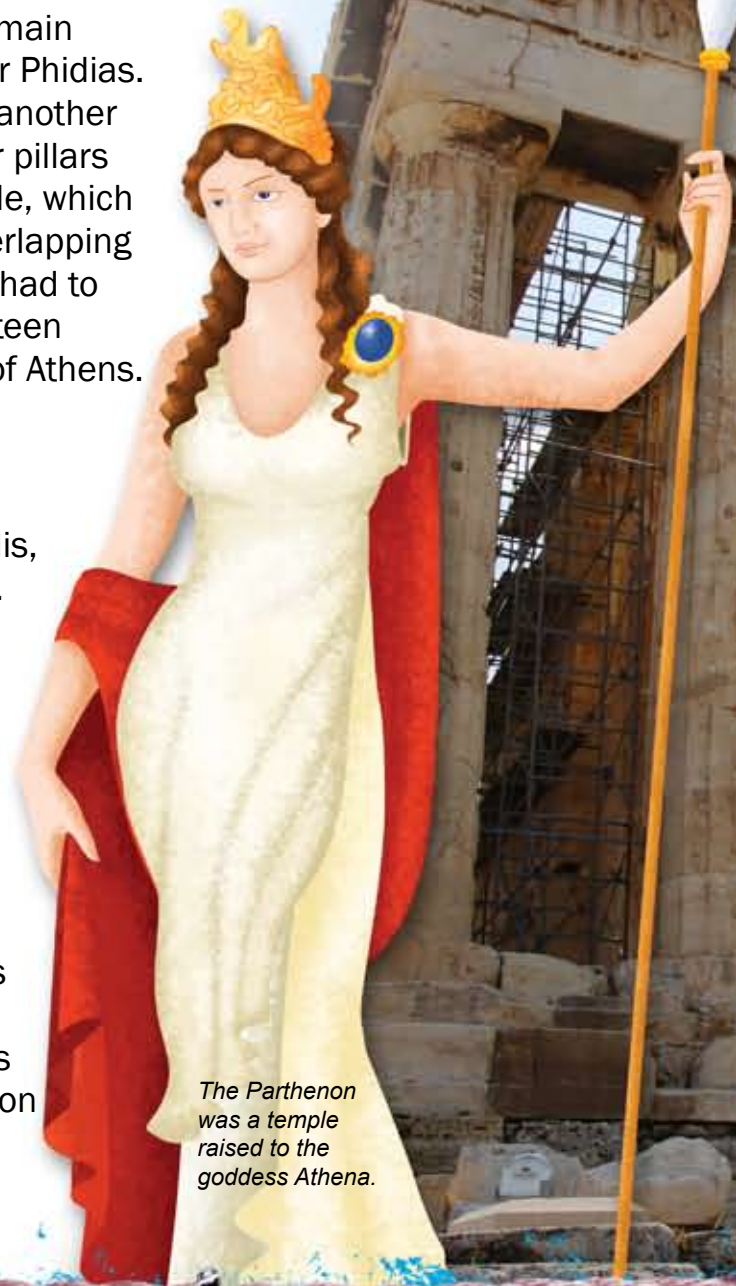
One bright idea

Several organizations like the British Committee for the Restitution of the Parthenon Marbles are trying to save the Parthenon. The marble statues that remain at the Parthenon are being destroyed by acid rain. The authorities will move seven statues to a museum. They will be replaced with replicas. But the main structure cannot be replaced. It continues to be eaten away by acid rain.

Monumental loss

The marble frieze panels on the Parthenon have been transformed by the acid rain into gypsum, which is soluble in water. So the Parthenon may slowly wash away or flake off.

The Parthenon was a temple raised to the goddess Athena.



Friday Mosque, Chinguetti: the desert catches up

Chinguetti is an oasis city in Mauritania, in north-west Africa. The Friday Mosque of Chinguetti has stood like a rock for the faithful since the thirteenth century. Now, the desert is creeping up on it.

Emblem of a nation

The Friday Mosque is a simple structure. It is made of stone and the minaret is a square tower. It has a prayer room and a mihrab, or arch facing the holy city of Mecca. The floor has a layer of sand. The room has four aisles and an open courtyard.

At home in an ancient city

Chinguetti was founded in AD 777. It almost came to an end after a few centuries. Then, it was revived in the thirteenth century. The city and the mosque probably go back to the same time. Chinguetti was an important trade centre. There are many old buildings in the city like the French fort and the water tower. Five libraries preserve holy manuscripts of the Quran.

