



# Orbis



To **know** your world better

**Geography Department**

**Volume 1/ Issue 3, October 2021**





# Editor's Note

*Greetings to our readers once again!*

*The team of Orbis has come together once again to present before you the third issue, this time with budding geographers helping out too. Coinciding with our annual Founders, we bring forth a grander rendition of Orbis, with our focus on the many different geographical wonders that our ever evolving Earth has to offer. One of our senior teacher, Mr. Minto Borah has written on Mud Volcanoes of Azerbaijan. There's articles describing a variety of things from the commonly known wonders like the Dead sea, Grand Canyon, the Northern lights also known as the Aurora Borealis, the Sahara desert, Phumdis, the Great Barrier Reef and, we have also wandered to the depths of the Mariana Trench! Other articles in the issue will shed light on various fascinating locations that our readers may not know about like the Great Blue hole of Belize, Galapagos islands and the Giant's causeway. Each article in this issue paints a vivid picture of the location and talks about many interesting details that will leave our readers awestruck and inspire them to visit these places. We hope everyone enjoys this issue. Happy Reading!*

*Thank You,  
Sanjana Baroah,  
Editor, Orbis.*



# Mud Volcanoes of Azerbaijan

Mud volcanoes are mound of mud heaved up through overlying sediments. Their craters are usually shallow and may intermittently erupt mud. These eruptions continuously rebuild the cones, which are eroded relatively easily. Some mud volcanoes are created by hot-spring activity where large amounts of gas and small amounts of water react chemically with the surrounding rocks and form a boiling mud.

Variations are the porridge pot (a basin of boiling mud that erodes chunks of the surrounding rock) and the paint pot (a basin of boiling mud that is tinted yellow, green, or blue by minerals from the surrounding rocks). Mud volcanoes and mud volcanism remain some of the most enigmatic and poorly understood natural phenomena despite being known and described since the time of Pliny in 77 AD.





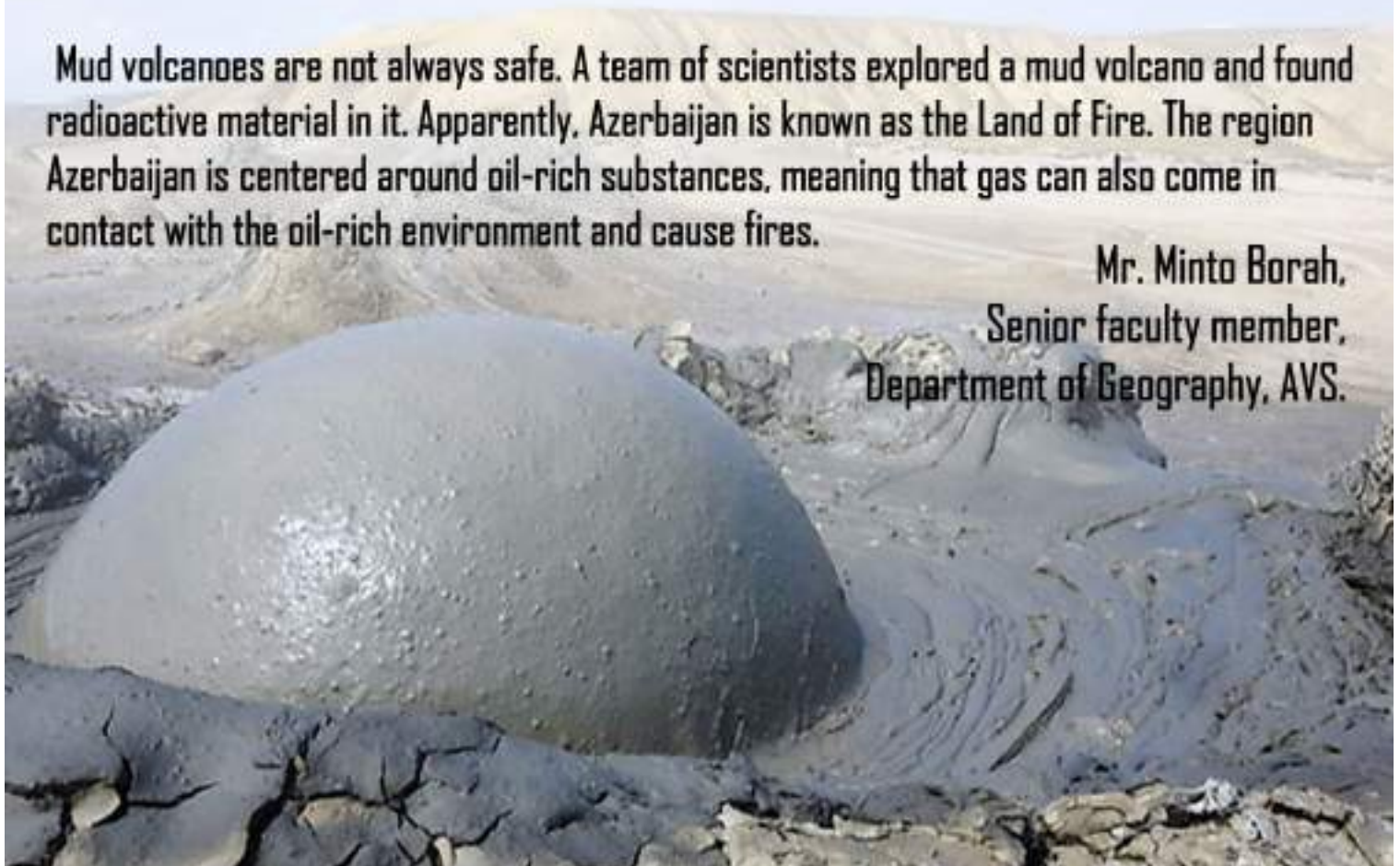
Thousands of mud volcanoes, also known as cold seeps, exist worldwide, defining and affecting the habitat and the daily lives of millions of people living among them. Moreover, mud volcanism and mud volcano distribution is intimately related to the formation and the distribution of much of the world's petroleum assets, thus serving as an indicator for valuable natural resources. Other mud volcanoes, entirely of a non-igneous origin, occur only in oil-field regions that are relatively young and have soft, unconsolidated formations.

