

# Thursday, Sept 2, 2021

**Pick Up:** ■ Cornell Notes ISN pg 19/Ocean map ISN pg 18

**Today you will:** ■ Notes on Exploration  
■ Listen & complete notes

Focus on the learning, not the grade!

# Brains On!- DSQ Sept 1

1. What historical event do you know of related to Marine Science?

# History of Exploration & Marine Science



# There are three main reasons to study oceanography history.

- 1. The history of oceanography isn't isolated from the world's overall history.
- 2. Oceanography's past helps you understand why and how people apply marine sciences today.
- 3. Its interesting!

# 4 stages of oceanography

- 1. ancient uses and explorations
- 2. the middle ages
- 3. European voyages of discovery
- 4. modern marine sciences

# 3 primary reasons for early civilizations to interact with the ocean

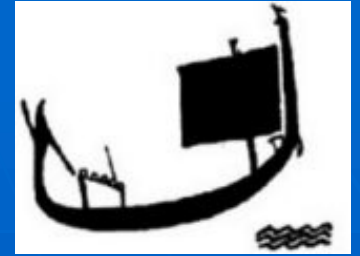
- 1. food
- 2. discover new lands
- 3. trade

# 5000 B.C to 800 A.D

- Egyptians- Earliest recorded sea voyage around 3200 BC.
  - made the first sailboats with a sail and oars
- Phoenicians- made the first trade routes (Mediterranean).
  - Stayed within sight of land, using the North Star for navigation
- Polynesians- made primitive maps and were the first to have long distance open ocean voyages with land out of sight.



