

Tuesday, Sept 14, 2021

Pick Up: ■ none

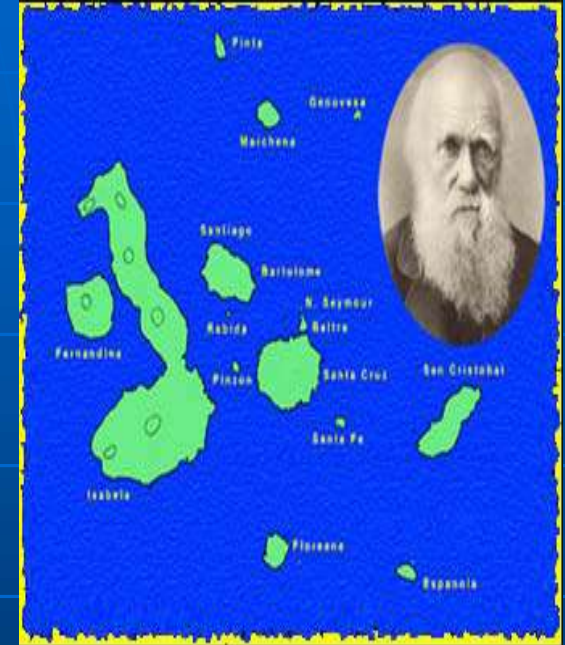
Today
you
will: ■ Finish notes on Modern marine
science explorations

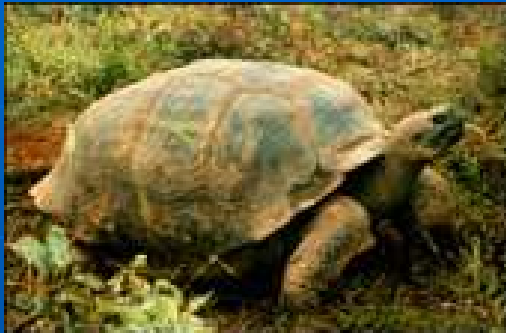
Focus on the learning, not the grade!

Charles Darwin

Marine Contributions

- naturalist
 - 1831, sailed on the HMS *Beagle*
 - Studied coral reef construction and theorized that corals build upward as the seafloor receded (this is still accepted today)
 - Found new species of plants and animals.
 - Proposed Theory of Natural Selection in his publication the "Origin of Species"