Under compactional stress, methane and related hydrocarbon gases mixed with mud force their way upward and burst through to the surface, spewing mud into a cone like shape. Because of the compactional stress and the depth from which the mixture comes, the mud is often hot and may have an accompanying steam cloud.

Azerbaijan has the most mud volcanoes of any country, spread broadly across the country. Three hundred and fifty out of the 700 volcanoes of the world are in the Azerbaijani Republic. Local people call them "yanardagh" (burning mountain), "pilpila" (terrace), "gaynacha" (boiling water) and "bozdag" (Grey Mountain) alongside its geographical name - mud volcanoes. Mud volcanoes actually erupt clay and not mud. They can actually be useful. Local People make cement from them and use for building projects.

Mud volcanoes are not always safe. A team of scientists explored a mud volcano and found radioactive material in it. Apparently, Azerbaijan is known as the Land of Fire. The region Azerbaijan is centered around oil-rich substances, meaning that gas can also come in contact with the oil-rich environment and cause fires.

Mr. Minto Borah,  
Senior faculty member,  
Department of Geography, AVS.





# The Great Barrier Reef

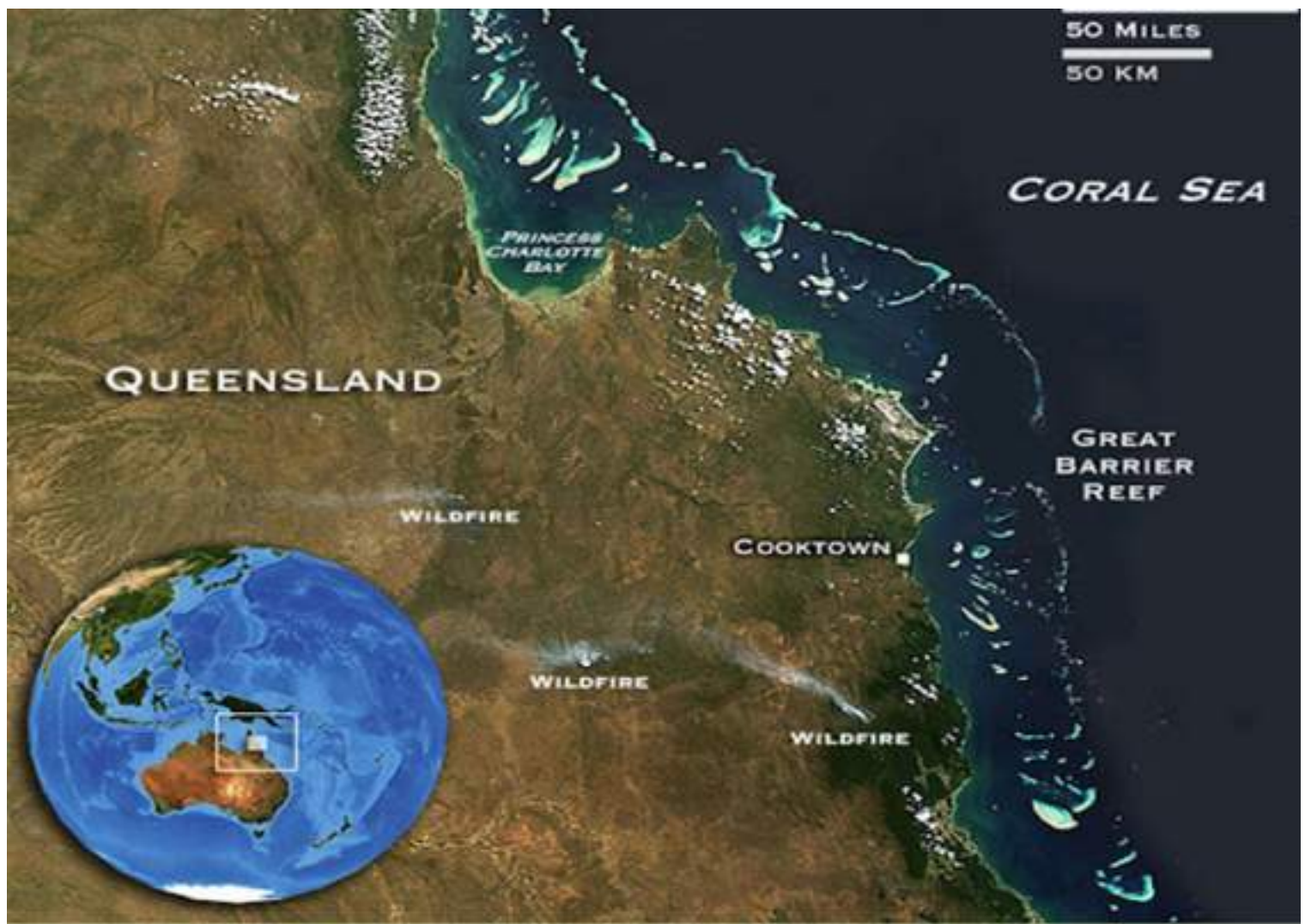
My tryst with coral reefs took place for the very first time during a trip to the Andamans. The crystal clear turquoise waters reflected a world that seemed caught in time. Watching them on closer they seemed an exquisite fragile world best left undisturbed. This is what piqued my interest on the Great Barrier Reef.