# 5000 B.C to 800 A.D

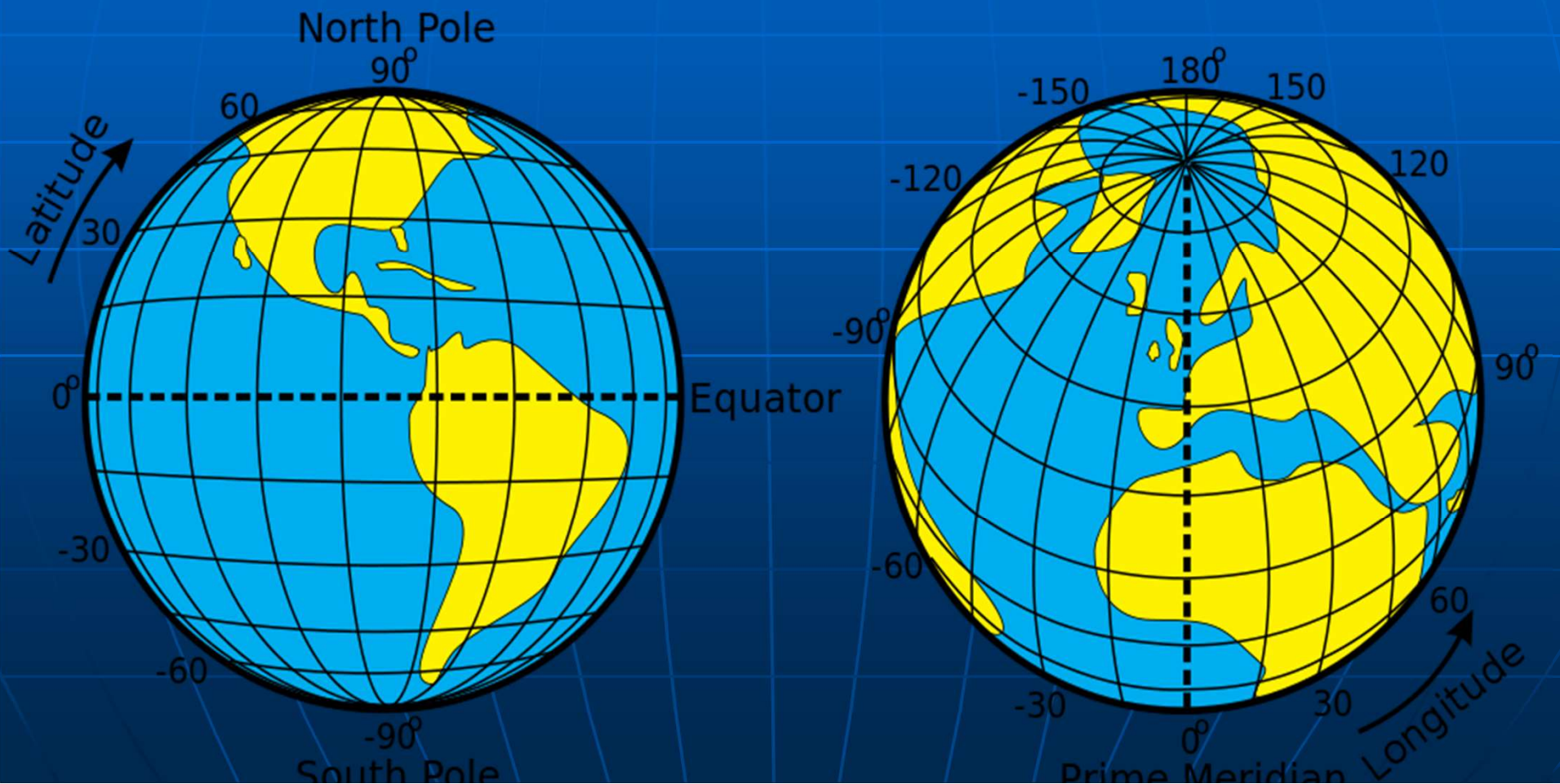


- Greeks- Major advancements in navigation
  - **Pytheas**- mapped out latitude using the North Star
  - **Eratosthenes**-
    1. **calculated Earth's circumference**
      - *Greeks knew the Earth was a sphere, not flat. Western civilization would "lose" this knowledge in the Middle Ages.*
    2. **Invented the first latitude/longitude system**, but it was irregular.
  - **Hipparchus** – **invented the lat/long grid system we use today (450BCE)**



# Latitude and Longitude

Purpose: to identify specific locations on Earth's surface.



# What is a parallel?

# What is a meridian?

- **Latitude lines** never intersect, so they are called "parallels".
- The *equator* is at zero degrees parallel.
- **Longitude lines** are called meridians. Zero degrees meridian is called the *Prime Meridian* and it runs through Greenwich, England.

## Stage 2

# Middle Ages = Dark Ages In Europe

- Any thoughts on why they were called the dark ages?
- Knowledge of geography and science entered an intellectual “darkness” there was also, poor communication and lack of education.
  - Myths replaced knowledge (Earth is round vs Earth is flat).

800 A.D to 1400 A.D

■ Vikings- Improved sailboats

- Bigger sails
- Oarsmen if no wind
- Flat-bottom boats (get closer to land)

■ Sea exploration was only done by Vikings

- This lasted from about 800-1100 A.D. (the middle of the dark ages)



# Major Viking discoveries

- 9<sup>th</sup> century: warming climate led to melting N. Atlantic ice, this allowed more Viking voyages through previously frozen area.
- Discoveries:
  1. Iceland (mild climate)
  2. Greenland (frozen land)
  3. North America (Newfoundland Canada) led by Leif Eriksson
    - Leif Eriksson day is Oct. 9<sup>th</sup>



## Meanwhile... In China...

- During the European “Dark Ages” other parts of the world, were making intellectual progress.
- In 1125 the magnetic compass was invented and being used by the Chinese sailors.
- Chinese ships had central rudders and watertight compartments

## Stage 3

### European Discovery (1400-1700)

- Primary motivations that led to the ocean explorations of the 15<sup>th</sup> century?
  - Economics, politics, and religion

# Prince Henry the Navigator of Portugal 1400s

- Used the compass (new to Europeans) to find a passage route around Africa. He failed, but brought back new information about the west African coast.



# The End of the Dark Ages

## ■ Bartholomeu Dias

- A Portuguese navigator
- 1487-Sailed around the tip of Africa, which he called: "Cape of Storms" (*Cabo das Tormentas*). Later named the Cape of Good Hope

# ■ Christopher Columbus



- 1492 went to sea to find a new route to India for trade, he headed west and crossed the Atlantic and landed in the Bahamas. He thought he had reached Asia because he was using Ptolomy's estimation of Earth's circumference.