The minaret is crowned with five finials—clay sculptures of ostrich eggs.



Three quarters of Mauritania is a desert or a semi desert. As a result of an extended, severe drought, the desert has been expanding since the mid 1960's.

The desert creeps up

Sand is inching up to Mauritania by five to ten kilometres every year. Mauritania now gets 20 per cent less rain than it did in the 1950s. One cause of this is the rise in temperature over the land and over the nearby Atlantic Ocean. Lack of moisture makes the sand fly further and faster. People have chopped down trees to feed camels and goats and for firewood. The roots that held the sand in place are gone. The trees that are still alive are biding time. Heaps of sand are building up around date palm trees. Soon, the trees will be smothered.

Stamp of acceptance

The mosque and the minaret are the national emblems of the Islamic Republic of Mauritania. They are seen on French and Mauritanian stamps.

Don't cut that tree!

New laws have made it illegal to cut most of the trees and plants in the region. But unofficially, the alfalfa plant that is laid out to cool the roof is still cut. In the 1970s, UNESCO stepped in to restore the mosque. The city has been declared one of UNESCO's world heritage sites. The National Foundation for the Safeguard of Ancient Towns in Mauritania plans to look after the mosque.

Chinguetti was once a green city where ostrich lived! Today, doors of houses get blocked overnight by sandstorms.

Scott's Hut: who'll shovel it for safekeeping?

British explorer Robert Scott was the second human to reach the South Pole. He was among the pioneers who dared to discover Antarctica, the frozen continent. Today, climate change threatens to swallow up his cabin, Scott's Hut.

One feisty cabin

Scott's Hut is at Cape Evans on Ross Island in Antarctica. Scott's Terra Nova expedition started in 1910, but the cabin came up the next year. It was insulated with seaweed sewn into a covering. This quilt padded the space between two layers of plank walls. The roof, also padded with seaweed, had three layers of planks and two layers of rubber ply. In the winter of 1911, Scott's Hut sheltered twenty-five explorers. It was heated with coal stoves and heaters. The hut was so warm, it was almost uncomfortable!

When the snow melts in summer, the water seeps in and damages the hut. In 2004, water flooded Scott's Hut.



Robert Scott

Global warming on a melting continent

Antarctica is warming up because of climate change. Satellite imagery from the National Snow and Ice Data Center shows that an ice shelf spread over 13,680 square kilometres has started collapsing due to sudden climate change.

Scott's Hut at Cape Evans is in danger. Blizzards are blowing in more snow than ever before. About hundred thousand kilograms of snow collects around and on the hut in a few months. Scott's Hut may collapse from the weight.



Supplies from Scott's expedition are still kept at the camp, just as they were when he left.

Can anyone turn back the climate clock?

Scott's cabin still has the scientific equipment that he left behind. These are part of our Polar heritage. Scientists and volunteers spend several days every summer looking after Scott's Hut and other such historical buildings. They clear snow from around the house. The Antarctic Heritage Trust is working to preserve the structure in several ways. One of the first things that it intends to do is to keep snow from blowing in on the hut with the help of vortex generators that modify the flow of air. Artifacts will be treated so that they last.



Race to the finish

Scott left the cabin on November 1, 1911, trying to beat Norwegian explorer Roald Amundsen to the South Pole. Scott did reach, but after Amundsen. Scott and his exhausted team died in March 1912 of the intense cold on their way back from the Pole.