A site of remarkable beauty, the Great Barrier Reef on the North East Coast of Australia is an ecologist's treasure trove with over 400 types of coral. This also makes it the world's largest coral collection. It is also the habitat of the large green turtle which today faces the threat of extinction. This diversity of species and habitats, and their interconnectivity, make the Great Barrier Reef one of the richest and most complex natural ecosystems on earth.

During the last few years, the impact of climate change and natural threats on coral reefs within Australia has increased. An important monitoring program that is established to observe the key variations within the examined coral habitat health. While on one hand it adds enormously to Australia's natural tourism, for the very same reasons it stands to face extinction and has been marked as a World Heritage Site.







Until the beginning of 1980s, most of the disorders that impact coral reefs were caused by humans and they were considered as local disorders such as pollution, overfishing, unsustainable development of coasts and nutrient enrichment. After that, the disorders obtained from ocean warming became diffused and the concern about ocean acidification effect was increased. During the year of 2002, about 95% of existing coral reefs were bleached due to the effect of ocean warming. The preservation of the Great Barrier Reef in Australia will help preserve the wider community of corals across the world.

Aanya Sarkar,  
Class VIII



# Dead Sea

The Dead Sea receives nearly all its water from the Jordan River, which flows into the lake from the north. It is a salt lake bordered by Jordan to the east, with Israel and the West Bank to the west. It lies in the Jordan Rift Valley, and its main tributary is the Jordan River. With a surface elevation gradient of -430.5m, it is the lowest inland point on earth.

It is also 304 m (997 feet) deep, earning it the title of the deepest hypersaline lake in the world with a salinity of 342 g/kg, or 34.2%. This makes it one of the world's saltiest bodies of water – 9.6 times as saltier than the ocean. This salinity makes for a harsh environment in which plants and animals cannot flourish, hence its name. The Dead Sea's main, northern basin is 50 kilometers (31 mi) long and 15 kilometers (9 mi) wide at its widest points.

Is the Dead Sea really dead? The answer is apparently yes! It's a ghost town with an unfriendly audience over there, because you can't expect to even find a bird. That's right, the lake is so salty that even avian creatures find the location inhospitable. The Dead Sea constitutes an enormous salt reserve. Here's an interesting tidbit of information: it's physically impossible for a human to drown in the Dead Sea as its salinity level increases the water density making submersion impossible. You won't find any motorboats, seafaring craft, or even rolling waves here. Nevertheless, the pristine landscape and the quiet ambiance make the Dead Sea appear like a destination on some utopian planet.







The Dead Sea has attracted visitors from around the Mediterranean Basin for thousands of years. It was one of the world's first health resorts (for Herod the Great), and it has been the supplier of a wide variety of products, from asphalt for Egyptian mummification to potash for fertilisers. Today, tourists visit the sea on its Israeli, Jordanian and West Bank coastlines. The Palestinian tourism industry has been met with setbacks in developing along the West Bank coast. The Dead Sea is receding at a swift rate; its surface area today is 605 sq. km (234 sq mi), having been 1,050 sq. km (410 sq. mi) in 1930. The recession of the Dead Sea has begun causing problems, and multiple canal and pipeline proposals have been made to reduce its recession. One of these proposals is the Red Sea–Dead Sea Water Conveyance pipeline project, which would provide water to neighboring countries and carry brine to the Dead Sea to help stabilize its water level.

The name Dead Sea can be traced to the Hellenistic Age (323 to 30 BCE). It figures in biblical accounts dating to the time of Abraham (the first of the Hebrew patriarchs) and the destruction of Sodom and Gomorrah (the two cities along the lake according to the Hebrew Bible, that were destroyed by fire from heaven because of their wickedness).