vandenburghi



porteri



chatamensis



abingdoni



hoodensis



unknown

Galapagos Tortoise

http://www.youtube.com/watch?v=Qd-1_CjgGCQ&safe=active



Marine Iguana

<http://www.youtube.com/watch?v=VfZQfCkKuKM&safe=active>

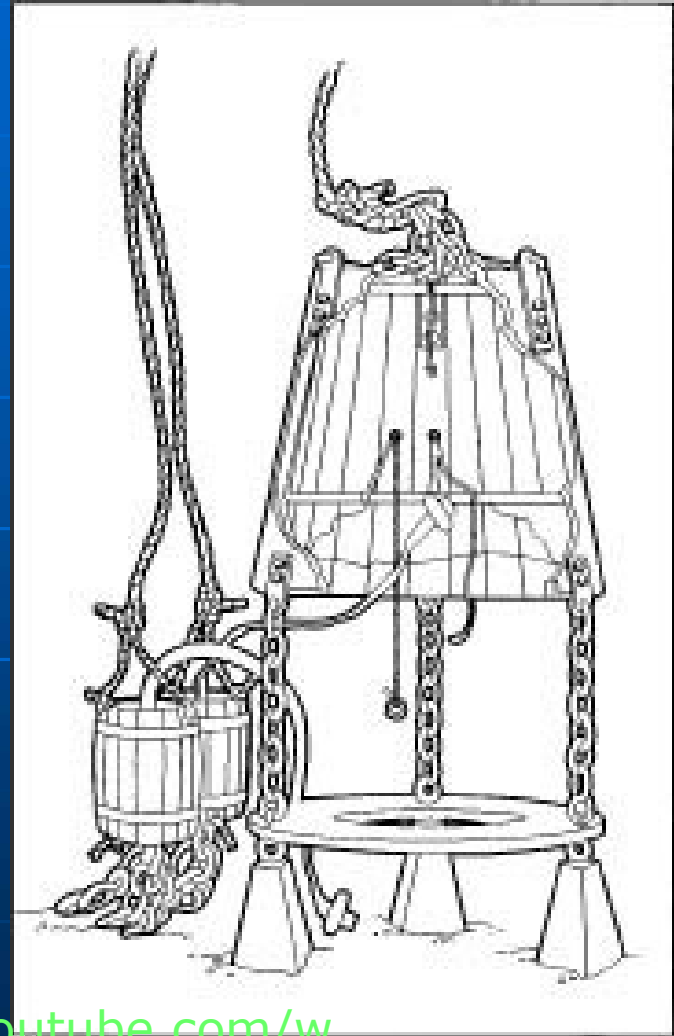
- **HMS *Challenger***- 1873-1876

- First exploration mission devoted entirely to marine science
- Led by Sir Charles Thompson
- Collected water, sediment, and temp data
- Identified more than 4700 new species of marine organisms
- **Challenger II expedition discovered the "Challenger Deep" in the Mariana's trench.** (over 35,000 ft. deep, deepest known point in the ocean)

Technology Advancements in Marine Science

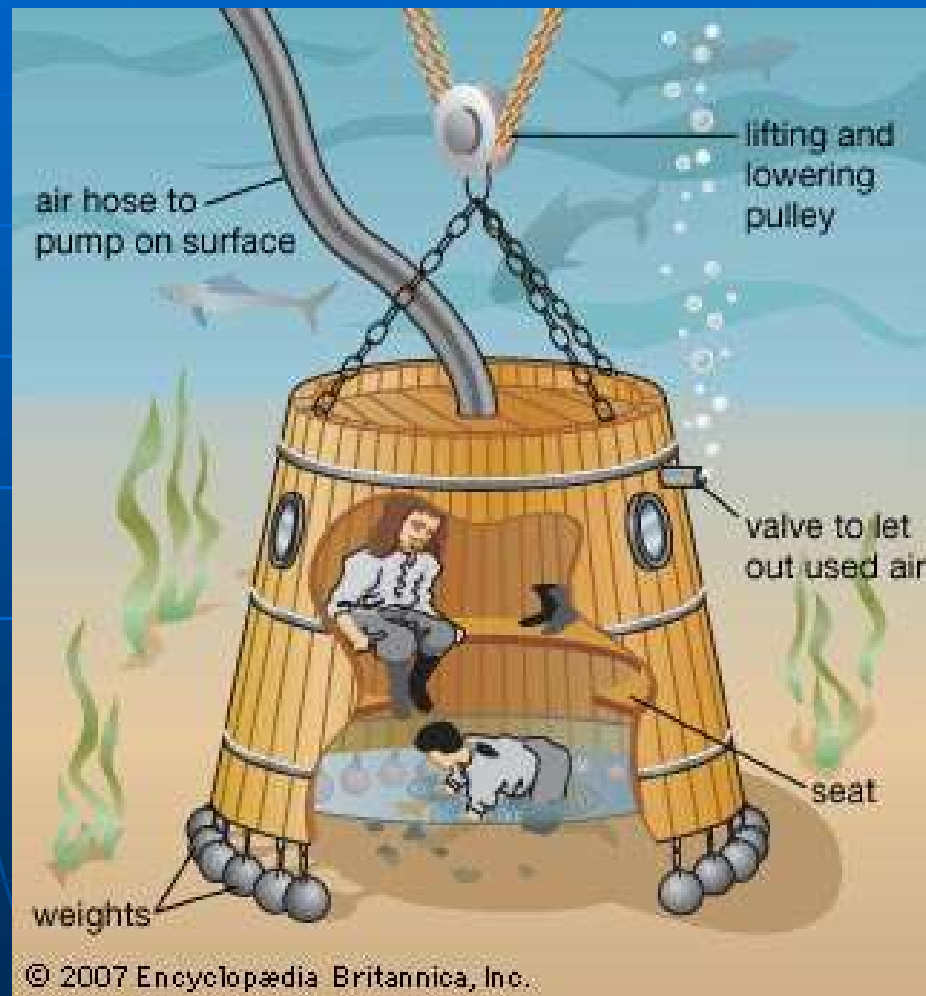
Exploring the Ocean

- Under world called Inner Space
- 2500 B.C., glass was discovered and the first mask was made
- In the 17th century a diving chamber/bell was invented
- Later came a diving suit