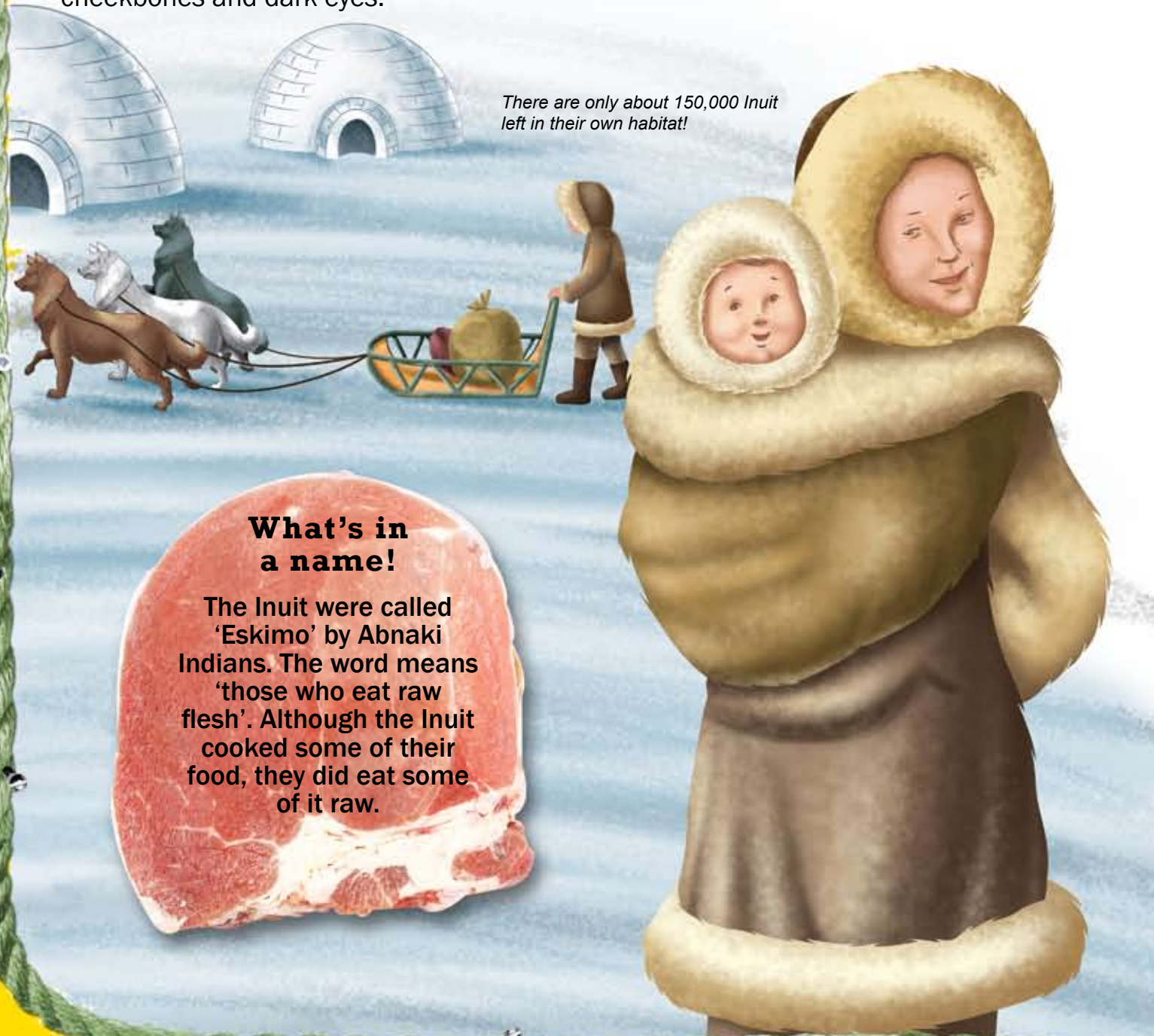
Inuit: lifestyle melting away

The Inuit people live in the Arctic and sub-Arctic region. Their land falls within Canada, Greenland, and Alaska (in the US).

Strong people

The Inuit are stocky, strong people. Most of them are about 1.5 metres in height. For centuries, they have been living in one of the coldest regions of the world, and so, their circulatory and digestive systems have adapted to the climate. They have light brown skin and thick, straight black hair. Their faces are wide, and they have high cheekbones and dark eyes.

There are only about 150,000 Inuit left in their own habitat!



What's in a name!

The Inuit were called 'Eskimo' by Abnaki Indians. The word means 'those who eat raw flesh'. Although the Inuit cooked some of their food, they did eat some of it raw.

People of harsh land

The Inuit were spread over about 5,150 kilometres of the Arctic. They hunted seals, whales, and fish. In winter, they hunted the polar bears, caribou, foxes, and hares. Since these animals move with the seasons, the Inuit followed them. In summer, they lived in tents made from the skin of animals they killed. In winter, some of them built houses of snow, others made houses of chunks of grass and soil, or sod.

Enter, a new world

Centuries ago, Europeans started entering Inuit land. Gradually, they changed the way the Inuit lived. They brought in diseases. As trade increased, more Inuit land was occupied. Some Inuit, who shifted to the new towns and settlements, live in crowded homes.

Global warming has made summers longer and winters shorter. With ice melting faster, sea levels are rising and may flood Inuit habitat. Permafrost, the permanently frozen layer that lies just beneath the topsoil, in the Arctic is thawing. This is releasing more methane gas, which adds to global warming.