The Dead Sea was home to one of the most important discoveries in modern archaeology. In 1947, the Dead Sea Scrolls were found in 11 caves near the ruins of Qumran on its northwestern shore. These ancient manuscripts date from around 250 BC to 68 AD. Whilst the Dead Sea is one of Israel's most popular tourist destinations, it's disappearing at an alarming rate. Its surface level is dropping by more than one meter every year and it's only half the length it was just a century ago.

Saksham Jain Benjamin Lal,  
Class VIII



# *Imaginibus*



*Jorhat, Shrey Modi, Class XI*



*Darjeeling, Shambhavi Jindal, Class VIII*

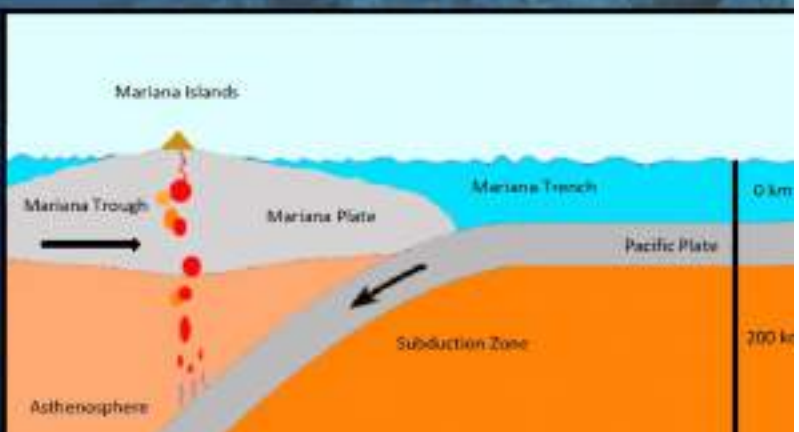


# Mariana Trench

Humans have always been inquisitive about things that are not familiar, not known. The unknown, in all senses of the word, is something that has forever urged people to take steps to find out, to discover, to make it known. One of the many mysteries that is still unravelling till date is the Mariana Trench.

Located in the western Pacific east of the Philippines and an average of approximately 200 kilometres east of the Mariana Islands, the Mariana Trench measures more than 2,550 kilometres long and 69 kilometres wide on average. It plunges into a black void which hosts the deepest known location on earth which is the Challenger Deep, 11,033 metres beneath the sea level. The trench was formed by subduction; the western edge of the Pacific plate was thrust beneath the smaller Mariana plate causing the deep fracture to form.

At its deepest point, the trench dips into a little explored zone of the ocean; The Hadal Zone. It was named after Hades, the lord of the realm of the underworld in Greek mythology. It is an appropriate title for a place where the conditions of pure darkness, freezing cold temperatures, scarce sources of food and immense pressure, create a challenging environment for creatures to survive in. For much of history, it was deemed to be a dead zone, void of any life at all.







Little is known about the lifeforms inhabiting the trench, but despite the lack of light, freezing and acidic conditions, more than 200 known microorganisms and small creatures, including amphipods and crustaceans, have been living there. The organisms discovered in the Mariana Trench include bacteria, crustaceans, sea cucumbers, octopuses and fishes. In 2014, the deepest living fish, at the depth of 8000 meters, Mariana snail fish was discovered near Guam.

The deep sea fauna has also found alternatives to sunlight, as a source of energy and light. Some have developed much sharper vision while some have abandoned the need for vision, as they rely on touch and vibration. The bioluminescent organisms produce light themselves to attract mates or startle prey. To compensate for the absence of photosynthesis, they rely on chemosynthesis carried out by the bacteria, which turns inorganic substances into organic. Research about the great depths of the trench will continue for years to come, and humankind will lead to explore strange new worlds and to seek out new forms of life.

Sanjana Barooah,  
Class XII



# Northern Lights

## *Aurora Borealis*

Natural phenomena are those that occur or manifest without human input. And so, there's this one interesting phenomenon that happens in Norway, called the northern lights. They are one of the most captivating, mystical beauty of nature that occurs. Between late September and late March, Northern Norway is dark from early afternoon until late morning, and the northern lights frequently soar across the sky.

So how do these lights occur? They are created from a collision between electrically charged particles from the sun that enter the atmosphere of the earth. Its appearance and intensity are controlled by the sun's activity and its location depends on the earth's magnetic field. There's a myth about the Northern Lights of Norway. In Norway, the Northern Lights were believed to be the souls of old maids dancing in the heavens and waving at those below.

An aurora is a natural light that display those shimmers in the sky. Colourful blue, red, yellow, green, and orange lights shift gently and change shape like softly blowing curtains. What causes the colours? The colours most often associated with the aurora borealis are pink, green, yellow, blue, violet, and occasionally orange and white. Typically, when the particles collide with oxygen, yellow and green are produced. Interactions with nitrogen produce red, violet, and occasionally blue colours.