<http://www.youtube.com/watch?v=oxWFqwFHXoo&safe=active>

Diving Bell





1797



1837



1855

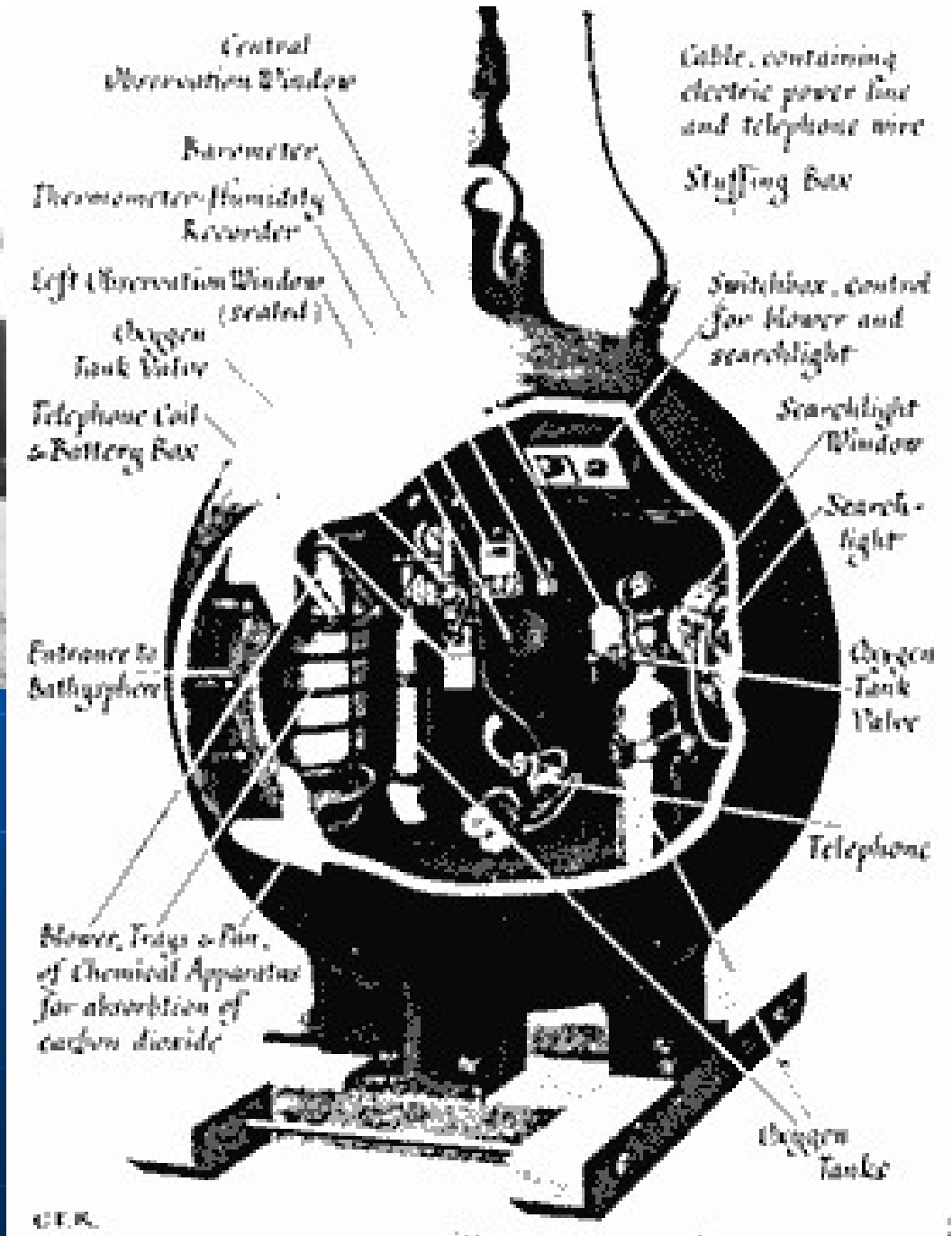
The Modern Scuba Tank

- 1943- **Jacques Cousteau and Emile Gagnan** made final improvements
- A tank with compressed air was developed that was strapped on the diver's back
- air breathed through a regulator
- marketed as the aqua-lung
- S.C.U.B.A- Self Contained Underwater Breathing Apparatus.



1880 to 1950

- V. Walfrid Ekman – Figured out the Ekman Spirals and Ekman Layer
- Fridtjof Nansen – Made the Nansen Bottle. Now people could take samples of water from different depths of water.
- Beebe and Barton – First bathysphere to 4,000 feet
 - Steel sphere at the end of a long cable (tethered)



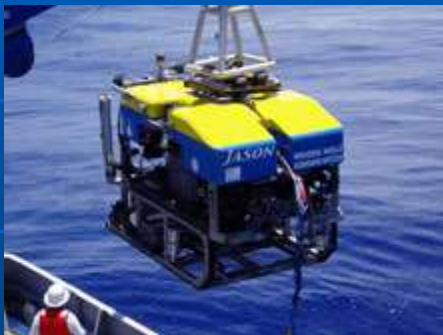
The Bathysphere

Diving Vessels

Also called submersibles

1. Bathysphere, allowed aquanauts to go to deeper depths
2. Bathyscaphe is a steel untethered submersible that could be controlled. Deepest dive in history (1960).
3. Alvin is a self-propelled machine with mechanical arms that can pick up specimens and can carry three humans
4. JASON, a robot, does not carry people

