



HABS

GEOGRAPHICAL



FOCUS ON

OCEANS

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Danielle McCarthy



Gideon Daitz

A Message from our Editors

Gideon and I take great pride in welcoming you to the 16th edition of the **HABS Geographical magazine**, with its focus on 'Oceans'. This expansive topic has allowed us to present to you a wide variety of highly intriguing articles, ranging from the discovery of the world's largest sink-hole to the dangers that oceans are facing in the twenty-first century. After a plethora of engaging articles, we would like to thank all those who submitted entries and to not be too disappointed if your article did not make it into the publication this time around – there will be plenty more opportunities moving forward, so keep writing!

A special thanks goes to Mr Bown and Miss Nanji for their continued support and guidance as well as the HABS Geographical Committee from both schools. We hope you enjoy reading this term's issue and are inspired to write your own article for the next edition!

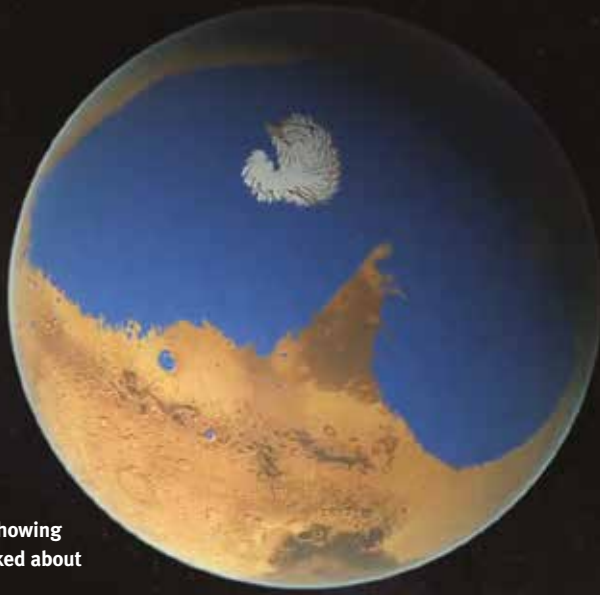
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Contents

The blue and red planet – Mars ocean hypothesis	2
Hannah Oliver (Y12)	
The dangers oceans face	4
Alex Marskell (Y11)	
Plastic pollution	6
Joseph Gale (Y12)	
The answer to climate change: has it been tide up in our oceans all along?	8
Annabel Paterson (Y12)	
The ocean is rising	10
Anjali Mulcock (Y10)	
Oceans – treat or threat to society?	12
Veylan Sebastian (8J2)	
Oceans: the 21st century gold rush	14
Nikita Sarkas (Y12)	
Crossword: the ocean	16
Girls School	
The Quiz	17
Boys School	
Interview: Miss Nanji	18
Francesca Devonshire and Amanda Leow (Year 12)	
Dragon Hole	20
Francesca Devonshire (Y12)	
Sea gypsies	22
Amanda Leow (Y12)	
Why orcas should not be held in captivity	24
Pebbles Fisher (Y12)	
The real cost of Rio 2016	26
Michael Miller (Y12)	
Above the surface: Hurricane Matthew	28
Paras Shah (Y12)	
Why are we still reliant on petroleum?	30
Ram Patel (7R)	
Book review	32
Anandita Ketkar (Y13)	



An artist's impression, showing how Mars may have looked about 4 billion years ago.

The blue and red planet –

Mars ocean hypothesis

HANNAH OLIVER (Y12)

Time and time again we have heard about the oceans on Earth. Covering about 71% of the planet, the Arctic, Atlantic, Indian, Pacific and Southern oceans are constant in our lives. They are so valuable to us, providing things from food to transport, if we lost them there would be no rain, no summer cruises, no coral reefs, not even a delicious fish finger left!

However, while we talk about the significance of oceans on Earth, have you ever wondered if we were the only planet to contain such an amazing ecosystem?

Approximately 3.8–4.1 billion years ago, it has been suggested that nearly a third of the surface of Mars was covered by an ocean of liquid water. This primordial ocean, christened the Paleo-Ocean, filling the Vastitas Borealis basin in the northern hemisphere of the planet, would have been larger than the Atlantic Ocean. It is an unusual idea as we refer to Mars as the desolate, dry, dusty Red Planet, full of unfriendly aliens and an even more hostile atmosphere.

In the 1970s, NASA's Viking program sent off a pair of American space probes to Mars, Viking 1 and Viking 2. On the 20th July 1976, the Viking 1 lander touched down on the surface of Mars, and was joined by Viking 2 on 3rd September. The space probes began image-documenting the planet, with results being sent back to Houston. The images showed features suggesting two possible ancient shorelines, thousands of kilometres long, called Arabia and Deuteronilus, existed near the pole on Mars. Additional geographical features were also discovered later on, similar to oceanic and river features on Earth, such as networks of gullies combined to form larger channels that resemble ancient riverbeds on Earth.

“Mars could have been a beautiful blue and red planet, once upon a time.”

But how could an enormous ocean covering Mars be possible?

Firstly, Mars' atmosphere is not dense enough to have water existing in liquid form, nor is the planet warm enough to contain liquid water, with a temperature range of -125°C to only 20°C , even in the summer. This means that if there was water on Mars it would be in solid form. So, instead of oceans, researchers would find evidence of glacier erosion and transportation. Hence, for this hypothesis to be correct, we must imagine a younger Mars with conditions that allowed liquid water to exist on its surface. Perhaps, early Mars had an atmosphere similar to Earth's, containing insulating carbon dioxide, which could create a greenhouse effect to keep the warmth of a weak, juvenile sun within the atmosphere. Then the surface temperature would be warm enough (above the freezing point of water) for water to be in liquid form.

So, maybe Mars could have been a beautiful blue and red planet, once upon a time. But where have its oceans gone? Was there a change in the atmosphere or temperature that resulted in leaving the planet arid in this modern age? Much remains unknown about how Mars lost its water and how much liquid water might remain in underground reservoirs, which could still contain the last survivors of Mars' life forms.

Scientists cannot know if this hypothesis is accurate until they have explored Mars more thoroughly however, it does give us hope that there is another planet out there, which contains life like ours.



The dangers oceans face

ALEX MARSHELL (Y11)

Oceans are key to day-to-day life, no matter where in the world you call home. They hold 97% of Earth's water, produce over half the oxygen in the air and indirectly produce \$500 million in terms of the ecosystem services they provide directly and indirectly to the communities and industries which depend on them. As of now, Oceans face great danger, which would have disastrous consequences,

should human society continue choosing to ignore the warning signs.



Fig. 1 Ocean map

Oceans cover 71% of our planet and are home to thousands of different species, many of which are under great risks. 70% of all fish species in the ocean are either extinct or heavily endangered, due to the basic method most damaging to oceans

– fishing. With millions of people fishing all over the world, fish are captured so fast, that it is affecting those whom they eat and those who eat them. The unsustainable demand for fish has risen, and fishermen have had to match it and increase their capturing rate, fracturing life in the process.

Despite the threat coming from those who make a living at sea, human activity also contributes to a majority of ocean pollution. The rubbish that human society leaves behind and throws into the oceans is often non-decomposable



Fig. 2 Polluted waters of the ocean

extraction and subsequent use, an unprecedented amount of carbon dioxide has been emitted into the atmosphere. As a result, different species are finding it very hard to survive in these conditions because the acidity of the water has become unsuitable for living conditions. After the Industrial Revolution, the ocean acidity went up by 25%, so if this issue does not get resolved, there will be even more marine species dying out.