Is the world listening?

In the next century, the Arctic will get warmer by four to seven degrees Celsius, double the warming elsewhere. In 2005, the Inuit Circumpolar Conference complained against the US for releasing the largest amount of greenhouse gases. "We refuse to disappear. We will not become a footnote to globalization," they declared, asking the US to reduce the emission of greenhouse gases.



The Inuit erected inukshuks in the image of man. Today, most of their customs are lost.

Global warming is depleting the number of Arctic animals, making hunting more difficult for the Inuit.



Penan: the price of 'prosperity'

The Penan is the only nomadic tribe in Sarawak on the island of Borneo, Malaysia, and in Brunei. Although there are about ten thousand Penan in Malaysia, only two hundred of them continue to live as nomads.

A different tribe

The Penan are a gentle, polite people. Their skin is lighter in colour than that of other tribes of the region. Their eyes are narrow and the cheekbones high. Their hair is thick and black. They believe everyone is equal, and they share whatever they have among themselves.

The Penan believe in 'molong'—the practice of using forests and natural resources in a manner that they are preserved for future generations.



Happy in the rainforest

These nomadic hunter-gatherers eat a lot of sago. They eat anything they can catch, even squirrels. Barking deer though, is a favourite. Actively defending their forests and their way of life, indigenous people are our best line of defense against the destruction of forests. In order to combat global warming, reforestation and prevention of logging is a must. The survival of the Penan's, our planet and the entire human race rests largely on the preservation of trees.

Shooed out

The Penan were safe in their forests till the 1970s. That is when the demand for timber went up and forests were cut down. Dams were built and forests were converted into palm plantations. When they protested, their complaints were mostly ignored. Most of them were forced to settle in towns.

New to urban life, they live in poverty and ill health. The timber merchants often threaten to kill them. The rich and powerful timber companies also offer the Penan jobs and money to win them over.



The Penan hunt with poisoned blowpipes.

Fighting back

The Penan have been protesting this invasion since 1978. These peaceful people block the roads the timber loggers take. Some companies backed out but not all listened. The Penan still need to be given the right to own the land they live on. They have hunting rights inside Mulu and Pulong Tau National Parks.

Penan leaders like Kelesau Naan filed a case for land rights. Seventy-three-year-old Naan was found dead in January 2008. His people believe he was murdered.

Saying without words

Penan use a sign language in the forest. Twigs and folded leaves are placed with messages like, 'Follow me'!



Yanomami: grappling with the Garimpeiro

The Yanomami are a large original tribe of South America. They live in the Amazon rainforests, along the border of Venezuela and Brazil. It has only been a hundred years since they interacted with the outside world, but they are already losing their way of life.

A strong tribe

The Yanomami are intelligent and cheerful. Like most tribes, they are muscular. They are a healthy tribe that has developed immunity to most of the illnesses of the area. They are short and well-built. They have broad shoulders. Their brown skin has a yellow tint and the hair is thick and black. They have little body or facial hair. They have high cheekbones and thick lips. The eyes are slanted and rather narrow.

Happy people

The Yanomami live so deep inside the jungle that outsiders have to trek hundreds of kilometres through forests to reach them. There is plenty of food in the rainforests, and the Yanomami eat fruits, honey, and eggs. They eat fish and the larvae of bees. Tribes like the Yanomami live in complete harmony with nature. This tribe understood the ecological importance of the rainforests where they have lived for generations. As a tribe they realized the ecological importance of the rainforests and the damaging effect their destruction could have over world environment.

Room for plenty

A Yanomami village, of up to four hundred people, lives under one roof! The shabono is an oval shelter around a huge courtyard. Each family lights its own fire to cook.



Excellent hunters, the Yanomami look for monkeys, wild boar, fowl, and snakes.



At the hands of marauders

In the 1970s, gold and precious stone diggers, called Garimpeiro, began raiding Yanomami land. In 1990, over forty thousand raiders killed Yanomami to take over their land. The raiders also brought diseases. Twenty per cent of them died in seven years. Loggers who are a real threat to these people and environment at large are increasingly trespassing on indigenous lands in search of mahogany trees.