- Later he reached South and Central America

# Later Expeditions

- **John Cabot**- 1497 left England and sailed to what is now Delaware.
- **Vasco Nunez de Balboa** – 1500s crossed the Isthmus of Panama, first to see the East coast of the Pacific
- **Amerigo Vespucci** explored 9600 km of coastline from North to South America
  - Mapmakers in Europe named the Americas after him
  - First to recognize S. America as its own continent

## Later Expeditions Cont.

- **Ferdinand Magellan**, a Portuguese navigator , was the first to attempt to circumnavigate the earth
- **Francis Drake**- 1577 second successful circumnavigation of the world, his purpose was to raid Spanish ships for treasure.

# Stage 4: Scientific Explorations Modern Marine Science

Science – Using observation  
and experimentation to find  
answers (empirical evidence).

# Scientific Exploration

- James Cook: Mid 1700's
  - Figured out how to prevent scurvy (A crippling disease caused by vitamin C deficiency)
  - <http://dl.nfsa.gov.au/module/1318/>
  - 1<sup>st</sup> to use **chronometer (accurate clock or watch)** to determine longitude.
  - Mapped many islands in the Pacific including Australia and New Zealand.



- James Harrison: Invented the chronometer.

- The chronometer is a clock invented to be used specifically at sea. This allowed sailors to accurately comparing Greenwich Mean time to the local time.





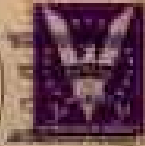
- Cornelis Drebbel- 1620 1<sup>st</sup> submarine

- [http://www.dutchsubmarines.com/specials/special\\_drebbel.htm](http://www.dutchsubmarines.com/specials/special_drebbel.htm)

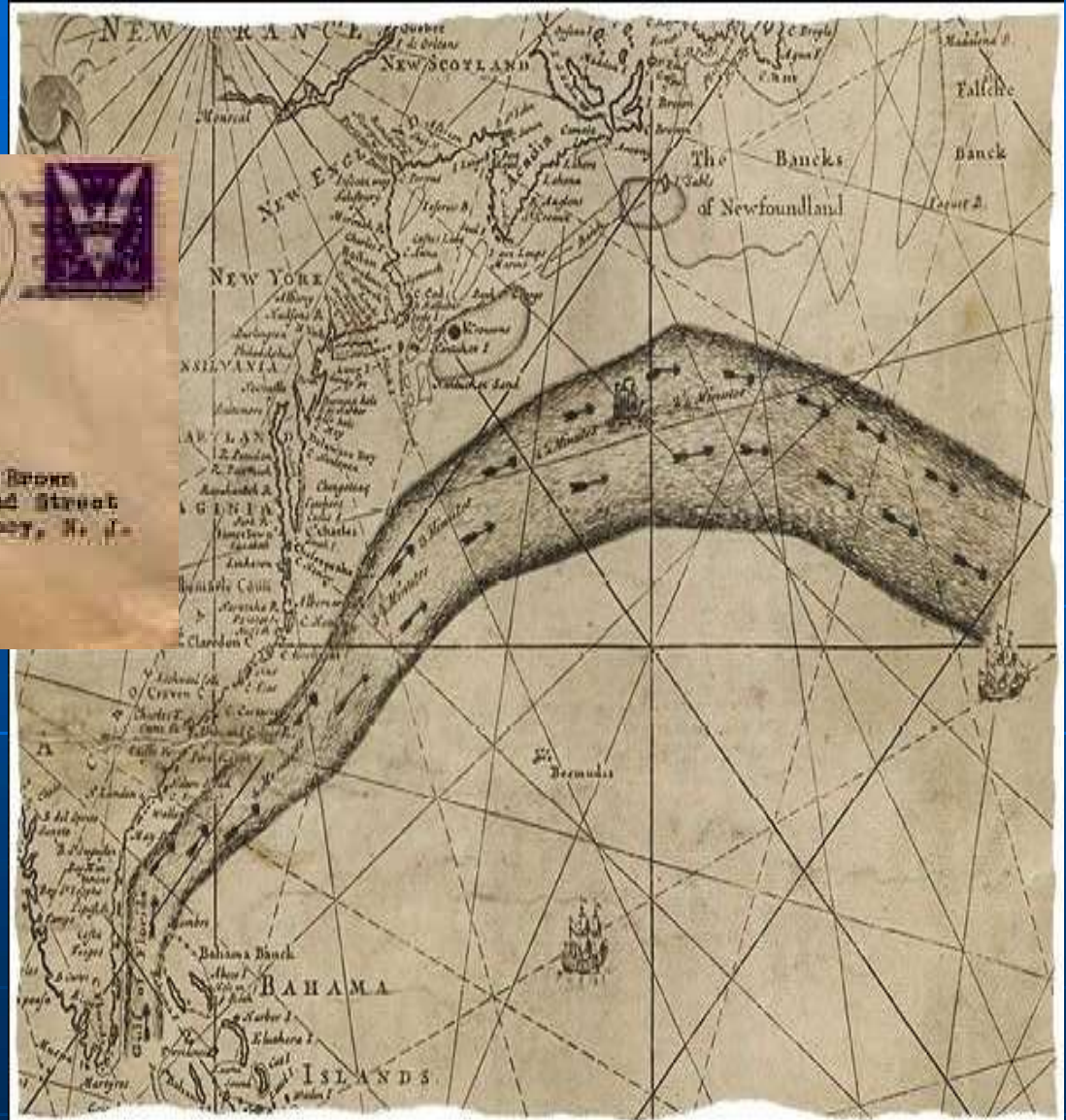
- Benjamin Franklin, US postmaster, wanted to know why it took longer for mail to come from Europe to America than vice versa
  - Later he drew an accurate map of the Gulf Stream



