1. **Scientific**

    a. Science is in some ways an "artifact" of the enlightenment. It is hard to say when "science" began since a definition if science is difficult. Early Greek and Roman "naturalists" may be seen for example, as scientists, but not in the modern sense of the word.

    b. Modern science is associated with the enlightenment and the age of reason which is slowly being chipped away by post modernists.

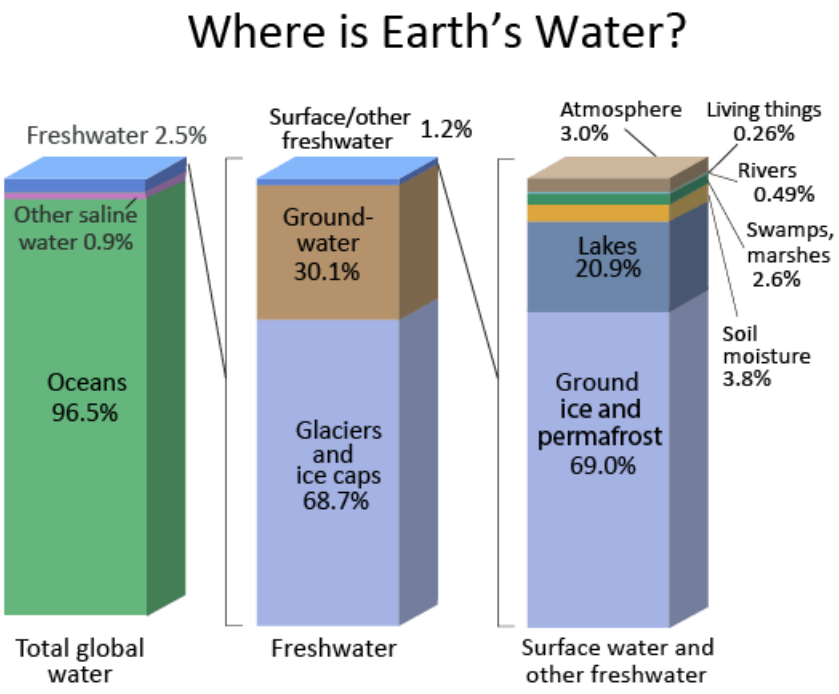
    c. Scientific studies of the ocean come late, since the age of exploration has a great impact on the scientific area. The sea is not easily studied and even now, we know more about the surface of the moon than we know about the bottom of the ocean.

    d. The study of the ocean involves many disciplines. The physical properties of the ocean are study by physics, chemistry, geology or earth and environmental studies. Biology has an entire division known as marine biology. The social sciences also look at the ocean and the people involved with it. Anthropology and archaeology look at the historical developments of the sea faring as well as the way the sea is involved with many cultures. History, sociology, political science and law are all disciplines that as part of their history have looked at the sea. Maritime law is of major importance in shipping, fishing, and many other areas.

2. The ocean covers most of the planet. All the oceans are connected so there is really only one ocean. For reasons we will talk about later it is possible and reasonable to divide the ocean into many parts – the Arctic Ocean; the North and

South Atlantic Ocean; the North and South Pacific Ocean; the Indian Ocean and the Southern Ocean. So while there maybe 7 "oceans" that are often named – there is really only one large body of water.

3. Most of the earth's water is in the ocean – about 96.5 percent. About .9% of the water outside the ocean is saline ("salty") while about 2.5 percent is fresh water. Of the 2.5 % of the earth's water that is "fresh" about 68.7% is in glaciers. Ground water contains about 30.1 of the fresh water while lakes contain about 20.9 percent. Of the remainder about 3% is in the atmosphere; 2.6% in swamps and marshes, 0.49% in rivers and about .26% in living things!



Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources.
NOTE: Numbers are rounded, so percent summations may not add to 100.

4. Living things are called the "biosphere" which is like the "atmosphere" which is the air. There is also the "hydrosphere" which is the watery part of the world and the lithosphere which is made of the rocks. Chemicals move from one sphere to the other. The amount of time a chemical spends in any sphere is called its "residence time"

   Atmosphere: the air around the planet
   Biosphere: living organisms on and around the planet
   Hydrosphere: the watery part of the world
   Lithosphere: the mineral part of the world
   Residence time: The amount of time that a chemical remains in a given sphere.

5. **BIASES**

WHAT ARE BIASES AND WHY ARE THEY IMPORTANT?

BIASES

This is something we need to take seriously. It can pervade many things including science. It is most likely to impact the interpretation of the data. One aspect we should note is called “anthropomorphism” which is the attributing of human characteristics to non-humans. A classic example is seeing porpoises or dolphins as “happy” because of their “smile”. The animal is not smiling that is just the way the dolphin’s mouth is shaped. It appears that if we see something that looks human we interpret it that way.