The temperature of oceans is substantially warmer than it was 100 years ago, due to changes in the atmosphere. This means ocean warming, or thermal expansion is another major concern that has been showing recent signs of long-term danger. As the temperature of the air increases, so does the temperature of the oceans, with the top layer increasing at an average rate of 0.2°F every ten years. This is very fast, and it is only predicted to go up further over time, unless less greenhouse gases are emitted into the atmosphere. The main impact of thermal expansion is a rising eustatic sea level, as well other indirect impacts such as an increase in frequency and magnitude of tropical storms.

From these issues we can see that a much more proactive approach is needed in the short term in managing our oceans sustainably.

Sources:

<http://www.worldoceansday.ca>

<https://www3.epa.gov>

<http://www.protectplanetoocean.org>

and therefore there is no escape for animals from hazards such as plastic bags or sweet wrappers, as shown in Fig. 2. Thousands of deaths are caused every year by litter that ends up in the oceans because various creatures get tangled up in it.

Oceans absorb one third of carbon dioxide in the world, but due to our increased reliance on things such as fossil fuels and a rise in their

Plastic pollution

JOSEPH GALE (Y12)

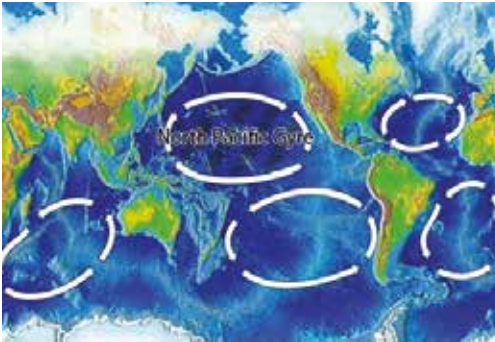


Fig. 1 Great Pacific Garbage Patch

Pollution is defined as the presence in or introduction into the environment of a substance which has harmful or poisonous effects. But how dangerous can marine pollution really be to humans? Should governments move their focus from air pollution to marine pollution in an attempt to give more attention to an equally big geopolitical issue? I will be focusing on the impacts of plastic pollution on the marine environment.

Plastic is a perfect multifunctional, lightweight and cheap material and the industry employs 1.45 million people in Europe alone. Plastic is also the perfect way to kill fish. Humans should be able to use cost-benefit analysis to realize plastic is not worth its detrimental effects. There is 5.25 trillion pieces of plastic currently in our oceans; that's 8 million tonnes per year being dumped carelessly into the water – the equivalent of 1 truckload per minute! Specifically 5 newly developed countries: China, Indonesia, Vietnam, Thailand and the Philippines are contributing to 50% of the plastic in the oceans in a quest to boost their economies whilst making the environment pay. Europe recycle 40% of their plastic every year whereas USA only recycle 8%, substantiating the dichotomy of priorities between two of the most developed regions whilst highlighting the need for improvement.

“Europe recycle 40% of their plastic every year whereas USA only recycle 8%”

The Great Pacific Garbage Patch is an area to the north of The Pacific Ocean located at 135°W to 155°W and 35°N and 42°N; this is where there is the highest concentration of plastic debris due to the large surface area and low density trapping plastic in the North Pacific Gyre current (Fig.1). This is where 700 species of fish are affected by plastic. The plastic waste is not biodegradable due to the strong, long polymer chains of carbon and hydrogen atoms; the properties of being strong, durable and being able to float make it so useful on land but so dangerous in water.



However, the plastic has a tendency to fissure into smaller particles called micro beads that are microscopic (half the diameter of a human hair) and toxic. The plastic is eaten by the fish, which in turn causes choking, intestinal blockage and starvation as they cannot digest or absorb the plastic. A case study found that 1 fish had 83 micro beads inside. Plastic bags can be mistaken by a fish, as a jellyfish and plastic pellets can be mistaken by sea-birds as fish eggs – detrimental. Moreover, plastic when ingested can be mistaken by the endocrine system as estradiol, causing hormone disruption in affected animals and fish. The main species affected by plastic are sea turtles, sea-birds, black-footed albatross' and zooplankton. Seals are also affected with plastic entanglement killing 40,000 seals a year in 1970's – this form of death is horrible with the plastic restricting movement, in turn causing an abundance of energy being used and eventual starvation.




Fig. 2 Sea-bird with plastic inside

Furthermore, ecosystems are being damaged and food chains are being interfered with. For example, a human disposes a plastic bag, which is then dumped into the ocean (this act has been illegal since 1988 but is hard to enforce) then a sardine eats part of the plastic that is then eaten by a human causing food poisoning. In essence humans are poisoning themselves, affecting tourism, contributing to global warming and killing our marine life. Despite awareness being raised by people like Maria Cristina Figueira of UNESCO through campaigning and ocean clean-up barriers being put in place, there is still a lot more that can be done. The population should stop making plastic a necessity and start recycling.

Sources:

<http://www.whoi.edu>
Google Images
www.plasticseurope.org
wikipedia



The answer to climate change: has it been tide up in our oceans all along?

ANNABEL PATERSON (Y12)

An apparent cease in the increase in global warming has puzzled scientists as the question arose – where has the excess heat previously in our atmosphere gone?

“An apparent ‘Global Warming Hiatus’ emerged, baffling scientists and meteorologists alike”

Throughout the late twentieth century, the ever-rising temperature of our atmosphere seemed an issue that was getting more pressing. However, from the turn of the millennium, a plateau in the annual

temperature statistics began to occur and what was initially thought to be a simple anomaly in the previous pattern, developed into a trend. An apparent ‘Global Warming Hiatus’ emerged, baffling scientists and meteorologists alike and prompting a hunt for the ‘sink’ where our missing atmospheric heat is being stored.

After more than a dozen theories being suggested and disregarded, a study conducted by Ka-Kit Tung and Xian Yao Chen of ‘Ocean University China’ seems to have found the answer to the speculations on the location of this sink. Their research involved studying networks of sensors worldwide and concluded that the absent heat from the surface of the earth is being stored in the depths of the Atlantic Ocean. Previously it has been believed that the Pacific Ocean was trapping the mysterious missing heat, however this is not the case.

This process of heat transportation is said to be caused by a slow moving system of Atlantic Ocean currents, known as the 'Conveyor Belt', which carries heat between the North and South poles. The speed of these currents is what drives the acceleration of global warming, which in turn is caused by salinity levels of the Atlantic Ocean. When the water is more saline, the denser northern Atlantic water near Iceland swiftly plunges up to a mile deep, taking the heat with it and moving the warmth away from the surface, which subsequently has less of a heating effect on the atmosphere.

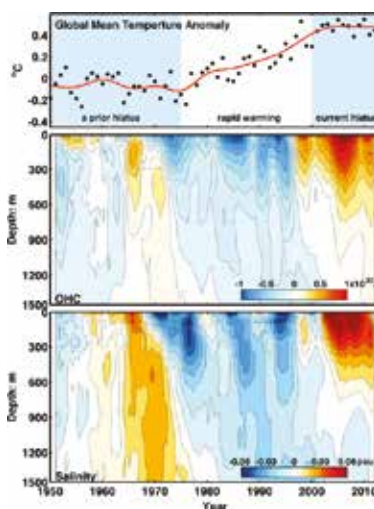


Fig. 1

According to Tung and Chen, this salinity change occurs in cycles of about 30 years with historically warm periods being followed by cooler years. This would account for the changes in global temperature shown in Figure 1, which shows the temperature changes in the last 60 years, making the duration of the current hiatus approximately 15 years and suggesting that the period of stability is coming to an end. This assumption has been supported by Tung's observation that the current 'Conveyor Belt' cycle is slowing down, suggesting to scientists that we will soon transition into the next cycle, as the salinity levels of the Atlantic begin to decrease.

