opening extract from

Oceanology:

The True Account of the Voyage of the Nautilus

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— The Antarctic Ice Shelf —

10th May, McDonald Island. We continued south into colder waters, where we passed more and more floating islands of ice until we saw a dazzling streak of white ahead, stretching across the horizon as far as the eye could see – the great Antarctic ice shelf! The Nautilus submerged, and we travelled through miles of underwater ice canyons of such a scale that they took my breath away.

An Example of Scrimshaw: A Nautical Pastime

To while away our journey south, Ned showed me some dice games he often played to pass the time on his whaling expeditions. He had carved the die we played with from a whale's tooth – a technique they call scrimshaw.

— Antarctic Exploration —

Captain Nemo explained that much of this icy continent was unexplored. Before anyone had even laid eyes on Antarctica, seafarers had told tales of a huge southern continent they called Terra Australis Incognita – the 'Unknown Southern Land'. In 1775 Captain Cook circumnavigated Antarctica, proving that it was neither as large nor as habitable as was once believed. Now much of its outline has been mapped, but the inner areas remain unexplored. The captain told us that it was one of his greatest ambitions to be the first man to reach the South Pole, but he feared that the ice sheet at this time of year was too broad for us to attempt it, as it would hinder our approach.*1

— A Whale Sighting —

The next day we surfaced to witness a wondrous sight – a pod of beautiful humpback whales leaping through the waves. Professor Aronnax was sure that they were travelling north for the winter. Ned regretted that we were not harpooning these beasts and explained how they are useful to us: oil from their blubber is burned in lamps and is made into soaps, paints and candles. Baleen from their mouths is used in corsets, collars and carriage springs. The professor cursed the whalers and challenged Ned, arguing that whales should be studied, not harmed. He said that if we keep hunting them in such large numbers, we may risk losing these majestic creatures forever.

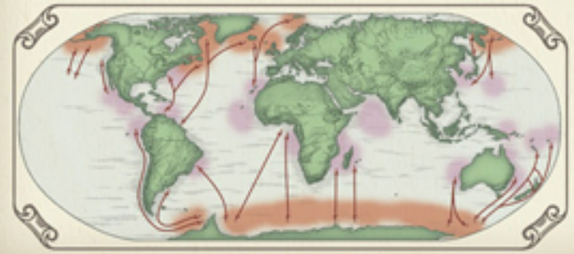
Arctocephalus gazella The Southern Fur Seal

— The Fate of the Fur Seal —

Professor Aronnax was delighted to see a rare southern fur seal, but he expressed grave concerns about their survival. The seals of these islands have been hunted nearly to extinction for their warm pelts. Even on board the Nautilus, the crew has a collection of sealskin coats to keep them warm on polar expeditions.*2

— The Migration of the Humpback Whale —

The professor gave me a map of the migratory routes he believed are taken by humpback whales. He told me that whales travel to warmer waters (shown in purple below) for the winter, when they give birth, because polar waters are too cold for the young calves. In the summer they travel back to polar waters (shown in red) to feed on krill, which is more abundant in cold regions.



— Fishing on the Ice —

On 12th May we went ashore, and Ned showed us how to fish through the ice. He cut a hole, then I dangled a fish-shaped lure into the water, moving it about as if it were real. Soon a large, codlike specimen appeared, snapping at the lure. Ned was ready with his harpoon. We landed our catch and proudly shared it with the rest of the crew at dinner.

*1. The South Pole was not reached until December 1911 by Norwegian explorer Roald Amundsen, who won a desperate race against British explorer Captain Scott. Scott reached the pole in January 1912, only to find that Amundsen had got there first. Scott and his team died on their return journey.

*2. In the nineteenth century, as a result of excessive seal hunting, fur seals nearly became extinct in Antarctic waters. Only a very small number survived on a few tiny islands. The southern fur seal population has now recovered.

— An Underwater Volcano —

16th June, Mariana Islands. We continued our journey through Pacific waters, approaching the Islas de los Ladrones, or the 'Islands of Thieves', also known as the Mariana Islands. We were travelling at a depth of 1,800 feet (550 metres) when from the seabed there came an incredible explosion, and we all rushed to the viewing window. Red-hot lava and clouds of sulphurous smoke were billowing spectacularly from what appeared to be an underwater volcano!

The Moving Plates of the Earth's Surface

— The Earth's Shifting Surface —

Professor Ewing studied the volcano most carefully. He explained that the earth's crust is made up of several different plates that move about, almost as if they were floating on a cushion of liquid. As the plates move, tremendous energies are released, transforming the earth's surface over millions of years into valleys and mountain ranges, both on land and underwater.

FIG. 1

Professor Ewing described the possible severe effects an underwater volcanic eruption may have on coastal regions.

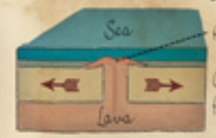
Waves of Destruction

An earthquake or volcanic eruption on the sea floor can trigger a devastating seismic sea wave. The movement of the ocean floor sends shock waves through the water. When these waves hit shallow water, they are suddenly slowed down by the seabed, which increases their height. More waves continue to arrive, pushing together and building in height. They can form a devastating wall of water 70 feet (20 metres) tall, which crashes down onto the coastline.

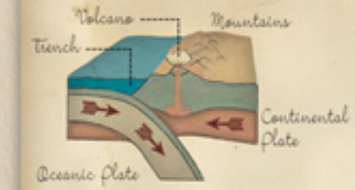

AN ARTIST'S IMPRESSION OF A SEISMIC SEA WAVE

— Plate Boundaries —

Different types of plate boundary affect the earth's surface in the following ways:



Constructive Boundary: Two plates move apart, leaving an upwelling of magma between them that forms a ridge, such as that discovered by Maury in the mid-Atlantic.



Destructive Boundary: Two plates move towards each other. The denser plate is pushed beneath the other to form volcanoes and deep trenches, such as the Mariana Trench.

Collision Boundary: Two plates collide, buckling and creating tall mountain ranges between them, such as the Himalayas.

Conservative Boundary: Two plates slide past each other, becoming locked together until they give way, creating earthquakes, such as those on the west coast of California.

Professor Ewing believed that the undersea volcano we witnessed was caused because the Mariana Islands are on a destructive boundary between the Pacific and the Philippine oceanic plates. These plates are colliding, with one being pushed beneath the other, forcing the magma under the earth's crust to the surface.*1

— Riches on the Ocean Floor —

Once we were out of range of the eruption, Professor Ewing and some of the crew ventured out to collect samples of rock from the sea floor so they could measure the effect of the volcano's outpourings over time. Astoundingly, they returned with a collection of smooth, shiny nuggets and crystalline, glittery rocks that sparkled in the light. Professor Ewing wondered whether these rocks had formed as one oceanic plate was pushed beneath the other into the magma under the earth's crust. This caused the plate to melt, releasing minerals into the magma, which then hardened on the surface after the volcano erupted.

* 1. The theory that the earth's surface is made up of moving plates was not properly developed until the 1960s. The fact that Ewing describes the idea here is truly remarkable. We must conclude that he was able to develop theories that were startlingly ahead of their time as a result of his exposure to undersea wonders that had never before been witnessed by scientists of his time. The names of the plate boundaries have been updated by the publisher using modern terminology.