Biases can be personal or cultural and can easily affect the interpretation of many things including data. This is something that many social scientists (even those who are not post-modernists) are interested in. Some are very deeply rooted in the culture or the person's own background and are often invisible to the people involved.

In social science and especially anthropology, there are two terms of importance: ethnocentrism and cultural relativism. These are terms which are often misused so we need to look at them carefully.

Ethnocentrism is trying to impose the categories of one culture onto another in an attempt to analyze the culture. Cultural relativism is the opposite – it means trying to see the culture in its own terms. You don't have to like them, just see how the society is working.

These two terms should be kept distinct from moral relativism and moral absolutism. These have to do with morality not analysis.

An easy example of ethnocentrism and cultural relativism comes from linguistics. For a long time Latin was seen as the "perfect language" so any deviation from Latin grammar was considered improper – even if you were looking at English which is a Germanic language and not a Romance one.
In Latin, verbs have 6 forms

Porto - I carry	portamus – we carry
Portas - You (sing) carry	portatis - You (plural) carry
Portat – he, she or it carries	portant – they carry

English has only 2 forms:

I, you, we, they	carry
He, she, it	carries

But generations of school children had to say:

I carry, you singular carry, he she or it carries, we carry, you plural carry, they carry. Latin has 6 forms, English should too.

This is clearly imposing a Latin structure onto English (other languages by the way have many more forms than Latin!

If we just say English has 2 forms, Latin has 6 we are being "culturally relative". If you are both have six then you are imposing the structure of one on the other.

Moral relativism and moral absolutism are problems about correctness in terms of moral behavior not structure. Some people, for example, have analyzed the caste system in India looking at how it functions in India. Many who did so did not like the system and thought it immoral. So they could be both culturally relative and morally absolute simultaneously.

The concept of “emics” and “etics” relates to the idea that a single event can be interpreted differently. The event is etic, the interpretation is emic.

THE OCEANS

1. The oceans cover about 71 percent of the Earth’s surface. Maybe the planet should have been called “Water” or “Ocean” but there is a kind of “people-centrism” which makes us the center of things. So since we live on the land, we call the planet Earth.

2. There is one and only one ocean. Although there is only one, it is divided into different parts all called “oceans” like the Atlantic and Pacific.

3. Water is made of a molecule (something which is made up of atoms). This particular molecule is made on 2 atoms of hydrogen and one atom of water. Hence the chemical formula H20.

4. All the water on earth is divided generally into fresh water and salt water. Fresh water - with nothing in it but water does not appear anywhere on earth naturally. There is always something mixed in it. Salt water contains salt, but also many other chemicals and minerals. All these together are taken as "salt".

The oceans cover about 71 percent of the Earth’s surface. Maybe the planet should have been called “Water” or “Ocean” but there is a kind of “people - centrism” which makes us the center of things. So since we live on the land, we call the planet Earth.

We talk about 7 oceans but a look at a map will show

how many there really are.

(Oceans map)

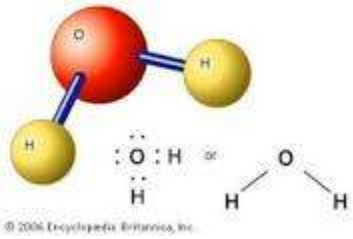
Just one.

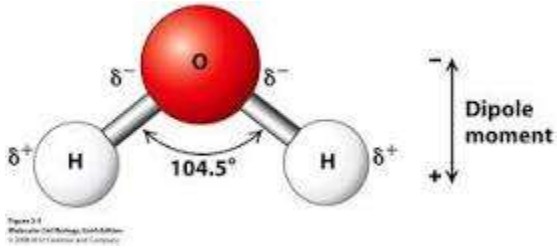
There are grounds for dividing it up into areas like North Atlantic, South Atlantic, North Pacific, South Pacific, Indian, Southern and Polar Oceans. But the number 7 is common in many things in the west. There are 7 days in a week (why?) 7 seas, 7 wonders of the world – the 7th son of a 7thson and so on. We rarely give these any thought, but they are there. They sort of hide in the subconscious, but not too deeply. Other things are much further down and we barely are aware of them. We all (hopefully) know how to make questions in English, but can you give me the rule? Many people will tell you that you raise your voice at the end of a sentence. So what happens with sentences like “What are we having for dinner tonight, mother?” or “What’s that lying in the road ahead (What’s that lying in the road, a head? What do you do with a stiff, neck?) But what about “When does the next train leave?” “Where did I put my book?” what happens when you raise your voice there?

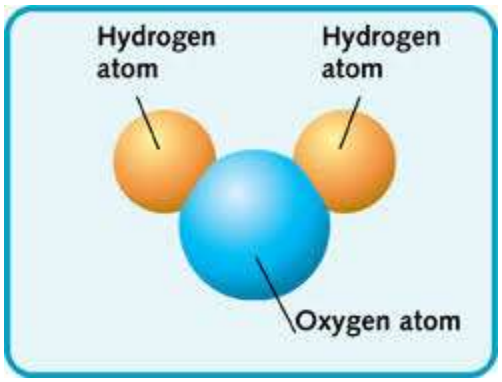
We need to start looking at the ocean by looking at it physically.