It is important to remember global warming hasn't stopped entirely, but simply slowed down, meaning it's only a matter of time until the problem resumes. However, it buys a little more time for the world to try and combat this issue and truly stop it for good.

"The frightening part," reflected Tung, "is it's going to warm just as fast as the last three decades of the 20th century, which was the fastest warming we've seen."

However this time, global warming will commence from a greater temperature than ever before – and the only way is up.

Source: www.washington.edu

The ocean is rising

ANJALI MULCOCK (Y10)

Global ocean levels have been gradually rising for a long time now, but to what extent has human society realised this incremental increase? According to core samples, tide gauge readings and satellite readings, the Global Mean Sea Level (GMSL) has risen by ten to twenty centimetres over the past century. This may not sound like much, but the worrying thing is how the rate of the rise has increased over the years. In the last twenty years, the annual rate of the rise has been 3.2 millimetres, which is roughly twice the average speed of the preceding 80 years. So why is this?

The cause of the rising levels of the ocean is arguably global warming. This cause can be split into three main factors. The first is thermal expansion. Over the past century, the burning of fossil fuels and other human and natural activities has released enormous amounts of heat, trapping gases into the atmosphere. These emissions have caused the Earth's surface temperature to rise, and the oceans absorb about 80 percent of this additional heat. If we all remember our Physics lessons, when water is heated up it expands. So, about half of the past century's rise in sea level is caused by warmer oceans simply occupying more space – known as thermal expansion.

“By 2100 sea levels will rise enough to swamp many cities along the US East coast,”

The second factor is the melting of continental glaciers and ice caps. It is quite natural for large ice formations to melt back a little into the sea each summer; because this is

usually balanced out by snows later in the winter, made primarily from evaporated sea water. But recently, high persistent temperatures have caused greater-than-average melting of glaciers as well as diminished snowfalls later. This imbalance results in significantly more ice melting into the sea, causing ocean levels to rise.

The third factor is ice loss from Greenland and West-Antarctica. Similar to the glaciers and ice-caps, increased heat is causing the massive ice sheets that cover these two





Potential flooding throughout London

places to melt at an unnaturally accelerated pace. The ice sheets sit on the Earth's solid crust and when the ice-sheets melt, the crust springs up, releasing pressure. This uplift, called post-glacial isostatic rebound, means that scientists cannot track changes in surface elevation and therefore cannot measure how much an ice sheet is shrinking. Instead, they use GPS stations to collect data from the bedrock and this new information shows that earlier studies underestimated the mass loss. This means that a lot more ice has been melting than had initially been thought. Scientists also now believe that seawater is finding its way under the ice sheets, effectively lubricating them so they slip more easily into the sea, contributing to rising sea levels.

You may now be wondering, how is this a problem? The answer is; rising sea levels affect a lot of people. Hundreds of densely populated cities like Venice in Italy, and coastal islands are now at risk of being claimed by the ocean. Many places that are not at immediate risk now, soon will be. Millions of people live in areas that will become increasingly vulnerable to flooding. High sea levels would force them to leave their homes and relocate, and lots of islands will be submerged completely. However, humans won't be the only ones affected. When sea levels rise rapidly, as they have been doing, even a small increase can have devastating effects on coastal habitats. As seawater reaches further inland, it can cause destructive erosion, flooding of wetlands, contamination of aquifers and agricultural soils, and lost habitat for fish, birds and plants. And the problem is ocean levels will continue to rise as long as global warming continues. A recent study has predicted that if oceans continue to rise at this rate, by 2100 sea levels will rise enough to swamp many cities along the US East coast, and eventually the Greenland ice sheets will eventually melt completely. To give you an idea of how devastating this would be, the ocean would rise enough to submerge London.



An underwater scene with two sharks swimming towards a bright light source, likely the sun, creating a silhouette effect. The water is a deep blue with visible light rays and small particles.

Oceans – treat or threat to society?

VEYLAN SEBASTIAN (8)2)

“Being out there in the ocean, God’s creation, it’s like a gift he has given us to enjoy”

BETHANY HAMILTON

The increase in global warming is having a significant impact on both marine and terrestrial ecosystems. The threat of global sea-level rise in submerging cities and flooding coastal inlets poses a huge threat to the world’s most vulnerable communities. Until global warming became an ‘accepted’ threat, society ploughed on with a ‘business as usual’ approach. With the increase of

Oceans are arguably God’s gift to humans and all living things on this entire earth. Buddhism says all religions are like rivers and lead to the same sea of one taste – saltiness, which represents liberation. So, if we pause and think for a moment where are we all racing to?

global warming, oceans and terrestrial ecosystems are warming leading to the melting of continental based ice caps and subsequently eustatic (global) sea-level rise.

A major cause for global warming is pollution, such as cars and factories burning and being dependent on fossil fuels. Humans cannot stop global warming yet as our economies are dependent on burning fossil fuels.

Unless global warming is addressed and the rate of warming reduced, the oceans will continue to bare the brunt of the direct and indirect impacts.

One impact is ocean acidification. This is the ongoing decrease in the pH of the Earth's oceans, caused by the uptake of carbon dioxide from the atmosphere. An estimated 30–40% of the carbon dioxide from human activity released into the atmosphere dissolves into oceans, rivers and lakes. To achieve chemical equilibrium, some of it reacts with the water to form carbonic acid. Some of these extra carbonic acid molecules react with water molecules to give a bicarbonate ion and a hydronium ion, thus increasing ocean acidity. Warmer oceans also absorb less carbon dioxide, and have a reduced capacity to act as a carbon sink.

Importantly, the world's oceans are home to an abundance of marine life. The marine life ranges from whales to micro-organisms. Global warming affects marine life as the oxygen in water will escape as the heat that global warming produces decrease the solubility of oxygen in water, meaning that fish can't breathe in water as there is no oxygen. As the temperature rises, the solubility of gases in water decreases.

Moving forward, human society must do more to think about how we might sustainably protect our oceans and the valuable ecosystem services they provide.

“75% of the earth is covered with water. Although it may not be a striking balance it is still harmonious and humans have lived up to it.





Oceans: the 21st century gold rush

NIKITA SARKAS (Y12)

Behind the allure of gold lies a darker truth. Within recent history numerous issues, directly as a result of gold mining, have been brought to light. Among these are genocide, modern day slavery and widespread pollution. On land, gold has become increasingly dangerous and difficult to extract, often costing more to extract 'virgin gold' than its current trading price at approximately £32/g. The resultant decrease in supply has come at a time of worldwide financial insecurity; where many seek to shift their investments to gold. Although, a recent discovery has the potential to relieve the pressure from this fragile industry.

“The oceans currently hold close to 3.5 billion valued at about £120.”