■ Jason



Alvin

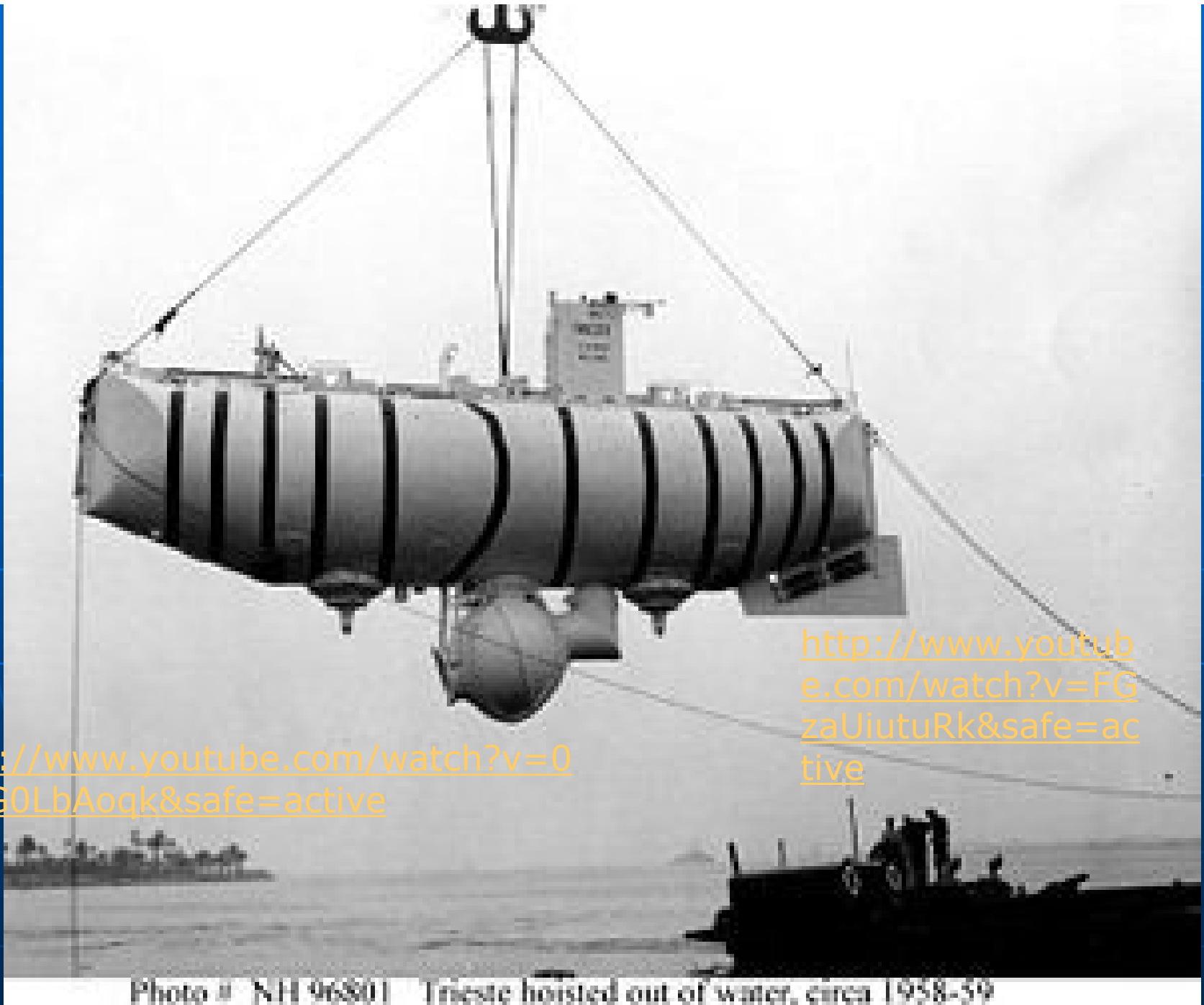


Buoyancy

- Discovered around 200 B.C. by Archimedes
- **Definition:** The force on any object is equal to the weight of the liquid that the object displaces
 - Buoyancy was the reason the Titanic sank

- Marie Thorp and Bruce Heezen – made the first map of the ocean bottom and provided evidence for the theory of Continental Drift.
- Auguste Piccard – First bathyscaphe to reach the bottom of the Mariana's Trench at 35,800 feet.