WHAT IS THE CHEMICAL NATURE AND SOME OF THE PROPERTIES OF WATER?

Leaving biases to the back of our minds, consider the nature of water







Water is made of a molecule which is 2 parts hydrogen and one part oxygen. Chemically this is H_2O. Water is a requirement of life. It is what makes up all the oceans and seas and lakes, rivers and so on in the world. But water hardly ever occurs in total isolation. Both fresh water and salt water are mixed in most cases with oxygen at least in part of the body of water. In fact as we will discover, not all things in the water are equally distributed. In this

course we are dealing with the ocean which is made of salt water. Salt water is not simply water with salt, but it has many different minerals in it.

According to Stanford University in the US, seawater contains 47 minerals and metals. Starting with the most abundant and proceeding to the least abundant, these are:

chloride, with a concentration of 18 980 parts per million (ppm) in seawater,
sodium (10 561 ppm),
magnesium (1 272 ppm),
sulphur (884 ppm),
calcium (400 ppm),
potassium (380 ppm),
bromine (65 ppm),
inorganic carbon (28 ppm)
strontium (13 ppm).
boron (4.6 ppm),
silicon (4 ppm),
organic carbon (3 ppm),
aluminum (1.9 ppm),
fluorine (1.4 ppm),
nitrogen in the form of nitrate (0.7 ppm),
organic nitrogen (0.2 ppm),
rubidium (0.2 ppm),
lithium (0.1 ppm),
phosphorous in the form of phosphate (0.1 ppm),
copper (0.09 ppm),
barium (0.05 ppm),
iodine (also 0.05 ppm),
nitrogen in the form of nitrite (also 0.05 ppm) and
nitrogen in the form of ammonia (once more 0.05 ppm).
arsenic (0.024 ppm),
iron (0.02 ppm),
organic phosphorous (0.016 ppm),
zinc (0.014 ppm),

manganese (0.01 ppm),
lead (0.005 ppm),
selenium (0.004 ppm),
tin (0.003 ppm),
caesium (0.002 ppm),
molybdenum (also 0.002 ppm)
uranium (0.0016 ppm).
gallium (0.0005 ppm),
nickel (also 0.0005 ppm),
thorium (also 0.0005 ppm),
cerium (0.0004 ppm),
vanadium (0.0003 ppm),
lanthanum (also 0.0003 ppm),
yttrium (also 0.0003 ppm),
mercury (once more 0.0003 ppm),
silver (also 0.0003 ppm),
bismuth (0.0002 ppm),
cobalt (0.0001 ppm) and, finally,
gold (0.000008 ppm).

Altogether, there are some 50 quadrillion tons (that is, 50 000,000 000 000 000 tons) of minerals and metals dissolved in all the world's seas and oceans. To take just uranium, it is estimated that the world's oceans contain 4.5 - billion tons of the energy metal
.
Salt water has different qualities than fresh water. Among them is the fact that they freeze at different temperatures. Fahrenheit used for 0 degrees the temperature at which brine (Brine is a high-concentration solution of salt (usually sodium chloride) in water. In different contexts, brine may refer to salt solutions ranging from about 3.5% (a typical concentration of seawater) freezes - in this case a solution where water becomes saturated. When this is used as 0 degrees then fresh water freezes at 32 degrees. One finds different parts of the ocean exhibiting different amounts of salinity.

Fresh water (< 0.05%)
Brackish water (0.05–3%) (estuaries)
Saline water (3–5%) (“salt water” – oceans etc. Sea water about 3.5%)
Brine (> 5%) (results from evaporation of “salt water” – salt lakes etc,)

The freezing point of water lowers as salt concentration increases. The ocean’s salinity varies a bit since more salt can occurs in warmer water.

	Kelvin	Celsius	Fahrenheit	Rankine
Absolute zero(by definition)	0° K	-273.15°C	−459.67°F	0 °R
Freezing point of brine (by definition (on Fahrenheit scale only)	255.37 K	−17.78°C	0°F	459.67 °R
Freezing point of water	273.15 K	0°C	32°F	491.67 °R
Triple point of water (by definition)	273.16 K	0.01°C	32.018F	491.688 °R
Boiling point Of water	373.1339 K	99.9839 °C	211.97102°F	671.64102 °R

Another interesting property of water is that it behaves oddly compared to other materials. As water gets colder and colder it becomes, like other materials, denser. However as it actually

freezes, the water molecules align in specific ways that cause it to become less dense. This is apparent since one can see that ice floats on water, indicating it is less dense than the water and hence buoyant. We will talk more about this an buoyancy in general later. In dealing with temperatures, we can see that there are many different scales possible. Fahrenheit is one, Celsius is another. Kelvin is yet another that uses absolute zero as a starting point and the Rankin scale does the same. The difference between these two is the size of the degree. Kelvin uses the larger Celsius degree, which is 1.8 times larger than the Fahrenheit degree.