The oceans currently hold close to 3.5 billion tonnes of gold within them; valued at about £120 trillion at current prices. The majority of this is dissolved within the oceans, whilst

a minority of gold remains undissolved the seafloor. The existence of large 'untapped' reserves of gold within the oceans has been known to us for years, however consistent advances within technology could mean that our usage of this gold may be coming sooner than expected. Prior reasons for not making

use of this resource lie predominantly with how the concentration of gold within seawater is on the order of parts per trillion. This means that gold makes up, on average, 13 billionths of a litre of seawater. In addition, undissolved samples of gold cannot easily be used in that they lie within rock multiple kilometres underwater.

Initial plans for the extraction of gold from the oceans focus on the prospect of deep sea mining. In fact, these plans may come into effect as early as 2018 with the Solwara 1 project near a hydrothermal vent (where concentrations of the valuable material within rocks is at its greatest) in the waters of Papua New Guinea. Immediate benefits from this include international investment in a floundering economy. Other benefits include the somewhat more obvious potential of being able to harvest both gold and copper from 1,036 meters underwater. However, not all are backing this idea. There are a variety of concerns which have been established, both by locals and others, perhaps concerned of the indeterminable future of this scheme.

With such great potential global and local benefits, the contest between environmentalists and those willing to invest in such ambitious seabed mining schemes is inevitable. Prior to risking any irreversible change, it is important for all to consider any viable alternative routes alongside further research in these niche fields.

Sources:

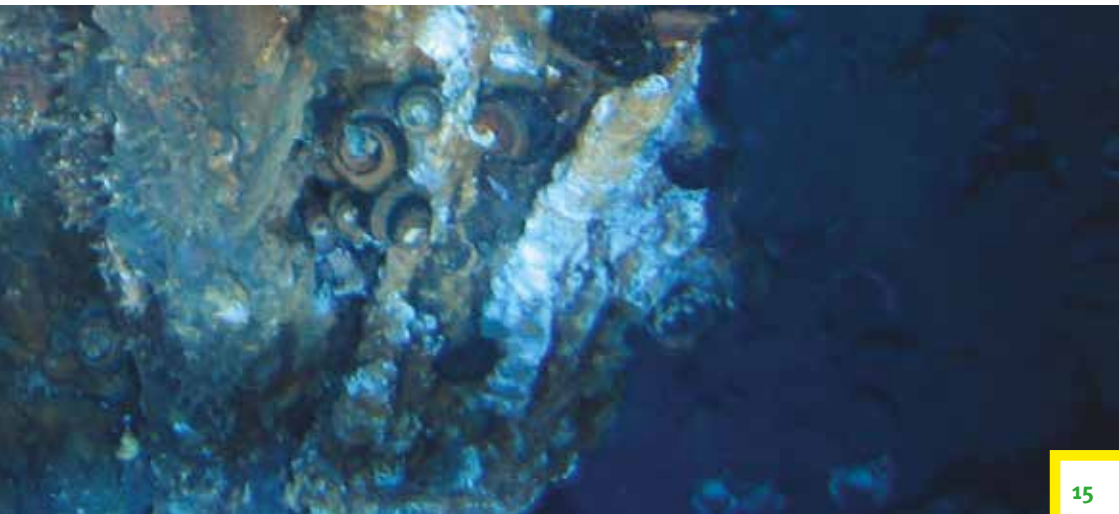
<http://news.nationalgeographic.com/2016/07/deep-sea-mining-five-facts/>

<https://www.revealnews.org/article-legacy/heres-what-you-need-to-know-about-the-deep-sea-gold-rush/>

http://www.thirdworldtraveler.com/Transnational_corps/Fools_Gold.html

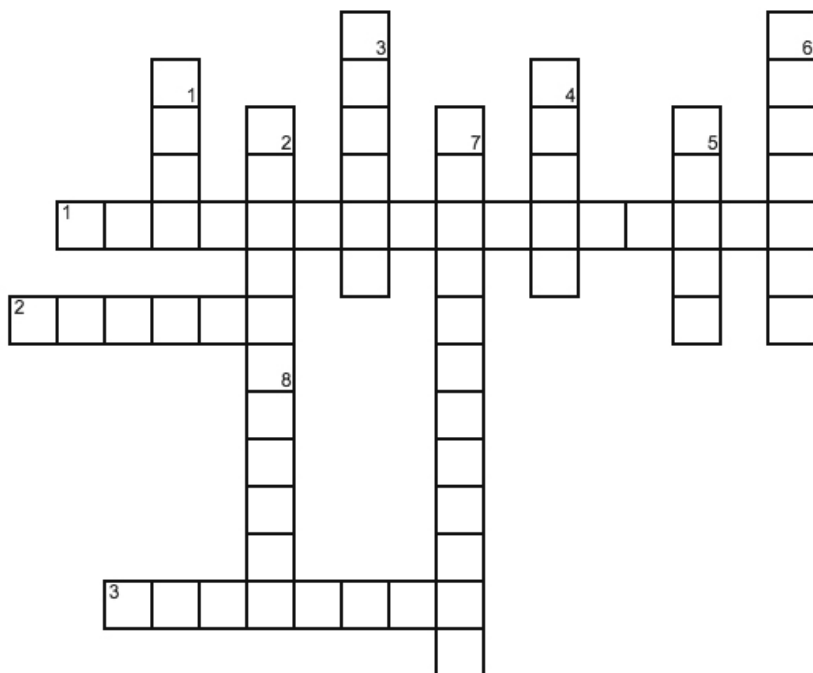
<http://www.goldrushnuggets.com/goldinocean.html>

“This means that gold makes up, on average, 13 billionths of a litre of seawater”



Crossword: the ocean

GIRLS SCHOOL



Across

1. The largest coral reef in the world.
2. What element of the ocean accounts for 70% of the gas we breathe.
3. There is a mountain range here longer than the Andes, Rockies and Himalayas combined.

Down

1. The number of oceans on earth.
2. Which language does the word pacific originate from.
3. The world's warmest ocean.
4. Caused by gravitational pull of the wind.
5. Large body of water.
6. The largest ocean in the world.
7. The deepest part of the ocean.
8. This sea was called the "Arabian Gulf" in most European sources up to the 20th century.

- 1 The largest volcano on Earth is located in Hawaii, what is its name?
- 2 What is the longest mountain range in the world?
- 3 What is the capital of Bermuda?
- 4 What name is given to hot fluid below the Earth's crust from which lava is formed?
- 5 What is the biggest country by area in North America?
- 6 What is a tundra?
- 7 What is the highest layer of a rainforest called?
- 8 Which ocean does the Amazon River empty into?
- 9 What is the largest land mammal found in the Arctic?
- 10 What is highest waterfall in the world?
- 11 What word beginning with 'C' describes the point at which two rivers or streams join?
- 12 Which two bodies of water make up the American Mediterranean Sea?
- 13 Which sea is also known as the Euxine Sea?
- 14 What is the highest mountain in Germany?
- 15 Can you name 3 US States beginning with A?

The Quiz

BOYS SCHOOL

Interview: Miss Nanji



Miss Nanji

FRANCESCA DEVONSHIRE AND AMANDA LEOW
(YEAR 12) INTERVIEW THE NEW HEAD OF GEOGRAPHY
AT THE GIRL'S SCHOOL ABOUT HER FAVOURITE SUBJECT.

Q: Why did you decide to do a Geography degree?

A: I started a History and Geography degree as I found both equally appealing and couldn't decide which I wanted to specialise in. As the year progressed, it became more apparent that a joint degree in two linked but not intertwined subjects run under two different faculties was not going to be straight forward; I had to make the difficult decision to drop one. While History had been the forerunner coming into my degree, Geography began to feel more relevant and exciting. My interest in the Arts and the Sciences could be linked. I enjoyed the options available for me to study in Geography from Globalisation (where one of the modules was 'Imagine a world without cheese') to the Geography of Japan, the Historical Geography of Latin America, Discovering Order in Geography and Glaciation.