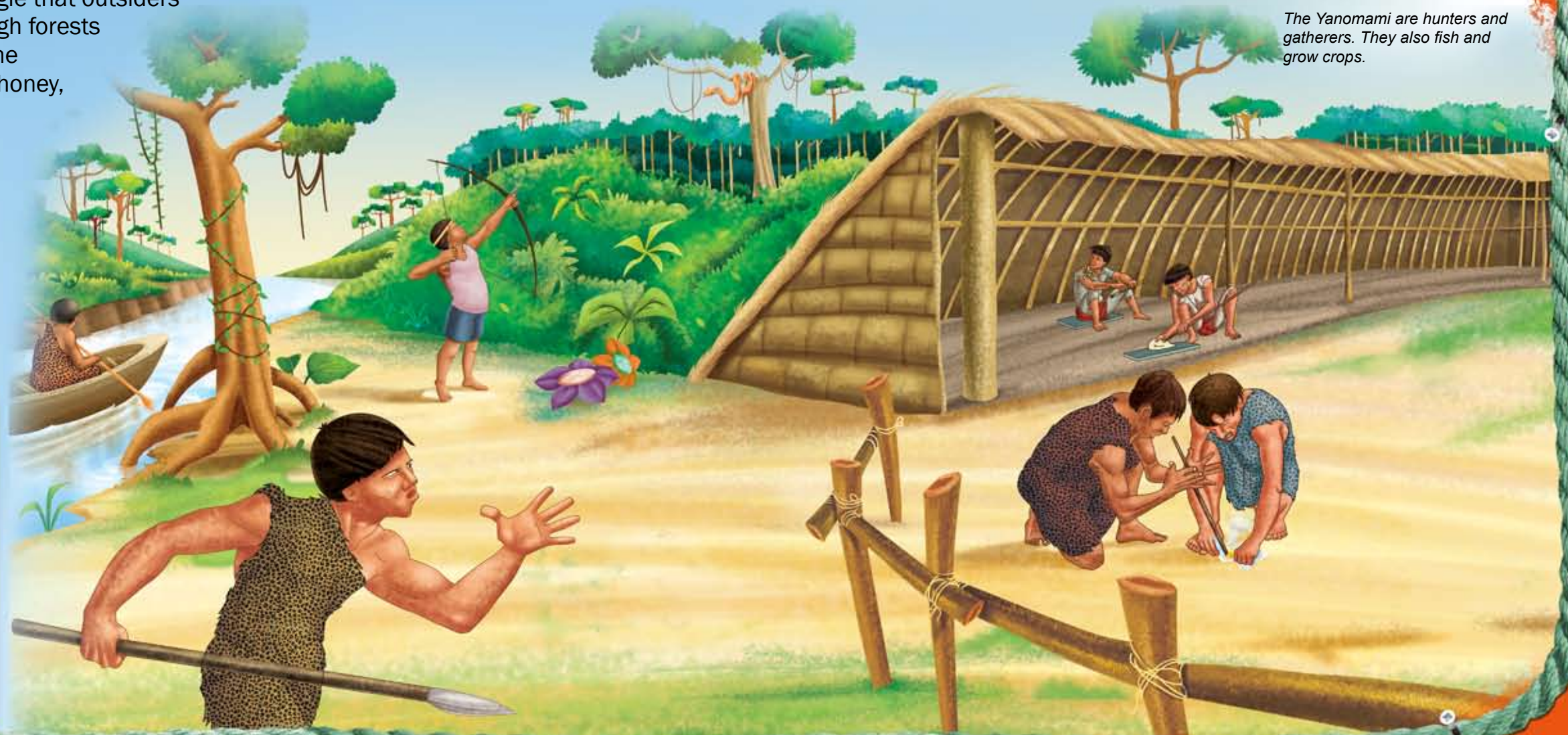
Help, finally

Brazil does not allow tribal groups to own land. In 1992, after groups like Survival International and Commission for the Creation of a Yanomami Park fought for the rights of Yanomami for twenty years, Brazil opened the Yanomami Park over about hundred thousand square kilometres. Most miners were made to leave. Though modern medical staff have been brought in, traditional medicine is encouraged.



A good Yanomami cook knows how to grill, boil, and roast food. Tapir is one of their common food.

The Yanomami are hunters and gatherers. They also fish and grow crops.



Bushmen: the hunter is hunted

The Bushmen have lived in the Kalahari desert of Africa for about twenty thousand years. Some scientists believe that they were the first people on the earth. As they form closer ties with the western civilization, and as their lands get earmarked for reserved forests for wild animals, these hunter-gatherers are in trouble.

Now, that's a Bushman!