WHY ARE DEFINITIONS IMPORTANT IN SCIENCE?

DEFINITIONS
Definition is an important part of science and one of the first things scientists need to do is to define their terms. Typically there are three kinds of definition or meanings:

Usage

Usage definitions which are the ones found in the dictionary and talk about the way people use the word. Frequently a good dictionary will give many examples of how the word has been used.

Denotational
Many words have denotational meanings – those which say what the word refers to.

Connotational

In many cases words have connotational meanings. These give some indication of what the person’s feelings are toward the referent. Countries change names sometimes because of

connotational meanings. The two words may refer to the same piece of real estate but the connotations are different.

Emotional

This is when the referential aspect of the word largely disappears and the word is used solely to express a strong emotion. In different cultures (languages) the “swear” words are often in completely different areas of the semantic domains. Some languages like English lean towards words that have to do with excrement and sex. Other cultures tend to supernatural things or plants and vegetables or some animals (which English does too). Chinese uses sex in verbal abuse; Japanese does not.

Another is an scientific definition which is a specialized definition used by scientists which restricts meaning to a very particular meaning and tries to lose the connotational meanings associated with usage definition The problems here are that scientific definitions may be completely opposite of the usage ones. For example “myth” often means something which is untrue (That is just a myth). Technically, for folklorists and anthropologists a myth is a story believed to be true and sacred. So when an anthropologist says “The Bible is a myth” it means it is a story taken to be true and sacred, not that it is untrue.

Similarly, the word “theory” technically means an explanation for something that has been repeatedly tested and no contradictions have been found. It is miles away from being a hunch or wild guess as it is sometimes used in usage.

At the museum of American Museum of Natural History there is a model of a blue whale which the signage indicates is the biggest animal that ever lived. There is also a Titanosaur – a kind of

dinosaur – where the signage proclaims that this is the biggest animal that ever lived. What is the problem?

(a) The whale sign went up before the titanosaur was discovered so the “biggest animal” has changed
(b) “Big” is not technically defined. Does it mean “longest”? The Blue whales get to be 110 feet or so. The Titanosaur measures some 121 feet. Titanosaur wins.
(c) “Big” is not technically defined. Does it mean “body mass”? The titanosaur has a very long skinny neck and a very long skinny tail. The Blue Whale has nothing skinny. Which has the greater body mass? Who wins this time?

CONCEPTIONS TIME. TIMES - OF VARIOUS SORTS

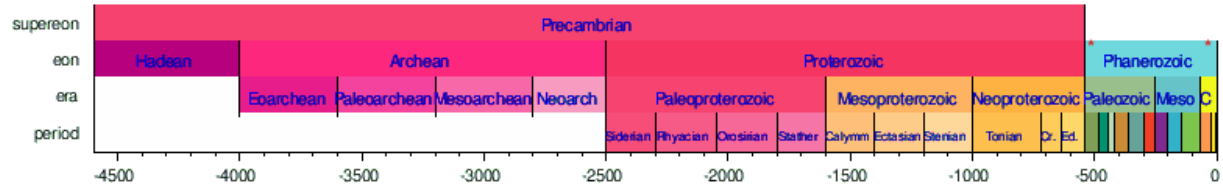
Time and tide wait for no man. Interestingly enough both words have the same origin. Time comes in many forms. Not only are there cultures that operate on different calendars (solar and lunar) but also the idea of time is quite different before and after the invention of the clock or chronometer. People tend to think in terms of their own life spans. Many scientists see things in geological time which is much longer and virtually incomprehensible to people.

There are many kinds of time scales and ways to measure it. Human time frame is usually measured in seconds, minutes, hours, days, years and decades and occasionally centuries and millennia. Sometimes the word “generations” is used to refer to a period of about 20 to 25 years

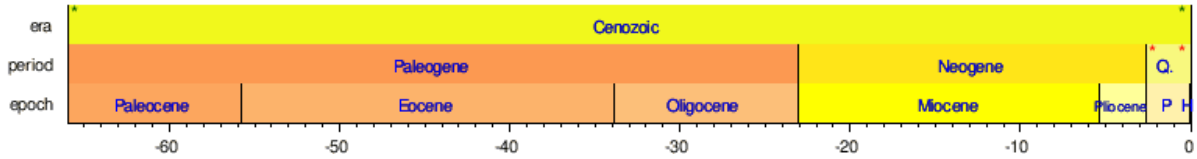
Geological time on the other hand is much greater. It is not unusual to talk of millions of years.

Time is divided into eons, eras, periods, epochs and ages.

So what sometime seems like a long long time on a human time frame may just be a blip on a geological time frame.

