

'The Being'

In the midst of a cool, breezy night, I stand aghast the withered corals that once collectively mirrored a magical underwater world among the glass-like Coral Ocean within the Great Barrier Reef. Over a hundred years ago, almost half of all corals perished in the Reef¹. Now, I'm almost certain that all the corals have ceased to exist. My grandfather told stories of his encounters with the olive-brown sea snake when he used to dive, and would scare me by explaining they can grow larger than two metres and are one of the most common sea snakes in Australia². I can't admire these wonderful, venomous³ creatures as they were deemed extinct earlier this year⁴. Scuba diving, in my opinion, is still a valiant way of getting away for people like me who work from a stress-inducing office - planning what to create, fix, or engineer next. However, people tend to avoid diving in the Reef, because the once abundant, lively marine ecosystem has now subsided to an ocean of plastic. It's been seven decades since 2050, the year that plastic in the ocean outnumbered fish⁵, yet the world continues to prioritise economic growth over the liveability of our oceans.

Gradually, I experienced the effects of the water pressure as I surpassed one-hundred and twenty-five metres below the surface; my chest tightened, along with my ears, which consequently popped. I examined the diminished *leptoseris* carcasses, formerly the deepest living coral in the Great Barrier Reef⁶. A mysterious, fascinating creature emerged from the bleached corals. It was something I have never seen before; a decently sized specimen with slim, sharp teeth, reminiscent of an angler fish's, with coloured scales, colours between red and peach, thriving in its own ecosystem without a fish surrounding it. From my observation, this 'being' has a unique diet, predominantly consisting of plastic, but more specifically decayed Coca-cola bottles and chip packets, as they are part of the most common items found in the ocean⁷, as well as other small marine inhabitants. Regardless of the legality, this fish, monster, whatever it was; it was not worth letting go of. I leapt out at its oblivion. I ascended slowly with the creature frantically spasming in my arms. Now at sea level, parallel to the immaculately white sand that was Whitehaven Beach, I swam over and laid 'the being' on shore where nobody was in sight, while I swiftly grabbed a bucket from my solar-powered car to fill with water. I plopped the mysterious specimen into the bucket and loaded 'the precious being' into my car. Surprisingly, it was lively despite what I'd witnessed him digest.

After studying 'the being' for numerous weeks with Luther, an avid marine scientist, we discovered that 'Joshua' - a name I gave to 'the being' for namesake - had a stomach larger than the average fish, and contained hydrochloric acid, the same acid which is found in a human stomach⁸. Mucus with electrolytes that prevent the hydrochloric acid from digesting the stomach was also found⁹. The most bizarre discovery we investigated was that 'Joshua' doesn't have pyloric caeca and a means of excretion; we therefore predicted that 'Joshua's meals' were digested whole.

Using my talents in mechanical engineering, I constructed a mechanical version of 'Joshua'; my goal of this machine is to eradicate plastic in the ocean. The body itself is made of marine grade aluminium, with a layer of metal separated from the internals to store water. With this water, my mechanism can scare predators away by enlarging. My 'Joshua' utilizes solar energy to maintain sustainability. This energy is used for mechanical digestion and fans which enables my machine to swim. The stomach mimics the animate 'Joshua's'; hydrochloric acid is secreted by nozzles, along with a lab-generated version of the mucus. To contest water pressure damage, I designed tube-like structures that stem out the front left and right of the machine. I took my idea to the waters to see if it functions, and it did, thankfully. With such an innovative idea, I ventured into pursuing my machine to be commercially manufactured. I had faith that, after a successful test-run, companies would invest in my idea. However, only a few days into sending emails to numerous companies, I got rejected, simply because they perceived the idea did not have the potential to be functional. It was soul-crushing to experience the pain of rebuke, despite hours, days and months worth of work presenting an elaborate three-hundred page test-run report.

I began to lose hope; the confidence in me was deteriorating as was my self-esteem. I no longer had the patience to wait, just to be declined again. I couldn't withstand the sting of rejection anymore; however, my resilience and empathy for marine animals was stronger than before. To rise from this suffocating, unjust selfishness, I decided to release my 'Joshua' on my own accord. I wouldn't earn profit unlike I planned, but that doesn't to me matter anymore; my desire to help sea creatures thrive for decades to come was my true priority. I am determined to make 'Joshua' known to this generation; I would film my release of 'Joshua', explain how and why I made it, share my inspiration, and post the video onto various social media platforms. I also included my email in the description.

To my amazement, just a few hours after posting my video, emails from sundry countries flooded my inbox; mostly offers from major companies to commercially manufacture my invention. There is hope after all. The marine life may be saved, perhaps even redeemed to how they used to live. Perhaps all the ocean needed is a chance to thrive again; with 'the being' - 'Joshua', who just needed a chance, the knowledge, wisdom, and faith of mankind. I can't wait to see the kaleidoscope of corals, the myriad of fish merrily swimming, illuminating the underwater world; I just wish I'll see it all but alas, I am content to know that I was that drop in the ocean that made a difference.

Footnotes

Footnote 1: Australian Marine Conservation Society. Date of creation/date of last update unavailable. *What Is Coral Bleaching And What Causes It - Fight For Our Reef*. [online] Available at: <<https://www.marineconservation.org.au/coral-bleaching/>> [Accessed 30 June 2020, 20:02].

Footnote 2: Oceana. Date of creation/date of last update unavailable. *Olive Sea Snake*. [online] Available at: <<https://oceana.org/marine-life/sea-turtles-reptiles/olive-sea-snake>> [Accessed 29 June 2020, 18:43].

