



*“... Come, my friends,
'Tis not too late to seek a newer world.
Push off, and sitting well in order smite
The sounding furrows; for my purpose holds
To sail beyond the sunset, and the baths
Of all the western stars, until I die.
It may be that the gulfs will wash us down;
It may be we shall touch the Happy Isles,
And see the great Achilles, whom we knew.”*

– Alfred, Lord Tennyson, Ulysses

The Voyages of the Sorcerer II: Global Ocean Sampling Expedition

The ocean is one of the last great frontiers on our planet. Since 2003 scientists at the J. Craig Venter Institute have been on a quest to unlock the secrets of the oceans by sampling, sequencing and analyzing the DNA of the microorganisms living in these waters. While this world is invisible to us, its importance is

Concord House

1407 Chapala Street, Santa Barbara, CA 93101
(805) 966-3961

immeasurable. The microbes in the sea, land, and air sustain our life on Earth. This is why Dr. Venter and his team have been on their voyage of microbial discovery. Since we know so little about our oceans and the microbes that inhabit them, Venter and his team are exploring the ocean from a gene-centric viewpoint. Several key questions arose that the expeditions hoped to answer:

- i. Is the ocean a homogeneous blend of microbes, or does it change from location to location?
- ii. If it does change, how much and over what distances?
- iii. Do the genes of the microbes sequenced vary widely?
- iv. Can newly discovered genes form pieces of a puzzle in the quest to generate eco-friendly fuels and products?
- v. How can an enhanced knowledge of the microbes and their genetic makeup help us understand the deeper, more subtle workings of our planet and the lives upon it?

In part, the voyages of the *Sorcerer II* were inspired by two of the great voyages of discovery – the H.M.S. *Challenger* expedition led by Captain George Nares, and Darwin’s expeditions on the H.M.S. *Beagle*. The *Challenger* oceanographic expedition was designed to take a sample of the ocean floor every 200 miles to discover the life forms therein. Departing from Halifax, which is where the *Challenger* departed, the *Sorcerer II* took seawater samples every 200 miles and then analyzed the DNA structures of each sample. They used the same algorithms developed in the quest to sequence the human genome. Each genome has a unique mathematical solution that determines its specific characteristics.

The microbes in the ocean account for over 50% of the biomass on our Earth, as compared to animals that comprise only 1/1000th of the Earth’s biomass. Each milliliter of seawater contains over one million bacteria and ten million viruses.

This stimulated Dr. Venter's thinking that there was obviously an unknown and unseen world in the oceans that could be vital to a better understanding of diversity on the planet.

One of Dr. Venter's primary motives for the expedition was to inspire young people to enter the field of science. The Sorcerer II is a 100' sloop with a carbon fiber rig. It can travel between 200 – 250 miles per day. The voyages have taken samples from all of the major oceans as well as many lakes. Samples were collected on board and then flown back to the lab in the United States where they were sequenced and analyzed.

Russ Lewin, Member, Institute of World Culture

April 2011