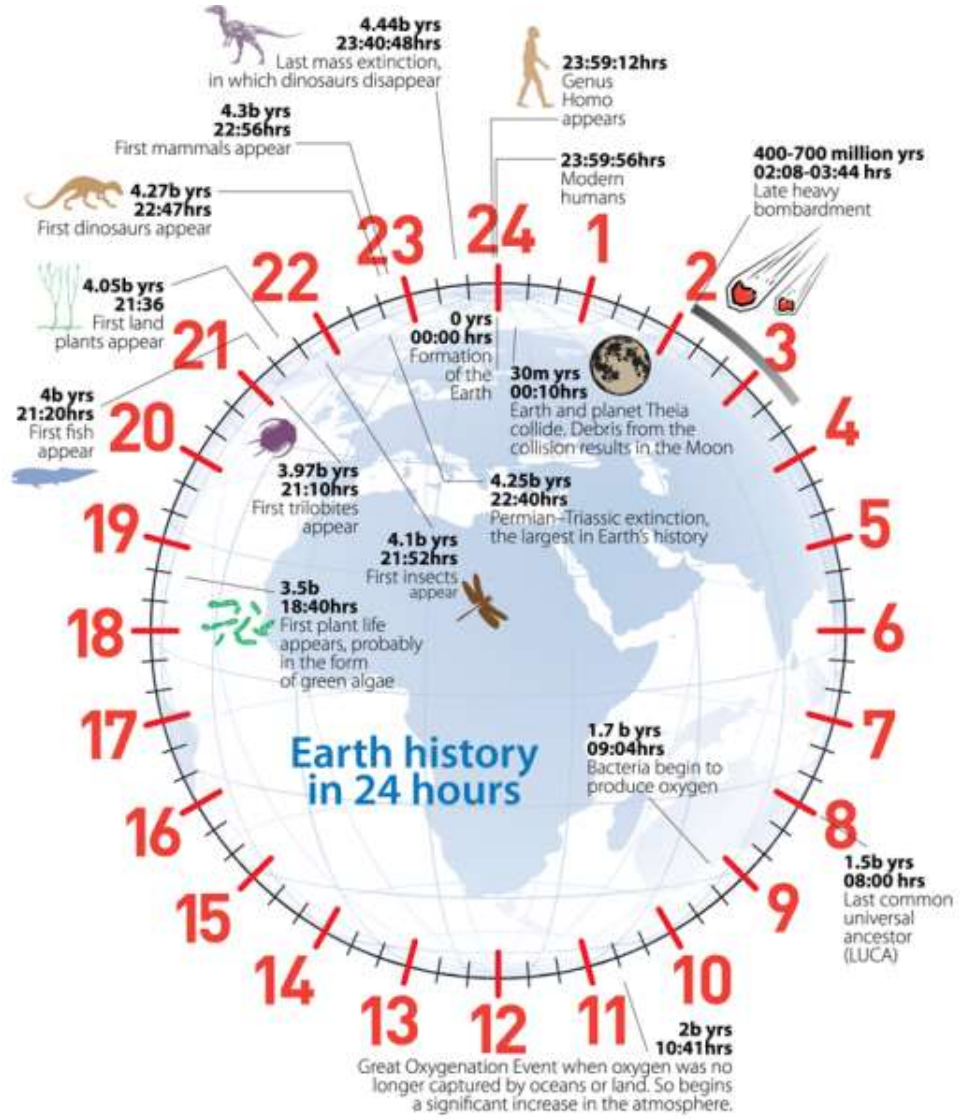


(Precambrian time)



(geological ages)

When we think of the history of the earth as being reduced to a single 24 hour period, humans appear only in the last minute.



(geological 24 hour clock)