Q: Why do you think Geography is such an important subject to study?

A: While it's clichéd to say it helps us to understand the world, perhaps we can validate this by thinking about the many different aspects of the world we live in and the broad nature of the subject that makes Geographers some of the most employable graduates. It helps us to study how nature affects how we live and how we live affects nature. It is constantly evolving and the broad skills that are a part of the subject allow us to prepare for an ever changing world. If we look at something like the UN's Sustainability Goals we can see all the different areas of Geography clearly outlined in the priorities of the 193 member states. With topics like climate change and migration making the news so regularly and terms like sustainability defining how we live and work, the value of studying Geography continues to increase.

Q: What is the most exciting thing about teaching geography?

A: The moment you take a group of students out of the classroom and you can see on their faces the connections they are making between what they have learnt and what they can see is one of the best things about being a Geography teacher. It is a subject that is evolving rapidly. For example with the continued development of GIS in Geography, I can now incorporate more technology in my teaching and can encourage students to be on their phones. My subject allows me to study maps and take students on fieldtrips. I can teach about Science and Maths in one lesson and be having debates about the merits of migration in another.

Q: What are your main areas of geographical interest?

A: My interests are broad as I enjoy all aspects of Geography. My degree is in both Human and Physical Geography so I studied a range of different topics including some economic, cultural, political and environmental Geography as well as hazards, demographics, agriculture and maps. My Geography dissertation was on Afghan Refugees and I continue to be enthralled by migration studies. However, I am also a keen physical geographer and Glaciation is a personal favourite of mine. If there was one thing that I could spend hours studying it would be maps of all sorts – from the tube map, to OS maps and GOAD maps, maps on the computer, road maps and different map projections.

Q: In your opinion, whose responsibility is it to help protect the oceans: is it us as individuals, the global community or the government?

A: The vastness and interconnectedness of oceans means that it cannot be just one of these options. It has to be on every level and from all people. There are so many aspects of the ocean that also need to be considered such as what constitutes international waters? How can we protect endangered species and coral? How do we monitor the oceans for hazards? Who has the right to use resources under the sea? How can we stop pollution in all forms of the ocean? It is important that governments work with a whole range of people including those that use the sea, those that pollute it and those that live by it as well as with NGO's and other countries to ensure that the Oceans are being protected.

Dragon Hole

FRANCESCA DEVONSHIRE (Y12)

Dragon Hole is an underwater sinkhole or officially Sansha Yongle Blue Hole. You may not have heard of it before because it was only discovered earlier this year in the Paracel Islands in the South China Sea.

The Dragon Hole is a roughly circular hole with steep wall depressions which give off a very distinctive dark blue colour. How could we have missed it before? Perhaps because of its depth - it is thought to be the deepest underwater blue hole in the world at 300 metres deep. If we put it into perspective, it could almost fit the Eiffel Tower. The next biggest hole is Dean's Blue Hole in the Bahamas, which is about 100 metres shallower and currently holds the world title.

Blue holes generate a distinctive blue colour when seen from above, as shown in the picture. This colour is caused by high transparency of the water reflecting bright white calcium carbonate sand.

“It is thought to be the deepest underwater blue hole in the world at 300 metres deep”

Some people in China say that the Dragon Hole has been known about for centuries but it's depth was only recently discovered by scientists. Scientists used a robot with a depth sensor to determine how deep the hole actually is. According to Chinese news agencies, over 20 species of fish living within the top 300 ft. of the hole have been identified. However, scientists have not yet been able to explore deeper than this due to the lack of oxygen, which suggests that other than bacteria, there is little life beyond this point. The reason for little or no oxygen in the lower region is because of the poor water circulation making it anoxic. The fact that waters of a blue hole are very high in sulphur also makes diving (and therefore investigation) difficult.





Dragon Hole from above.

Blue holes can play a vital role in determining scientific history of the planet as Prof Yang Zuosheng said, “Research into a blue hole can provide detailed records of how the climate or water level changes over tens of thousands of years. Once we have that data, we can deduct the pattern of evolution for climate change in the South China Sea, including its ecosystem, hydrological system and landform.” Sediment from deep within the sinkhole would need to be collected to help research into this.

Many blue holes which are flooded such as Dragon Hole and Dean’s Hole have originated from sinkholes during a glacial period, when ocean levels were lower, but have become flooded in the last ice age when sea levels rose again. Sinkholes were therefore targets of erosion from chemical weathering of rain on limestone terrains. Blue holes are typically found on shallow carbonate platforms, which contain both freshwater and saltwater (called a halocline) which corrodes rock rapidly to form the hole.

As Dragon Hole is still being investigated by scientists, there is little information about it and it has not yet been given protected status by the Chinese government but this will come in time and it will eventually hold the world title of the deepest underwater sinkhole in the near future.



Sea gypsies

AMANDA LEOW (Y12)

Off the coast of Malaysia, living in the turquoise seas are a group of indigenous people; the Bajau Laut tribe. More commonly known as the 'gypsies of the sea', they spend their lives living in off-shore communities and relying on their extensive knowledge of the ocean to make a living through fishing.



The women wear a mixture of rice powder and a yellow spice to protect their faces from the sun.

After being banned from living in Malaysia due to their refugee status they found shelter in the ocean, living in long boats, called Lepa which are typically just five metres long and one and a half metres wide, or stilted huts on coral reefs.

The Bajau tribe's beliefs are centred around a combination of animism (the belief that natural objects possess a soul) and Islam. The complex relationship between the ocean and its inhabitants is at the heart of the existence of these nomads.

At a young age of eight years old, the Bajau children are given a net and line, ready to begin learning to fish. They are taught to catch a variety of sea life, including crustaceans and molluscs, off their handmade boats, crafted from hollowed tree trunks. Furthermore, due

to the great lengths of time spent underwater, reportedly, the children's eyes have adapted to see more clearly, making diving easier.

The older, more experienced hunter-gatherers mainly use homemade spears, made from metal and wood scraps, to catch fish from their boats. However, the best divers have been known to free dive up to twenty metres under water to hunt for pearls and sea cucumbers. Since diving is an everyday activity, the Bajau deliberately rupture their ear drums at a young age by diving without equalizing. This causes the nose and ears to bleed, and bed rest for a week due to the dizziness felt but allows painless deep free diving for the rest of their lives. Unsurprisingly, this also causes many Bajau to have very poor hearing, especially at an older age. Unaware of the need to restrict



A child wrenching clams from the reef with a tyre iron.

their exposure to pressure, countless Bajau have ended up crippled or killed by deadly nitrogen bubbles in their bloodstream.

In the rare contact they have with people on land, the refugee community travels to the nearby town of Semporna to trade their goods, particularly pearls, for the necessities they cannot find in the ocean, such as rice and clothing. Arguably, their lifestyle is fairly economically driven as it is vital for survival.

“The Bajau deliberately rupture their ear drums at a young age by diving without equalizing.”