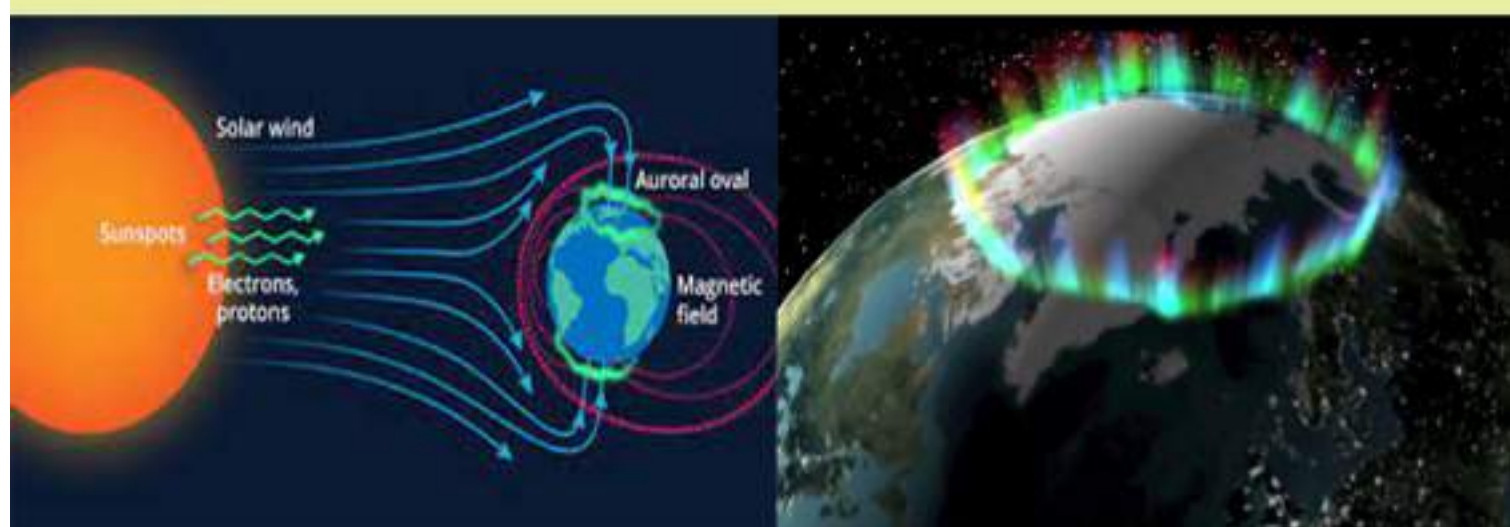
The northern lights are always present, but winter is usually the best time to see them, due to lower levels of light pollution and the clear, crisp air. September, October, March and April are some of the best months to view the aurora borealis. Are they visible from space? Satellites can take pictures of the aurora from Earth's orbit. In fact, auroras are bright enough that they show up strongly on the night side of the Earth even if one were looking at them from another planet.

What is the impact of the Northern Lights of Norway? The Northern Lights occur so high up in the atmosphere that they don't pose any threat to people watching them from the ground. The aurora itself is not harmful to humans but the electrically charged particles produced could have some potentially negative effects to infrastructure and technology. The aurora are essentially photon emissions from nitrogen and oxygen molecules, so we can't really touch it - even the gas that emits the photons is hard to quantify.

The northern lights look like a fire, but they wouldn't feel like one. Even though the temperature of the upper atmosphere can reach thousands of degrees Fahrenheit, the heat is based on the average speed of the molecules. After all, that's what temperature is. But feeling heat is another matter - the density of the air is so low at 60 miles (96 kilometres) up that a thermometer would register temperatures far below zero where aurora displays occur.

How long does aurora borealis last? The Northern Lights most commonly appear between 5:00 pm and 2:00 am. They don't usually exhibit themselves for lengthy periods of time - they may only show for a few minutes, then glide away before returning later.