HOW DOES THE CHANGING EARTH HAVE AN IMPACT ON LIFE FORMS – ESPECIALLY HUMAN MIGRATIONS

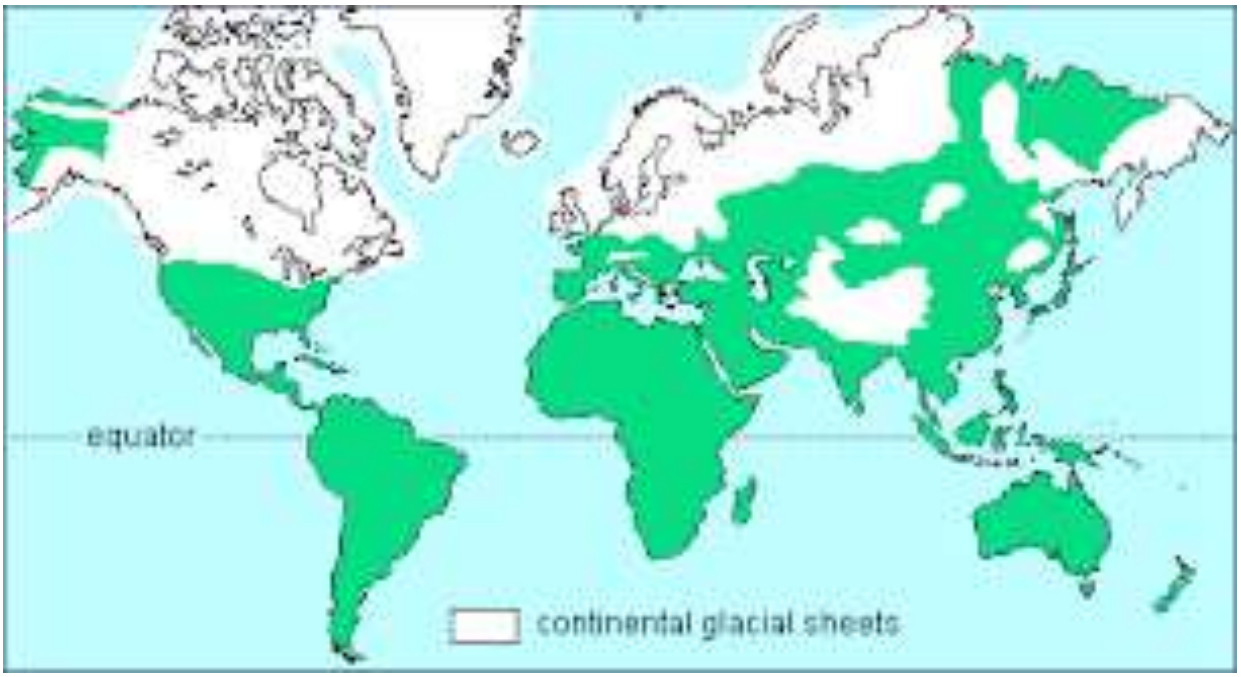
So when the earth seems unchanging, it is only when we think in human terms not geological ones. The oceans are changing just as much as the land is. Many events that happen on the land, also happen under the ocean and have huge impacts on the rest of the world.

Movement of the tectonic plates under the ocean has caused many changes in the earth's surface. In some cases, a major blockage of land has appeared and separated a single area of the sea into 2 separate parts as happens in Latin America. This has much importance in the evolution in some animals who having one species and breeding community finds itself with 2 which may know head off into different evolutionary directions.

In addition the Earth has undergone a number of "ice ages" during which time the polar caps expanded and glaciers moved further and further south. As they move south, the push material in front of them. When they reach their southernmost point and start to retreat as the world heats up, they leave behind a terminal moraine – a large pile of material they pushed before them. The glacier came as far south as NY on the east coast and the terminal moraine is Eastern Parkway. The ice came even further south in the center of the country. As the glacier forms the water to make it up comes from the ocean. So as the glacier comes down from the north, the sea levels drop as well.

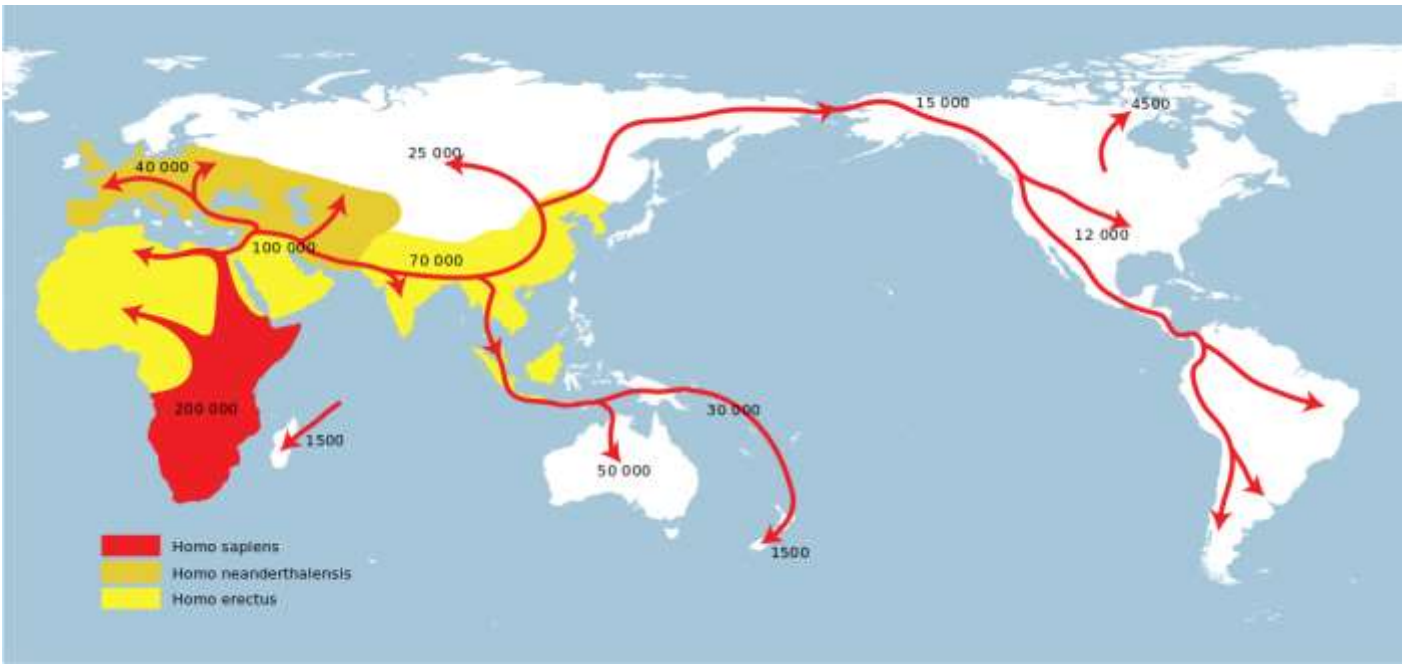
Migrations have been hindered and facilitated by appearance of the ice ages. As the glaciers descend from the north and the tops of mountains, they require water to form the ice. This water is water that has ultimately come from the ocean. So as the glaciers descend, the sea levels also lower. As the sea levels lower, the shore line recedes and more and more land appears.