Unfortunately, due to the growing fishing industry, the numbers of fish are rapidly declining. Therefore, it is becoming increasingly difficult for the Bajau to catch sufficient quantities of fish to survive on, causing

both fishermen and the Bajau to use more extreme and dangerous methods. For example, both have enthusiastically adopted the use of both dynamite and cyanide to catch fish in the coral reefs. Torosiaje used to be flanked by teeming reefs; now there are only wastelands of broken coral. Conservation charities such as WWF and Conservation International are helping create marine management programmes that encourage sustainability through no-fish zones and a return to traditional fishing methods.

Why orcas should not be held in captivity

PEBBLES FISHER (Y12)



Fig. 1 a male orca with a collapsed dorsal fin.

The orca is the largest member of the oceanic dolphin family. Over a hundred of these beautiful killer whales have already died in captivity and with many still remaining there, we need to recognise why orcas deserve to be left in their natural home, the ocean.

There are many reasons why I feel strongly about the captivity of 56 orcas

around the world, not including the 163 orcas who have died in captivity, and the 30 miscarried or still born calves. One of the many problems facing captivity is premature deaths. Orcas in the wild have an average life expectancy of 30 to 50 years, however the average age of death for orcas that have died at SeaWorld is 13 years old. In the wild, despite centuries of sharing the ocean, there has only been a single reliable report of an orca harming a human being. Due to the stress involved in being deprived of everything that is natural and important to orcas in captivity, orcas have attacked and killed three humans since 1991 and many others have been injured. Another problem with captivity is that all captive, adult, male orcas have collapsed dorsal fins, as seen on Figure 1. This is likely to be because they have no space to swim freely and are fed an unnatural diet of thawed dead fish. SeaWorld claims that this condition is common however, in the wild; it rarely ever happens and is a sign of an injured or unhealthy orca.

SeaWorld confines orcas, which usually swim up to 100 miles per day, to tanks that in relation to them, are the size of bathtub. They would need to swim 1,208 laps around the perimeter of the tank to equal what they would swim in the wild. Orcas that are not compatible are forced to live in tight quarters together in captivity,

due to SeaWorld reducing the cost of maintenance. The resulting anxiety and tension causes fights between orcas, whereas in the wild, they have strong social bonds that may last for life. Their social rules prohibit serious violence against each other and when fights do occur, they can find space to flee. In captivity, there is



Fig. 2 orcas free in the wild.

nowhere for them to go, leading to injuries and death. An example of this was Tilikum, the largest orca in captivity, who regularly endured painful attacks by two dominant female orcas, Haida and Nootka. On 21st February 1991, trainer Keltie Byrne fell into the pool containing all three orcas. She was pulled to the bottom of the enclosure by Tilikum, tossed around the three orcas and ultimately drowned. She was the first of three people to have been killed because of Tilikum's stress, frustration and confinement.

“They would need to swim 1,208 laps around the perimeter of the tank to equal what they would swim in the wild.”

In captivity, orcas are unable to hunt and obtain water from their prey, so SeaWorld give them gelatin, a substance that is not natural for them, in an attempt to keep them hydrated. Orcas in captivity gnaw at iron bars and concrete from stress, anxiety and boredom, sometimes

breaking their teeth and resulting in painful dental drilling without anaesthesia. Finally, orcas are highly social animals that live in stable social groups ranging from 2 to 15 individuals. In some populations, calves stay with their mother for life. However, in captivity, orcas are forced to live with orcas from other family units who speak a completely different language and are constantly moved between facilities for breeding and performing.

Orcas suffer mentally and physically just to line SeaWorld's pockets. However, you can help them! The momentum is on our side with the release of the documentary *Blackfish*, which has sparked worldwide debate about whether orcas should be held in captivity. There is also a recent lawsuit against SeaWorld claiming that the park's orcas suffer from a disturbing number of captivity-related health issues, such as severe dental trauma and injuries sustained from fighting with each other. SeaWorld has already put an end to the breeding of the orcas, and with hope will eventually stop keeping these beauties in captivity at all.

The real cost of Rio 2016

MICHAEL MILLER (Y12)

On the surface the Rio de Janeiro Olympic Games cost \$6.2 billion. However, under this layer of figures and calculations, what were the real costs to freedom, education and quality of life?

The 2014 Brazil World Cup tried to embrace favelas, showing them as places with potential. Footballers were filmed going to these shantytowns to meet people, play football and donate clothing, money or food to help the locals. The World Cup shone a light on the favelas and tried to make them better. The Olympics hid them away.

This not only happened in the media, but also physically in Rio. An expressway called The Red Line goes from the airport in Rio to the coast, and was the route taken by almost everyone travelling to the Olympics. This road travels directly next to and through one of the largest favelas in Rio, Máre. Instead of using this opportunity to improve the favela around this road, as they may have in 2014, the government put up what locals call the 'wall of shame'. A ten-foot high wall on either side of the road painted in bright colours with traditional Brazilian shapes and patterns. You could say this was simply advertising, but the hardships for the favelas didn't stop there. Using Máre as an example again, when the government were short on funds for the construction of the facilities for the games, they took money straight from the favelas. The main secondary school in Maré is state sponsored, and the government provides scholarships for less fortunate children in the area. These scholarships were taken away 4 weeks before the Games started. This means some students' graduations will be postponed years, hindering hundreds of children's education.

These costs along with continuous police intervention can only lead to a communal hate and resentment towards the Brazilian government for the forthcoming years.





Figure 1 : The ‘wall of shame’.

This could lead to crime rates increasing, and, even worse, the redevelopment of gangs, which were split up before the 2014 World Cup.

The Brazilian government lost not only the support of these people through their handling of favelas, but also their trust. The government managed to actually increase inequality in a place that already had one of the highest Gini coefficients in the world.

The IOC spoke about how the Rio Olympics could break the metaphorical wall between the favelas and the centre of Rio. Instead the Brazilian government put up actual walls.

Sources:

<https://segundavueltasv.wordpress.com> ‘The only Olympic legacy I see is repression and war’ (live reporting from within the favelas by locals)

2nd August 2016, Authors are Jonathan Watts, Thaís Cavalcante, Daiene Mendes and Michel Silva.

‘Nemesis’ Misha Glenny (2015)

Video – <http://www.ibtimes.com/how-much-have-rio-olympics-cost-brazil-budget-games-explained-2397764>