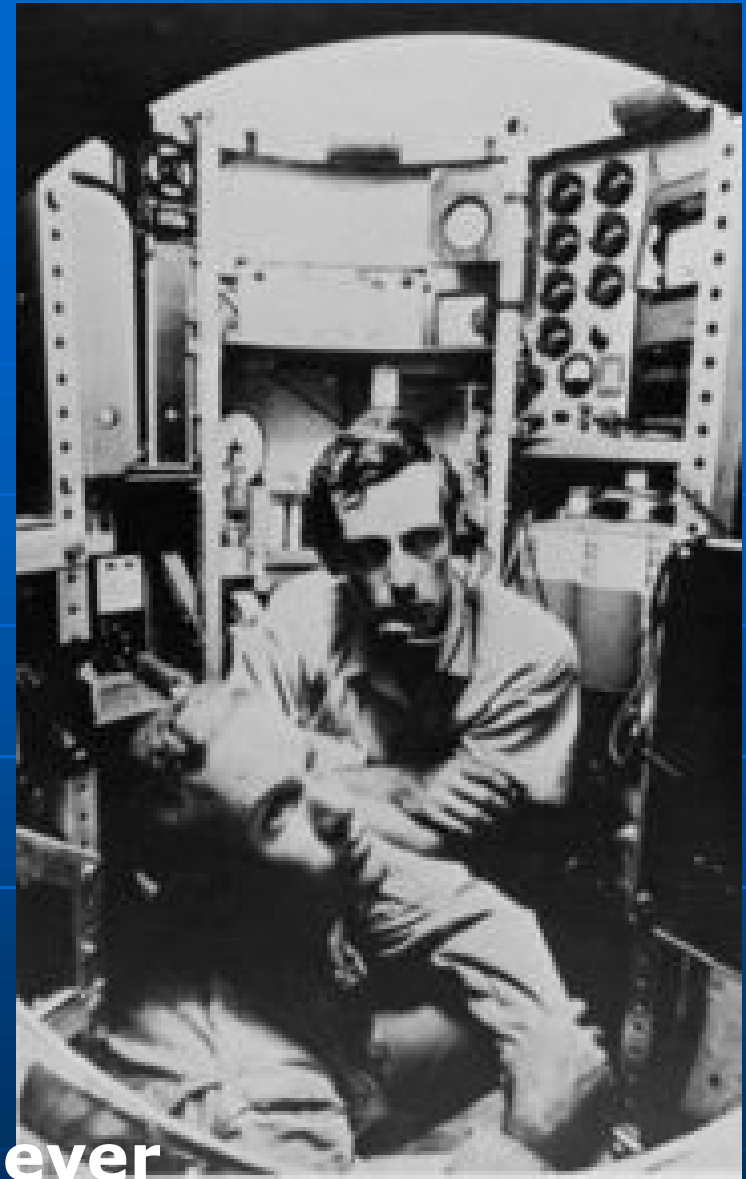
<http://www.youtube.com/watch?v=0mBG0LbAogk&safe=active>

<http://www.youtube.com/watch?v=FGzaUiutuRk&safe=active>

Photo # NH 96801 Trieste hoisted out of water, circa 1958-59



This trip was made in 1960 and **never** Repeated!! The decent took 4 hours and 48 minutes.



- Don Walsh and Jacques Piccard inside *Trieste*

The ***Meteor***, a German ship,
25 months on **Atlantic**
ocean using sonar

- **Sonar- sound navigation ranging**
- **mapped the ocean floor revealing many different depths and features**



<http://www.youtube.com/watch?v=4dftaWQLtPQ&safe=active>



FAU Human powered sub

- http://www.youtube.com/watch?v=BowxagcXpho&safety_mode=true&persist_safety_mode=1&safe=active

<https://www.youtube.com/watch?v=UwVNkfCov1k>

Watch the following clip and
note down the major
contributions in each section.

- http://www.youtube.com/watch?v=aMWJIOyiY8o&safety_mode=true&persist_safety_mode=1&safe=active

The 5 Oceans

- Arctic- smallest, covered in ice
- Pacific- largest, ring of fire
- Indian- warm latitudes, whale sanctuary
- Antarctic- lots of krill and marine life (aka- Southern Ocean)
- Atlantic- growing @ mid-ocean ridge
- Mediterranean Sea- not an ocean but connected to Atlantic. Pollution is a huge problem.