(ice age (last) - extent of ice1)



(ice age (last) - extent of ice2)

The area between Southeast Asia and Australia and New Guinea drops in sea level and many islands appear as land is uncovered. About 50,000 years ago, people made their way across this area into Australia and New Guinea and began to populate the Pacific. It would be many more years before the other Pacific Islands much further out in the ocean would become populated.



(human migration1)

The area between N. America and Asia is now separated by a short stretch of water known as the Bering Strait – a stretch of ocean about 55 miles across. However, in the strait there are islands so traveling from Asia to the Americas by this route is, even today, possible without being out of sight of land. Between Russia and the US the distance is about 2.5 miles. So you can actually see Russia from Alaska!

(Bering strait)

This is the path believed to be the one by which the original colonizers of N. American arrived, although there was at one point a land mass there called Beringia

(Beringia)

Movement across the continent
from East to West was probably slow. Interestingly enough, the earliest sites are found in S. America, leading to the idea that the migrations may have been along the coast line, which at the time, would have been much further out. Hence early sites in N. America would now be submerged. The S. American sites however are on ranges high above the water. So, sites there would not have been covered by rising water levels as they were in the north.

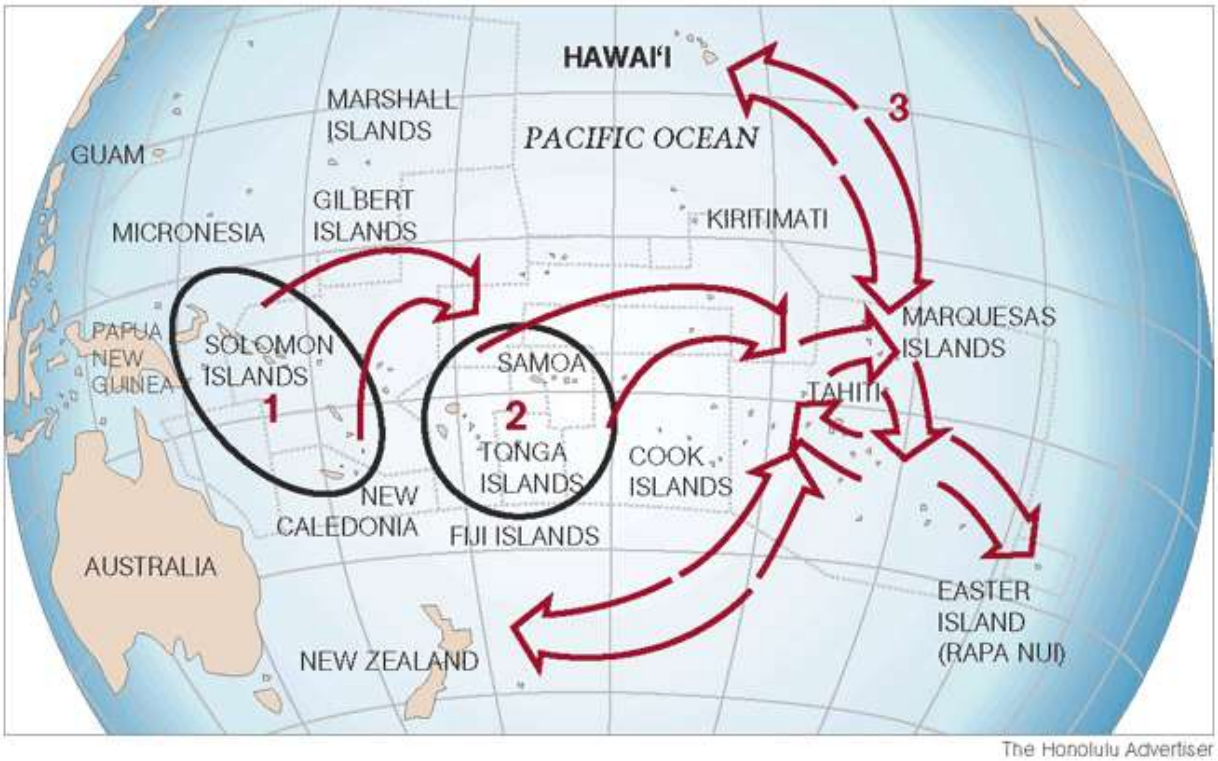
Monte Verde is an archaeological site in southern Chile, located near Puerto Montt, Southern Chile, which has been dated to as early as 18,500 BP (16,500 B.C.).