Fariha Zaman,  
Class X





# The Loktak Lake

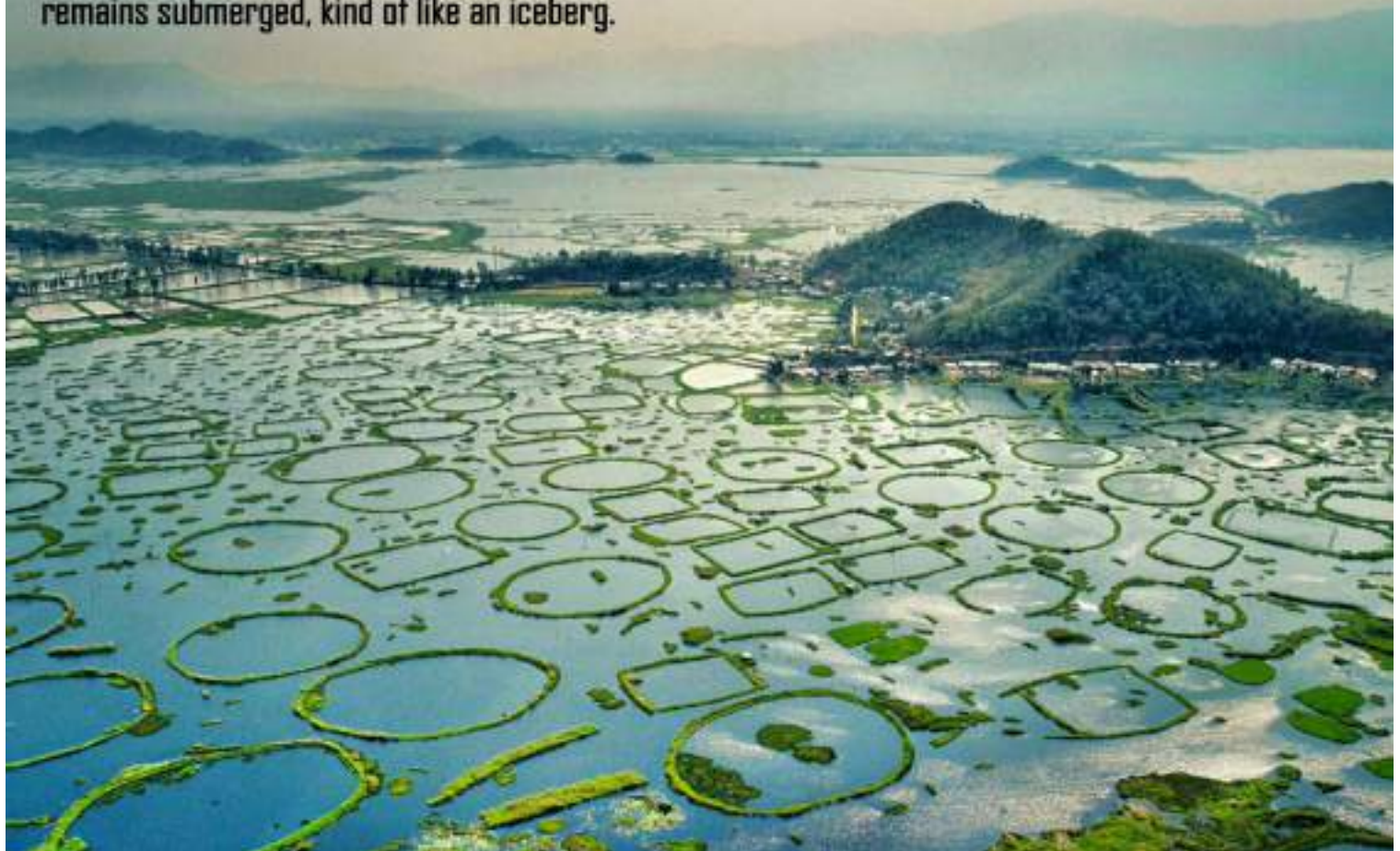


## *Phumdis:* *The Floating Islands* *of Manipur*

Phumdis are a series of the floating archipelago, exclusive to the Loktak Lake in Manipur state, in north-eastern India. They cover a substantial part of the lake area and are heterogeneous masses of vegetation, soil, and organic matter, in different stages of decay. The large mass of Phumdi is in the south-eastern part of the lake, covering an area of 40 sq. km (15.4 sq. miles).

This mass constitutes the world's largest floating park, named Keibul Lamjao National Park. The Park was formed to preserve the endangered Eld's deer subspecies, called "Sangai" in the Meitei language, which is indigenous to this area.

Phumdis are used by the local people for constructing their huts for fishing and other livelihood uses and is inhabited by about 4000 people. They are formed of soil, organic debris, and matted vegetation that are in various stages of decomposition. The thickness of these floating islands varies from a few centimetres to around two meters. 20% of this thickness surfaces above water while the rest remains submerged, kind of like an iceberg.







During the dry season, the water level in the lake falls significantly so that the roots of the Phumdi vegetation touch the lake bottom and seep nutrients from it. During the rains, the Phumdies get disconnected from the lake floor as water levels rise in the lake, allowing them to then float on the water. The cycle continues and allows the Phumdies to survive. Athapums are artificial circular Phumdies, built by the villagers as enclosures for fish farming; aquaculture has caused a proliferation of the Phumdies in the lake.

The largest of all the Phumdies in the lake is situated in the south-eastern region of Loktak Lake, which forms the Keibul Lamjao National Park. This Park is the last natural refuge of the endangered Manipur brow-antlered deer (*Cervus eldi*), locally known as the "Sangai" one of the three subspecies of the Eld's deer listed as an endangered species by the IUCN.

Apart from the brow-antlered deer, which is the flagship species of the park, other fauna found in the park are mammals, reptiles, and migratory and resident avifauna species. The proliferation of Phumdies, coupled with a severe infestation of the lake by water hyacinth, has substantially impeded water circulation and caused an increase in siltation and deposit of pollutants in the lake ecosystem.

The building materials used to build huts on the Phumdi blocks sunlight from reaching the lower depths of the lake water, which has resulted in the formation of vertical profiles of the lake water body. Further, pesticides and insecticides are used for catching fish or as an insect repellent. Processes of decay release toxic gases such as methane and hydrogen sulphide and reduce dissolved oxygen. This causes the lake water to degenerate into a eutrophic condition, creating a dead water zone called the hypolimnion. Above the hypolimnion is a thin layer, known as epilimnion, where fish survive to some degree. The benthos is becoming increasingly thick, causing not only pollution of the lake water but an increase in the shallow parts of the lake.