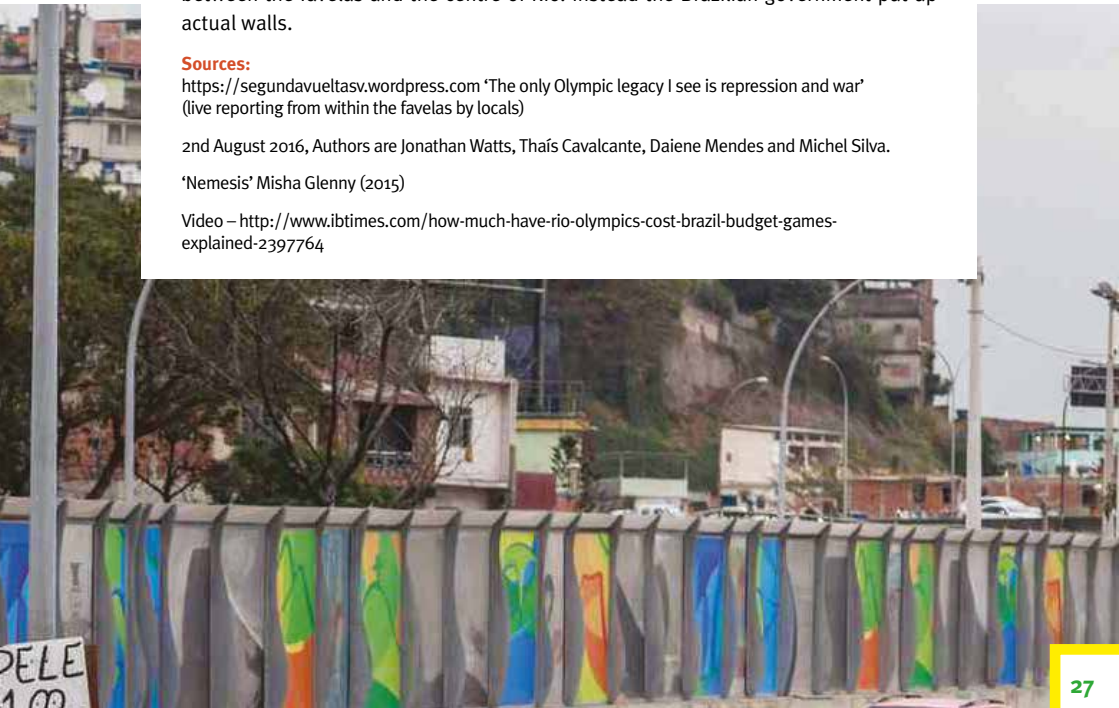




Figure 1 (above), Hurricane Matthew in full force.

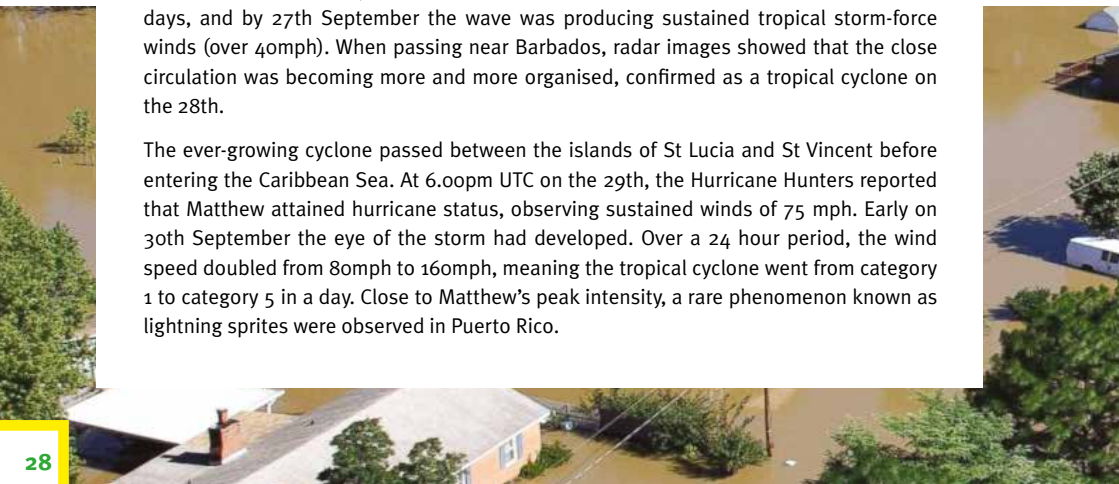
Above the surface: Hurricane Matthew

PARAS SHAH (Y12)

Hurricane Matthew is the fourteenth tropical cyclone, thirteenth storm and second major hurricane of the annual hurricane season. Matthew, Figure 1, was recently the first Category 5 hurricane since Hurricane Felix (2007) and is the longest major hurricane since Hurricane Ivan (2004). It is the one of the most costly and deadliest in history.

On 22nd September 2016 a vigorous tropical wave left the west coast of Africa and moved westwards across the Atlantic Ocean and later was assessed as having a high probability of tropical cyclogenesis. Along the wave there were more and more frequent thunderstorms, aided by the favourable environmental conditions. It grew over several days, and by 27th September the wave was producing sustained tropical storm-force winds (over 40mph). When passing near Barbados, radar images showed that the close circulation was becoming more and more organised, confirmed as a tropical cyclone on the 28th.

The ever-growing cyclone passed between the islands of St Lucia and St Vincent before entering the Caribbean Sea. At 6.00pm UTC on the 29th, the Hurricane Hunters reported that Matthew attained hurricane status, observing sustained winds of 75 mph. Early on 30th September the eye of the storm had developed. Over a 24 hour period, the wind speed doubled from 80mph to 160mph, meaning the tropical cyclone went from category 1 to category 5 in a day. Close to Matthew's peak intensity, a rare phenomenon known as lightning sprites were observed in Puerto Rico.



By 4th October, Matthew had made its way to Haiti where it made its first landfall, and by the following day to Cuba. Two days later Matthew was around 12 miles from the Florida coastline. By the 8th, it had moved further north to South Carolina, where it became the first hurricane to make landfall north of Florida since Hurricane Hazel (1954). As it became less coastal Matthew began to undergo an extratropical transition (where although the overall strength increases, the core weakens just before the end phase of the hurricane). It became post-tropical on 9th October and had dissipated over the Atlantic (near Canada).



Figure 2, The map shows the route of the hurricane. Before the first dots on this map, it was a huge wave with strong winds.

As of the 13th October, the death toll stands around 1,050, with around 1,000 from Haiti alone. The US has also been badly affected with approximately 46 deaths, most linked to floods and storms. However this is expected to grow, as the numbers of those who are affected indirectly or injured increases.

Matthew has impacted many countries; most that knew about the hurricane ordered evacuations, to take place and shut down local services such as schools. The hurricane has caused over 5.2 billion USD worth of damage in the US alone, with countries like Haiti dependent on foreign aid, with an approximate amount of 1 billion USD required. However these are just preliminary estimates and are expected to increase, along with more than 1.5 million people in need of humanitarian assistance. This makes it the most expensive hurricane since Hurricane Sandy (2012). The damage has been caused from a mixture of things such as the flooding and heavy rainfall, as rivers overflow their banks and storms, destroying people's houses and infrastructure. These were huge factors and the damage can be seen in places such as Greenville, Figure 3.

In only a few days, it is incredible to see how a wave can turn into a powerful, damaging hurricane and then disappear as if nothing had happened.

Figure 3 (below), Damage from Hurricane Matthew is seen in Greenville, South Carolina 2016.



Why are we still reliant on petroleum?

RAM PATEL (7R)

Petroleum is a resource which we have consumed since its discovery and production in Pennsylvania from 1859. We have been familiar with terms like oil and gas exploration, fracking, drilling and rigs. Petroleum is extracted from fossilised creatures from the ocean and sediment deep within the earth rock known as crude oil. Companies of the past like 'Standard Oil' and names like 'John D. Rockefeller' are symbols of the wealth and stability that petroleum production brings to countries. Desolate deserts in the Middle East have transformed within eighty years into advanced societies all due to Petroleum. Has our dependence on petroleum reached a tipping point?

Is the world enveloped in an Oil whirlwind?

We can't miss a petrol pump in our lives, it's a part of our society. They may not look appealing, but our reliance on this addictive fossil fuel is immense. The majority of our public transport and freight is reliant on oil. We have more cars on the road than ever before. Lately, in the news we often hear many stories on fracking, considering that fracking now accounts for half of the US crude oil production. This is a technique of collecting shale oil by digging down for around 2km to the shale deposits; and using extreme high pressure water and sand to crack the bedrocks. This allows petroleum and gas to flow out and be extracted. The obvious problem is potential fault lines and seismic incidents that can take place. The US pioneered this approach and they still use it today. The UK want to use this method to do the same on land. In the USA and Middle East you can see rigs on land and the UK wants to implement the same techniques.



