History of Oceanography

- Oceanography vs. other sciences
- Historical Periods
  - Prehistoric peoples
  - Discovery and Navigation
  - Challenger Expedition
  - Post World War II
- History of Photosynthesis
- Evolutions/Revolutions
Evolution of Scientific Disciplines

- Observation
- Hypothesis Testing
- Manipulation
- Control
Homer’s View of the World (~900 BC)

- The Mediterranean (*Thalassa*) was surrounded by land, and in turn surrounded by a “continuous river”
- The earth was still flat
• Ptolemy developed a “conic” projection (latitude and longitude are accounted for), so the earth is **round**.

• North is on top, East is on Right, but the circumference is only 29,000 km!
HMS Beagle (1831-1836)
Scientific Hypotheses (post-Beagle)

- Edward Forbes: The “azoic hypothesis”
- Ross Brothers: deep-sea life at the poles, and the “emergence hypothesis”
- Darwin: Natural Selection and Evolution
- 1857: T.H. Huxley describes “Bathybius haeckllii”
1872-1876: The Challenger Expedition

At each station:
- depth, bottom water temperature, and meteorological information was recorded
- Bottom sample was collected, as well as a sample of bottom water
- direction and rate of surface currents was determined

At many stations:
- vertical profiles of chemistry, temperature, and currents were determined
- bottom flora, fauna were collected
- nets were used to sample intermediate depths
Scripps Institute of Oceanography established, 1903-1910 (originally a Naturalist society)

1925 Meteor Expedition, first ship to map the ocean with sonar
The Journey to the Depths
Pre-World War II

• Biological Oceanography as a tool for Fisheries
  – 1887: Victor Hensen publication
  – 1941: Riley’s model

• Discovery and Exploration
  – New species, new habitats
  – The Aquanauts
  – Search for the Giant Squid
Post World War II

- Global Productivity
  - Steeman-Nielsen introduces C-14
  - Global Ocean Color
  - Biogeochemical Provinces
Post World War II

• Discovery of Hydrothermal Vents
  – Deep sea diversity
The Microbial Food Web
- New organisms
- New versus Regenerated productivity
- Ecogenomics
Post World War II

• The Iron Hypothesis
Post World War II

• Modeling
History of Photosynthesis

• Geological
  – Oxygenic photosynthesis began about 2.5 billion years ago (bya)
  – Radically changed the planet and life

• Evolutionary
  – 1974—Lynn Margulis
  – Specialization of PSI, PSII, other forms

• Scientific
  – 1700’s, Joseph Priestly “discovers” photosynthesis
  – 1942, Melvin Calvin defines pathways
  – 2000, rediscovery of the environment
The Role of Endosymbiosis
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