Oceans

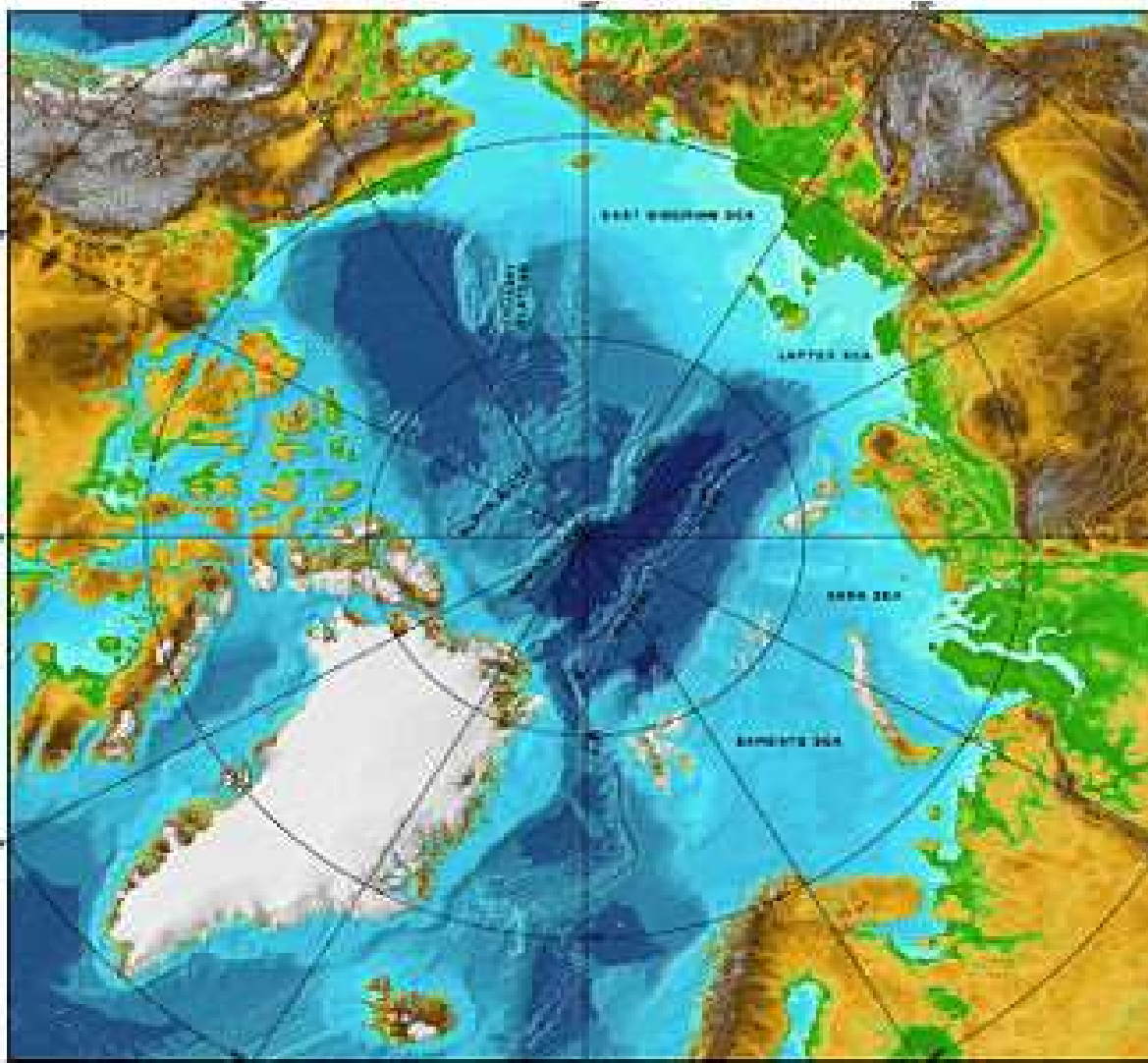
- There is really only ONE ocean!!
- This makes navigating difficult so we subdivide it into several smaller ones.