The first submarine was constructed by Cornelius and Oliver of Holland, in the year 1615, from 1 of long pine. It was propelled by 12 men, and submerged to a depth of twelve feet. This occurred in 1615.



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## Drebbel's 1st Submarine

# Ben Franklin's Gulf Stream- Image 1

- Matthew Fontaine Maury:  
American Naval Officer
  - “The Father of Oceanography”
  - Studied currents and other physical aspects of the sea
  - 1855 analyzed the logbooks of navy ships and published the first books on oceanography called
    - *The Physical Geography of the Sea*

# More Exploration

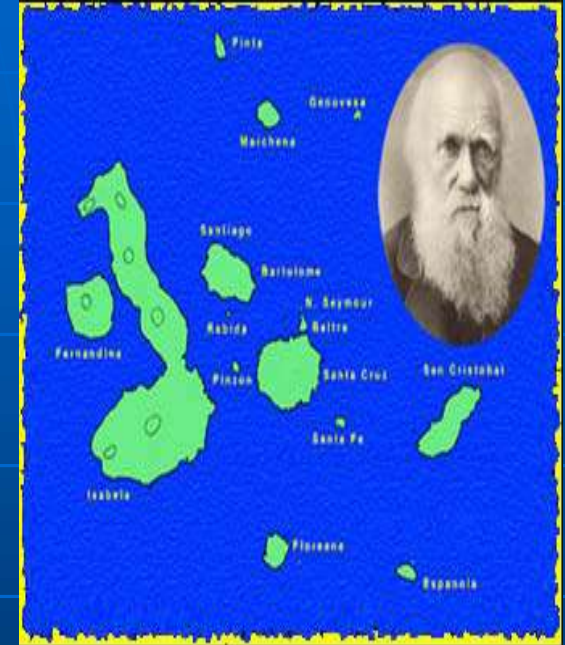
- Thomas Jefferson: 1807 authorized *Survey of the Coast* (the predecessor to NOAA)
  - NOAA- National Oceanic and Atmospheric Administration
- Charles Wilkes: 1836 the Wilkes Expedition (U.S. Exploring Expedition) proved the existence of Antarctica.

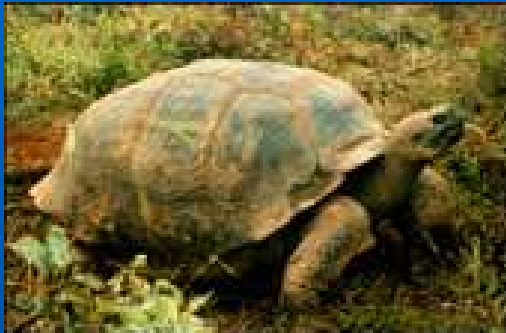
# Charles Darwin

## 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](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
- Led the most successful ocean expedition devoted exclusively to scientific study
- 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)