Footnote 3: Marine Education Society of Australasia. Date of creation/date of last update unavailable. *Marine Algae*. [online] Available at: <http://www.mesa.edu.au/sea_snakes/sea_snakes02.asp> [Accessed 30 June 2020, 19:02].

Footnote 4: Snyder, C.L. Created 04 January 2019. *8 Aquatic Animals That Might Be Extinct In 100 Years*. [online] Business Insider Australia. Available at:

<<https://www.businessinsider.com.au/aquatic-animals-going-extinct-because-of-climate-change-2018-12?r=US&IR=1>> [Accessed 30 June 2020, 18:51].

Footnote 5: World Wildlife Fund United Kingdom. Date of creation/date of last update unavailable. *The Holiday Plastic Choking Our Oceans*. [online] Available at:

<<https://www.wwf.org.uk/updates/holiday-plastic-choking-our-oceans>> [Accessed 29 June 2020, 18:18].

Footnote 6: Pappas, S. Created 02 January 2013. *Deepest Corals In Great Barrier Reef Discovered*. [online] livescience.com. Available at: <<https://www.livescience.com/25923-deepest-corals-great-barrier-reef.html>> [Accessed 1 July 2020, 20:35].

Footnote 7: SLO active. Last updated 03 July 2020. *Plastic Pollution Guide - Ocean Pollution Facts & Figures*. [online] Available at: <<https://sloactive.com/plastic-pollution/>> [Accessed 6 July 2020, 20:04].

Footnote 8: Various Authors. Last updated 05 June 2020. *Gastric Acid*. [online] Available at: <https://en.wikipedia.org/wiki/Gastric_acid> [Accessed 9 July 2020, 18:47].

Footnote 9: Purves, W. Created 20 October 2003, but originally answered 13 November 2001. *Why Don't Our Digestive Acids Corrode Our Stomach Linings?*. [online] Scientific American. Available at:

<<https://www.scientificamerican.com/article/why-dont-our-digestive-ac/>> [Accessed 10 July 2020, 18:23].

Appendix

Coral Bleaching

An aquatic algae called *zooxanthellae* found in the tissue of corals is what disperses the abundance of colours that corals are famous for. Coral bleaching is a coral's response to danger or stress (such as pollution). *Zooxanthellae* is discharged from the coral as a result, and consequently, the coral loses its main source of energy, as the algae provided the coral with easy access to photosynthesis, but also the vibrant colours once emitted by the algae are replaced by a marble white tinge. Coral may die as a result of coral bleaching.

The Effect of Ocean Pollution on Our Oceans and Marine Life

Everyday litter always ends up in our oceans; most of this litter is mostly plastic. The carelessness leads to the "ingestion, suffocation, and entanglement of hundreds of [marine] species"; and consequently, marine wildlife could perish, or plastic residue may remain in the fish that we eat. Photodegradation causes plastic to absorb or release harmful chemicals, such as PCBs; if absorbed, the sea animals that eat the plastic interfere with food webs, whereas if emitted, it links to environmental and health problems, such as global warming.

What Prevents the Human Stomach from Digesting Itself?

Parietal cells in the mucosa (the surface of the stomach) secrete hydrochloric acid into the lumen (the cavity or, space in the stomach) which is used for chemical digestion of food². Simultaneously, special goblet cells also located in the mucosa deliver great quantities of special mucus with electrolytes such as bicarbonate (HCO₃⁻) trapped inside onto the mucosal surface. These electrolytes found in this mucus prevent the penetration of hydrochloric acid into the mucosa; which ultimately rejects the digestion of the mucosa.

Water Pressure and the Effect on Humans

As water is much denser than air, the pressure of air does not have the same effect as underwater pressure does on our bodies. At sea level, the pressure on our bodies is approximately 1 kg, which is caused by the atmosphere; however, just 10.33 metres of water (10.33 mH₂O), the weight of the Earth's entire atmosphere is upon you, adding another 1kg of pressure. Parts of the body that contain air, such as the lungs, sinuses and intestines, all compress due to water pressure, causing side effects such as a tight chest and shortness of breath (the lung is being compressed, thus meaning less air is able to enter the lungs). Divers must ascend slowly to abide by Henry's law, otherwise, divers may experience decompression sickness; a condition in which the nitrogen diffused into a diver's tissue breaks solution, causing microbubbles to invade other parts of the body, which results in excruciating pain or even death.

Digestive System of a Teleost Fish

The digestive system starts with mechanical digestion, processed through the jaw which allows food to pass through and break down in the esophagus. Food is then taken to the stomach where further digestion occurs with the excretion of hydrochloric acid by the parietal cells, and is sent to the pyloric caeca; a part of a teleost's digestive system which takes in nutrients and secretes enzymes that assist digestion and is not found in humans. The food is then taken to the small and large intestines, which absorb all remaining nutrients before excretion.

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Footnotes

Footnote 1: International Union for Conservation of Nature. Date of creation/date of last update unavailable. *Marine Plastics*. [online] Available at: <<https://www.iucn.org/resources/issues-briefs/marine-plastics>> [Accessed 18 July 2020, 20:29].

Footnote 2: Purves, W. Created 13 November 2001. *Why Don't Our Digestive Acids Corrode Our Stomach Linings?*. [online] Scientific American. Available at: <<https://www.scientificamerican.com/article/why-dont-our-digestive-ac/>> [Accessed 10 July 2020, 18:23].

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Word Count

The Being, not including the title, consists of 1000 words.

The appendix, not including headings, equates to 563 words. Each key idea stated contains 3 sentences, except for Water Pressure and the Effect on Humans, which contains 4.

In total, combining *The Being* and the accompanying appendix, contains 1563 words.