The 5 Oceans

- Arctic
- Pacific
- Indian
- Antarctic
- Atlantic

Arctic Ocean

- Smallest ocean
- Covered in pack ice
- Attracts migrating animals, like whales



Bathymetry and topographic data



5000
 6000
 7000
 8000
 9000
 10000
 11000
 12000
 13000
 14000
 15000

Islands larger than 10000 m² are plotted in white
 (minimum size of island is using the same 5-degree
 parameters as in the rest of the map)



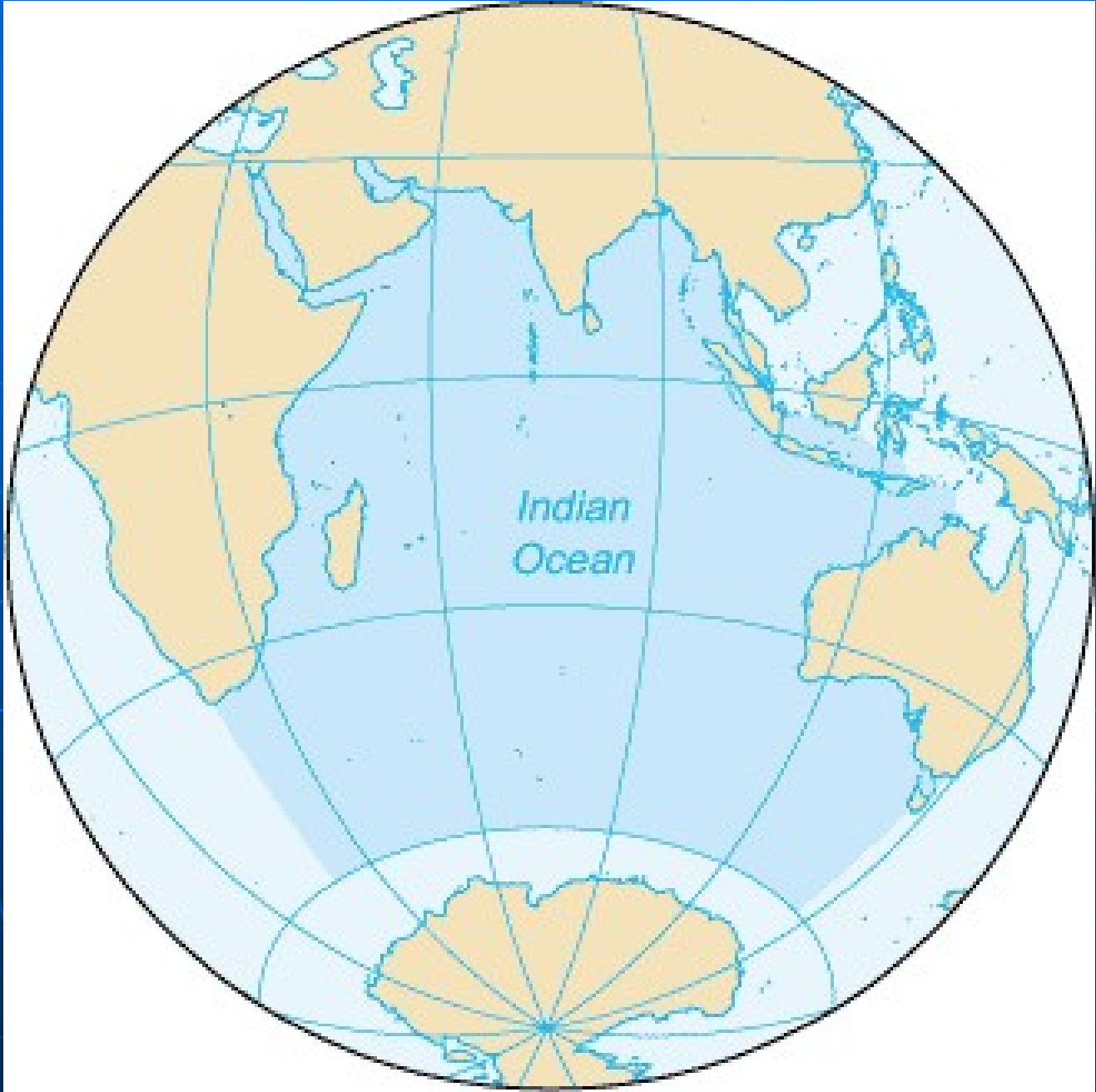
Pacific Ocean

- 1/3 of the globe is covered by this ocean
 - Half of the planet's seawater
- Has the highest mountain – Mauna Kea Volcano (10,200m)
- Has the deepest trench – Mariana's Trench (11,034m)
- Shrinking because of subduction zone causing the "Ring of Fire".
- Nuclear Testing during the 40's and 50's



Indian Ocean

- Warm latitudes
- Tropics and coral reefs
- Subtropics have monsoons (reverse currents)
- Whale sanctuary
- Red Sea