Anvita Dey, Class X



# *Imaginibus*



*Kaziranga, Shrey Modi, Class XI*



*Brahmaputra, Zainab Khan, Class XII*



# The Amazon Rainforest

First of all, where is the Amazon rainforest?

It is located in South America and spreads over an astonishing 5.5 million sq./km. It is extremely rich in the ecosystem and houses around 40,000 plant species, 1,300 bird species, 2,200 types of fish, 427 types of mammals, 430 amphibian species, 380 reptile species, and a staggering 2.5 million different varieties of insects. It is the largest

forest that grows in the tropics of the Amazon River that lies in a basin drained on the whole by it with 1100 tributaries. The forest is enveloped by an extensive cover of a moist broadleaf forest of about 7 million sq./km of which 5 and a half sq./km is covered.

The region also includes territory belonging to 9 nations. The majority of the forest is contained within Brazil and also Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname and Venezuela. It was formed at least 55 million years ago and also more than one-third of all species are found in the rainforest.





It is stated that when it rains there, it takes about 10 minutes to reach the ground level because the forest is so thick that the ground remains permanently in darkness. Only 1% of the sunlight makes it to the forest ground as well, making it completely dark. It is also known as the carbon sink because it absorbs CO<sub>2</sub> and stores it. So, it is a major player in maintaining carbon levels globally and with that, it is also the richest tropical forest in the world in terms of biodiversity. One-fourth of the world's western medicine uses ingredients from the Amazon rainforest. 70% of the plants, which work against the cancer cell, come from the Amazon rainforest.

However, in the 20th century, Brazil's population grew overnight. People began settling in metropolitan areas of the Amazon rainforest. They used slash and burn techniques to create grazing farmlands. The size of the Amazon rainforest shrunk dramatically. The destruction of large sections of the forest generated worldwide concern. Various international bodies joined and helped the Brazilian government to conserve efforts and to protect the forest.

If the Amazon rainforest is destroyed, rainfall will decrease around the forest region. This would cause a ripple effect, and prompt an additional shift in climate change, which would result in more droughts, longer dry spells, and massive amounts of flooding. Everyone should play their part in spreading awareness and making active decisions to save forest life around the world.

Kibpriya Yesmin Ullah,  
Class XI





# The Giant's Causeway



The Giant's Causeway is a place where myth and science meet. Either it was formed by the geological action of an underwater volcano or by a giant named Finn MacCumhaill, who is believed to have built it as part of a causeway to the Scottish island of Staffa (which has similar rock formations). I am sorry to break it to you, but the latter is only a folklore.

As a matter of fact, the place got its name from that folklore itself.

The Giant's Causeway lies on the edge of the Antrim plateau between Causeway Head and Benbane Head, approximately 40 km northeast of Londonderry. There are approximately 40,000 of these stone pillars, each typically with five to seven irregular sides descending gently into the sea. To elaborate more on its formation, the Giant's Causeway resulted from successive flows of lava inching toward the coast and cooling when they contacted the sea. Layers of basalt formed columns, and the pressure between these columns sculpted them into polygonal shapes that vary from 38 to 51 cm in diameter and measure up to 82 feet in height. They are arrayed along cliffs averaging around 330 feet in elevation.

The coastline of County Antrim in Northern Ireland is renowned for its scenic beauty, possibly the world's best driving routes, the Causeway Coast Route, clinging to its edge. The Giant's Causeway, sitting at the northern end, takes centre piece as the crown's unique jewel, known as the 8th Wonder of the World to many in Ireland and beyond. Subsequently, the site was designated as a UNESCO World Heritage Site in 1986. It is protected not only for its beauty but also because its cliffs, seashores, marshes, and grasslands are home to some 50 species of birds, as well as to more than 200 species of plants. Humans settled around the Giant's Causeway in the 19th century, but the site is now uninhabited. It does, however, attract approximately 300,000 tourists annually. Its unique rock formations have stood as a natural rampart against the unbridled ferocity of the North Atlantic storms for nearly sixty million years. The rugged symmetry of the columns never fails to intrigue and inspire visitors. To stroll on the Giant's Causeway is to voyage back in time.



Yashodhara Mahanta, Class XI



# The Grand Canyon

The Grand Canyon is a geographical feature adored for its breath-taking shape and colourway, located in the magnificent state of Arizona in America. The Canyon lies on the southwestern portion of the Colorado Plateau, which occupies a large area of the southwestern United States and consists essentially of horizontally layered rocks and lava flows.

Through the canyon runs the majestic Colorado river and along with this intricately sculptured abyss of the canyon, and between its outer walls lie a series of astounding peaks, mounts, gorges, and ravines. The greatest depths of the Grand Canyon are laid more than a mile below its rim. The deepest and most spectacularly beautiful section, 90 km long, is within the central part of Grand Canyon National Park which encloses the Colorado river's length from lake Powell to lake Mead.

