

# THE WATER

**Y**ou have probably heard that water covers three quarters of the Earth's surface, but did you also know that scientists have barely skimmed the surface when it comes to understanding the ocean? Read on to explore the murky depths of the watery world in this two-part instalment!

## What's Down There?

The landscape underwater is remarkably varied – from underwater mountains so tall that they jut out of the water surface to form islands, to bottomless trenches in the ocean bed, where bizarre organisms can be found lurking in the cold, dark depths.

There are active submarine volcanoes that erupt violently, spewing steam and smoke into the water, even sending rocks shooting out of the water. You'll also find lush, kelp gardens that

are as diverse as any botanical garden: colourful coral reefs that throb with life like a small city would! And in the freezing seas of the Arctic and Antarctic are large ice holes, known as **polynyas**, which teem with life.

### Marine Biologists

Scientists who study organisms that live in or near the sea are known as marine biologists. Marine biology is a diverse field – a marine biologist who studies whales would also have to understand the movements of the waves and the chemistry of oil spills. Marine biologists also need a strong sense of curiosity about what lurks in the sea!

### Deep-Sea Exploration

Exploring the deep sea is a challenging and dangerous endeavour – water pressure increases with depth, so

anything used to navigate the deep sea has to be made of extra thick steel to prevent the vessel from getting crushed by the tremendous pressure.

The bathyscaphe *Trieste* holds the world's record for the deepest dive; in 1960, it dived 10 911 metres to the bottom of the Challenger Deep in the **Marianas Trench**, where the water pressure is 1000 times the atmospheric pressure at sea level!

### The Harshest Place on Earth

The Death Valley is one of the hottest places on land, where temperatures can go up to 56°C. But if you think that is harsh, check out what deep sea organisms living near hydrothermal vents have to put up with!



# IR PLANET

by Maureen Ker



## What is a Bathyscaphe?

A bathyscaphe is a diving vessel capable of diving to great depths. It has a flotation hull that helps control the vessel – the hull is flooded when the vessel descends, and the iron ballast is released when the vessel ascends to the surface.

Hydrothermal vents were discovered in 1977 during deep-sea exploration. Scientists found underwater geysers that spew hot water (about 400°C!) and poisonous gases into the surroundings.

The environment around these vents is dark and harsh – where temperatures alternate between very cold and very hot. The highly acidic water (similar in pH to vinegar!) is filled with noxious gases and toxic metals; and it is always pitch dark because the Sun's rays cannot penetrate that kind of depth. Depressing huh?

While this astonished the scientists, the real shocker was when they discovered that there are actually animals living in this hellish environment!

Creatures like six-foot long giant tubeworms, snow-white vent crabs and heat-resistant bacteria were found living in this highly-toxic habitat!

## Peculiar Feeders

Scientists believe that these organisms survive because a special kind of bacteria turns the poisonous hydrogen sulphide gas into food for the organisms, in a process known as **chemosynthesis**. Therefore, the organisms must somehow harbour these chemosynthetic bacteria in their bodies in order to survive in the vent environment.

But wait, there's a twist! Scientists also discovered that the giant tubeworms living around the vents lack a gut, mouth and eyes! How do the bacteria enter the tubeworm's body? Well, it seems that these tubeworms do have mouths and guts initially, but gradually lose these features as they grow older!

## The Deepest Place on Earth

How would you like to travel to Earth's deepest spot? A crevice so deep and seemingly bottomless that it seems to go right through the centre of the Earth! In 1960, Don Walsh and Jacques Piccard did just that. They managed to descend to the deepest point on Earth in the bathyscaphe *Trieste* to the Challenger Deep located in the Marianas Trench in the Pacific Ocean, near Guam.

On their way down, the men had to put on warm clothing as it got progressively colder. After about 5 hours, they reached the pitch-black bottom and with the aid of lights, observed that the bottom was not as barren as they had expected – there were actually small flounders and shrimp swimming around!

**Want to find out more about underwater gardens? Don't miss the next issue of YG!**



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