In figure 1, the Gulf of Mexico is leading the way with the largest number of oilrigs. If anything our dependence on oil is not decreasing. We are using more petroleum and therefore our requirements and reliance increase substantially. The largest oil producing nations currently seem to be USA, Saudi Arabia and Russia, ranging from 11-12 million barrels-a-day. We can only see these figures increasing in the distant future.

Where are the world's oilrigs?

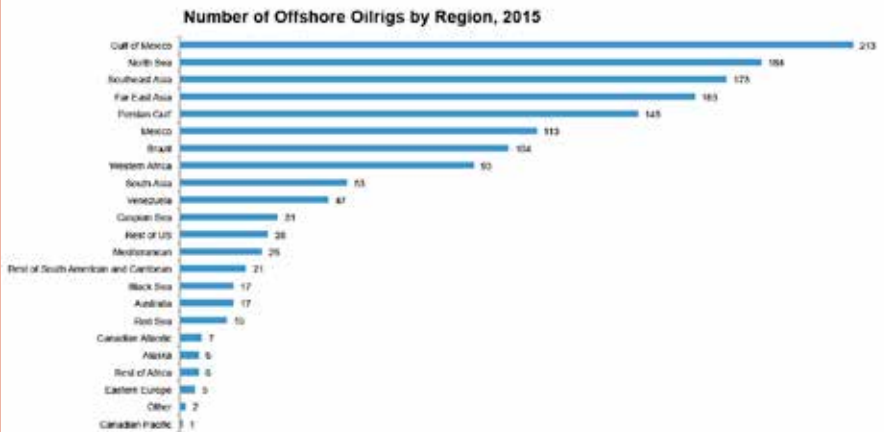


Figure 1 (above).

Are we doing enough to decrease Oil usage?

Today, we often debate on renewable energy such as solar, wind, tidal and geothermal energy. However, our uptake of renewable energy compared to petroleum is very low. The impact to our environment is huge; only recently there was debate on Uganda's oil bids by corporations that violate giraffe habitations.

Has our over-dependance on this black murky liquid gone a step too far?

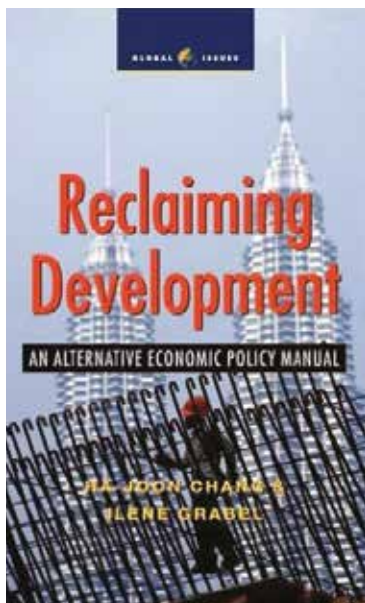
Sources:

<http://www.eia.gov/todayinenergy/detail.php?id=25372>
<http://money.cnn.com/2016/03/24/investing/fracking-shale-oil-boom/>
https://en.wikipedia.org/wiki/Extraction_of_petroleum
<http://resourceinsights.blogspot.co.uk/2013/12/if-mexico-is-next-brazil-in-oil.html>
<https://www.weforum.org/agenda/2015/10/where-are-the-worlds-oil-rigs/>
<http://oilprice.com/Energy/Natural-Gas/The-Arguments-for-and-Against-Shale-Oil-and-Gas-Developments.html>
http://www.cpre.org.uk/what-we-do/energy-and-waste/shale-gas/the-issues?gclid=CjwKEAajwvb2_BRCb_s7Yo7_ZIHASjABz6Loje42Tz2MHorgsQ9KM09l4ohfZfQun5MddOICvDdoBbRoCxiPw_wcB
https://en.wikipedia.org/wiki/List_of_oil_exploration_and_production_companies
<https://www.newscientist.com/article/2107595-endangered-giraffes-threatened-by-ugandas-oil-drilling-bid/>

BBC Horizon – Planet Oil Series

Book review

ANANDITA KETKAR (Y13)



In “Reclaiming Development”, Ha Joon Chang constructively opens up the problems associated with the modern-day neoliberal development agenda and suggests feasible alternatives to the current paradigm of development.

“Political decisions- rather than technology- are the primary driving force behind the pace and form of globalisation”. Through such statements, Chang both carefully and cohesively examines the ways of development that are being promoted by the global agenda. For example, this very statement is explained by stating that technology merely defines the realm of possibilities open to a country that is trying to develop, but that the diffusion of this technology is dependent upon the governments and policymakers of the affected countries. Whilst analysing the historical do’s and don’t’s of development theory, Chang maintains a balanced view by suggesting how other measures could slowly be introduced to

mitigate the shortcomings of the ones we are currently implementing. For example, when Chang suggests that industrial policy needs to have the “overall development vision” of the country, he looks to examples of success in the proposed change; the civil servants who deftly managed industrial policy in East Asia were mostly lawyers in Japan and engineers in Taiwan and China, which could be a method that other countries could use too.

“Reclaiming Development” also points out how all is not doomed- thankfully, there is room for some types of trade protection under present WTO rules, which could allow certain countries to develop in the same way that today’s MEDCs have without a drastic change in the institutions that govern the world today. Nevertheless, the book does point out how we should start seeing the shortcomings in the capitalist, free-market ideals we are promoting through these very institutions. For example, whilst Trans-National Companies might seem the beacon of hope for democracy-enthusiasts, their very existence threatens democracy by granting global investors and corporations veto power over domestic policy choices that they oppose.

Whilst some of Chang’s suggestions spark controversy, they are undoubtedly a bold challenge to the method of development that we have so long accepted. Perhaps this is exactly what is needed to truly mitigate what we label as “inevitable” problems associated with improving the standard of living for everyone.

Geography Enrichment

The study of Geography provides a conceptual framework and holistic perspective to help pupils and adults alike explore, understand and address the global challenges of the twenty-first century. At both Haberdashers' Aske's Boys' and Girls' Schools, the Geography departments are committed to providing a myriad of enrichment opportunities.

- i. **Write for Habs' Geographical Magazine's** Spring – Summer 2017 issue. Further Information overleaf.
- ii. **Become a member of the Society** and attend Geography club, cross-curricular debates, quizzes and guest speaker talks.
- iii. **Read beyond the syllabus.** Not all background reading has to be from a book.

The following magazines are appropriate and all available in the schools' libraries:

Geographical, Geography Review, The Economist (also Intelligent Life and Prospect), New Scientist, National Geographic and any of the broadsheets.

How many did you get?

Crossword puzzle solutions

Down:

1. five
2. latin
3. indian
4. tides
5. ocean
6. pacific
7. marinatrench
8. redsea

Across:

1. greatbarrierreef
2. oxygen
3. atlantic

Quiz Answers

1. Mauna Loa
2. The Andes
3. Hamilton
4. Magma
5. Canada
6. A vast treeless region where the subsoil is permanently frozen
7. The emergent layer
8. The Atlantic Ocean
9. The polar bear
10. The Angel Falls
11. Confluence
12. The Caribbean Sea and the Gulf of Mexico
13. The black sea
14. Zugspitze
15. Alabama , Alaska, Arizona , Arkansas

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