The word 'Bushman' is used for a group that includes several others. They are also called San, Basarwa, and Khwe. Bushmen are active in their natural surroundings. This makes them lean and athletic. They can run long distances chasing animals. Bushmen have high cheekbones and lighter skin than many other ethnic groups in Africa. They have thick, dark, curly hair.

Children of the forest

The Bushmen eat seeds, nuts, roots, and entire plants. They are also excellent hunters and use poison-tipped spears and arrows. Their home spans Angola, South Africa, Namibia, and Botswana. They are simple people who live in make-shift wood homes. Even women go out to collect food.

Your home no more

The Bushmen lived the same life for thousands of years. Then, the Europeans entered Africa. They wanted to 'civilize' the Bushmen so that they followed western culture and religion. Governments, like that of Namibia, gave permits to kill Bushmen. The land that the Bushmen used to hunt on is being fenced in and used for farming and grazing cattle. During the 1950s the Bushmen had to convert to farming and grazing cattle. Climate change and use of genetically modified seeds created an enormous effect on their lifestyle.

Bushman cave paintings depict scenes from daily life, including hunting.

In 1997, the Botswana government ordered these hunter-gatherers to leave the Central Kalahari Game Reserve.



What's that you said

Bushmen have a unique language that includes clicking sounds. These are written as '!' or '/'. One group that lives in Angola, Botswana, and Namibia is the !Kung.

Today, less than a hundred thousand of the millions of Bushmen remain.

By 2005, the quiver tree, used by the Bushmen to make quivers, was dying. New trees of this species are growing away from the equator. This is called the pole-ward range shift.

Less rain means less or no food. The Bushmen are having trouble being able to produce enough food for survival.

Quiver Plight

The famed desert tree used for generations by Africa's bushmen to make quivers for their arrows is threatened by global warming. The quiver tree has iconic status in Namibia, where its blue-green crown stands out against a parched landscape.



Glossary

Abdominal gout— gout is a painful condition that usually affects joints. In rare cases, it can attack other parts of the body like the abdomen

Acid rain— rainfall that becomes acidic due to environmental pollution. Acidity is measured on the pH scale of 0 (most acidic) to 14 (most alkaline). Rain has a natural pH balance of between 5 and 6. Anything less than that is acid rain.

Anti-bacterial— something that destroys bacteria

Archaeologist— one who studies history through excavating, or digging out, historical sites and findings like pottery

Baleen plates— two rows of flat whalebone plates in the upper jaw of a whale that has no teeth. Baleen plates filter the food that the whale swallows with water. It presses the tongue against the jaw, spitting out the water and keeping only the food.

Bile— bitter liquid produced by the liver to digest food

Blowhole— hole for blowing or breathing, located on the top of the head of a whale or dolphin

Blizzard— violent snow storm

Blubber— fat, especially of sea mammals

Captive breeding programme— to plan and breed species that are rare or endangered in zoos or special places

Carrion— decaying flesh of dead animals

Cross-pollination— pollen of one flower transferred to another

Desertification— the transformation of land that was not a desert into arid land because of human activity and climate change

Dorsal— of the back

Entomologist— scientist who studies the life cycle and behaviour of insects

Global warming— literally, the heating up of the earth's atmosphere. Now, it refers to the unusually warm temperature caused by burning fossil fuels and the release of greenhouse gases

Greenhouse gas or GHG— gas such as methane and nitrous oxide, which contribute to the greenhouse effect. These gases trap the heat of the sun instead of letting it escape into the atmosphere. This heat envelops the earth, heating it up like a greenhouse. This is the greenhouse effect. A certain amount of greenhouse gases occurs naturally. Without them, the earth would be too cold to live on.

Habitat fragmentation— changes in the natural home of a plant or an animal. It can be caused by natural changes or human activity and can lead to the extinction of species.

Industrial Revolution: — a noticeable change in the eighteenth century with more machines taking over mechanical work. These machines generally work on fossil fuels that release greenhouse gases when they are burned for energy.

Methane— greenhouse gas released by cattle after digesting food, and from burning fossil fuel

Minaret— tall tower of mosque

Nitrous oxide— a greenhouse gas that is released through burning fossil fuels and biomass and from agriculture

Nocturnal— active or occurring during night

Quiver— case for holding arrows

Regurgitate— bring swallowed food that has not been digested to the mouth

Replica— copy

Sago— a starchy food made from the inside of the sago palm

Scavenger— animal that feeds on dead animals and waste

Sepal— usually green, sepals lie just below the petals

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