The Grand Canyon's colorway ranges from different hues with consideration to its lamina which includes red, buff and grey, delicate green and pink, or in its deepest depths, brown, slate-grey, and violet! Although the main attraction of the canyon is its splendid view, it also holds a rich history of the rocks that owe the canyon its name to being called "The Grand Canyon".





By the processes of erosion due to the river Colorado running through it and also because of weather phenomena (but with no deposition of any sort of minerals from the mentioned erosion processes), the Grand Canyon is composed of crystallized, twisted, and contorted unstratified rocks of the inner gorge. At the bottom of the canyon are Archean granite and schist which age back to 2.5 billion years.

Hence, rock formations of considerably different ages are separated only by a thin distinct surface that reveals the vast unconformity in time. In the canyon, not many plants (bush vegetation) and fossils are found because the age of the rocks found in the canyon are mostly primitive algae and marine species like mollusks, corals, trilobites, and other invertebrates.

The canyon is also home to various species of animals. Both varied and abundant. Common mammals are the many varieties of squirrels, coyotes, foxes, deer, badgers, bobcats, rabbits, chipmunks, and kangaroo rats. In addition, the canyon region is home to a great many species of bird including raptors such as bald eagles and peregrine falcons, and the rare Californian condor. Fish species include trout and (in the Little Colorado River) the rare humpback chub. The Grand Canyon still remains a homeland and a sacred place to a number of Native American cultures, a point of emergence for some, offering us an opportunity to consider powerful and spiritual ties.

Riiariti Sohliya, Class XI





# The Greatest Desert- Sahara

*"What makes a desert beautiful is that somewhere in the vast expanse of sand, hides a well." - Antoine de St. Exupery.*

*The Sahara is one of the largest hot deserts on Earth, comprising much of North Africa; covering 3,500,000 square miles of the continent. It is bordered by the Atlantic Ocean in the west, followed by the Atlas Mountains in the north, along with the Mediterranean Sea, Red Sea in the east and Sahel in the South. This desert also spans 11 countries, namely Algeria, Chad, Egypt, Libya, Mali, Mauritania, Morocco, Niger, Western Sahara, Sudan and Tunisia.*

*The climate in Sahara is not one for the faint of heart; the normal temperature is 30°C whereas the highest temperature ever recorded was 58°C. The desert hardly receives rainfall; it rains less than 100 millilitres per year. The Sahara has a variety of physical features that include ergs, regs, Hamada, and oases. It is most famous for the sand dunes which can reach almost 600 feet high; but they cover only about 15 percent of the entire desert.*

*As we all know about the Sahara's harsh climatic conditions, life in the Sahara is quite difficult as you can imagine, the populace is nomadic, moving location with the seasons; even if they live permanently, it's near irrigated places to raise crops.*

*Now if we come to the animals that inhabit this seemingly alien terrain, there are around 500 species in Sahara. 70 of them are mammals, 90 are avian, and 100 are some forms of reptile. The Addax, also called the white antelope, is native to the Sahara, and is quite well adapted to the desert as it can live without water or proper nutrition for extended periods of time. They also have broad and flat soles because of which they do not sink in the desert sand.*



*Ahona Chowdhury, Class V999*





# Is your passport ready



U	N	K	E	G	C	H	I	N	A	A	I	C	S
N	U	K	R	A	I	N	E	I	H	L	K	O	A
I	U	A	I	N	A	Z	N	A	T	G	S	N	U
T	G	L	I	H	K	D	I	I	L	E	P	G	D
E	A	D	N	A	U	U	A	R	I	R	I	O	I
D	N	E	I	N	A	R	I	N	D	I	A	S	A
K	D	A	N	I	G	E	R	I	A	A	D	P	R
I	A	R	N	E	A	P	D	U	U	C	N	A	A
N	A	I	S	Y	A	L	A	M	N	N	A	I	B
G	S	N	A	R	I	G	Z	R	D	B	L	N	I
D	A	N	S	A	A	M	R	U	B	S	I	G	A
O	A	A	N	I	T	N	E	G	R	A	A	N	N
M	I	E	A	N	A	H	G	N	I	A	H	I	A
N	U	I	A	L	S	N	I	D	A	A	T	A	I

CHINA  
CONGO  
THAILAND  
MALAYSIA  
BURMA

PERU  
CANADA  
ALGERIA  
UGANDA  
SAUDI ARABIA

UKRAINE  
IRAN  
GHANA  
SPAIN  
INDIA

UNITED KINGDOM  
ARGENTINA  
NIGERIA  
TANZANIA





**Patron : Dr. Vidhukesh Vimal,  
The Headmaster  
The Assam Valley School**

**Editor-in-Chief : Sanjana Barooah  
Design team : Shrey Modi**

**Luqmaan Ahmed  
Saumya Jindal**

**Correspondents : Donovan Figg  
Yashodhara Mahanta  
Luvish Sharma**

**Teacher Incharge : Ms. Kamalica Bhowmick**

**Publisher : The Assam Valley School  
Balipara, Asom-784101**

*A Geography Department Publication*

*October 2021*

*Disclaimer : The opinions and views expressed by the writers are their own and not endorsed by The Assam Valley School*