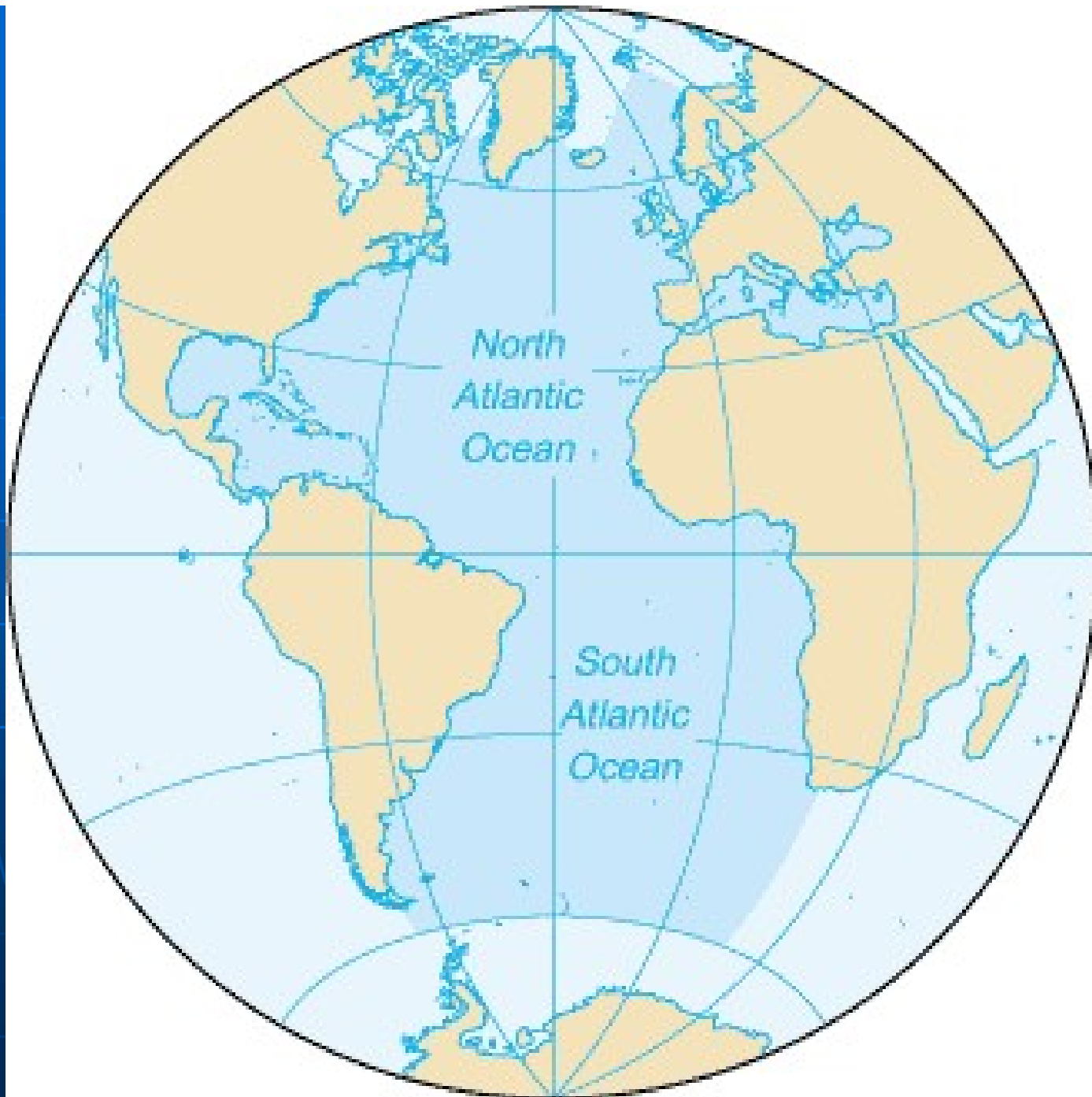
Antarctic Ocean

- Marine life flourishes here
- Krill, plankton
- Cold goes north to balance the tropics



Atlantic Ocean

- Icy northern region, but includes the Caribbean
- North Atlantic Drift Current
 - The Gulf Stream
- Spreading and growing b/c of the Mid-Atlantic Ridge
- Abundant sea life, suitable habitats



Record the following on your map (use colors):

Oceans:

Atlantic
Pacific
Indian
Arctic
Southern

Continents:

North America
South America
Europe
Asia
Africa
Australia
Antarctica

Other Bodies of Water:

Amazon River
Arabian Sea
*Baltic Sea
Bering Sea
Black Sea
Caribbean Sea
Caspian Sea
Gulf of Mexico
Mediterranean Sea
Mississippi River
Nile River
Persian Gulf
Red Sea

Ocean Features:

Mid-Atlantic Ridge
Marianas Trench/Challenger Deep