Although there are many theories about the populating of the Americas which postulate early arrivals from many places, the archaeological and genetic data basically deny those claims.

The populating of the Pacific is the last major population movement into un occupied territory, although the Vikings also moved into an unoccupied Iceland.

Carbon dating and other techniques are leading archaeologists to a new view of the settlement of eastern Polynesia – supported by Polynesian cultural tradition – which suggests a comparatively recent settlement of eastern Polynesia and the existence of a vibrant voyaging and trading culture.

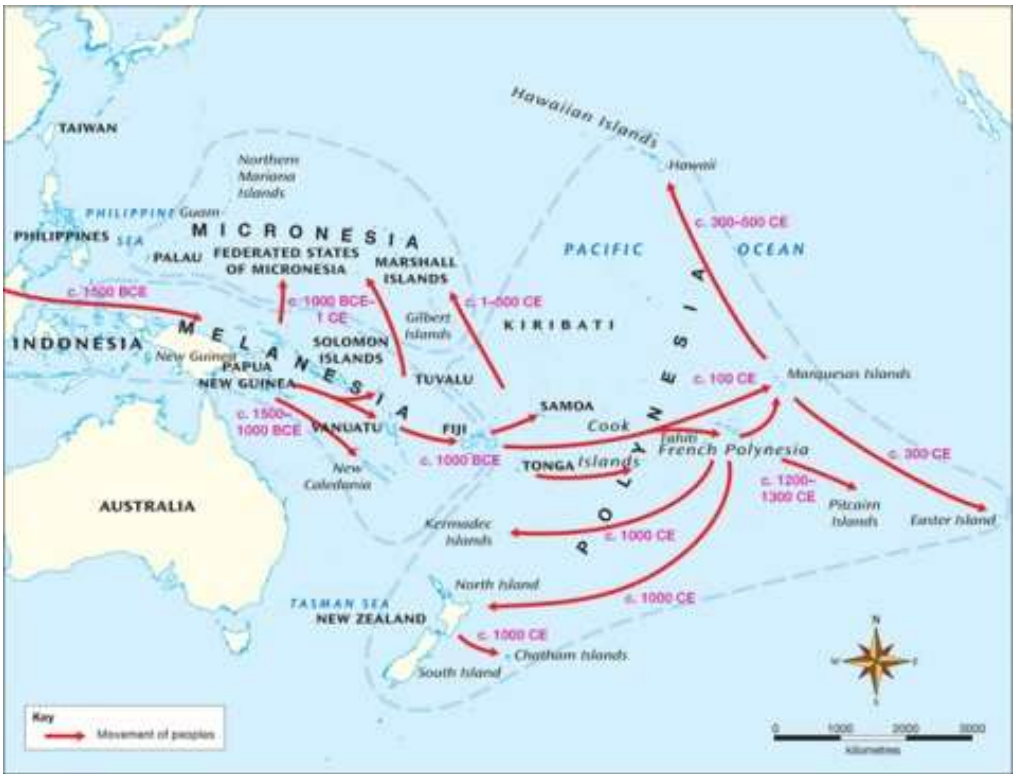
1. Voyagers left the region of New Guinea, Solomon Islands, Vanuatu and New Caledonia about 3,000 years ago, in 1000 to 800 B.C.
2. They arrived in the Fiji-Tonga-Samoa region, where they spent as much as 1,500 years before sailing out of Samoa, perhaps no earlier than 500 A.D.
3. While orthodox theory suggests a central east Polynesia jumping-off area in the Marquesas-Society Islands area, new archaeological work suggests the voyagers kept moving and quickly established a regional homeland – a multi-archipelago Polynesian homeland connected by active canoe voyaging, a single language and culture. Hawai'i was among the early settlements in 800 to 1000 A.D., perhaps established about the same time voyagers found the Marquesas, Tahiti and other islands. Outliers like Aotearoa (New Zealand) and Rapa Nui (Easter Island) may have been settled as late as 1200 A.D.



The Honolulu Advertiser

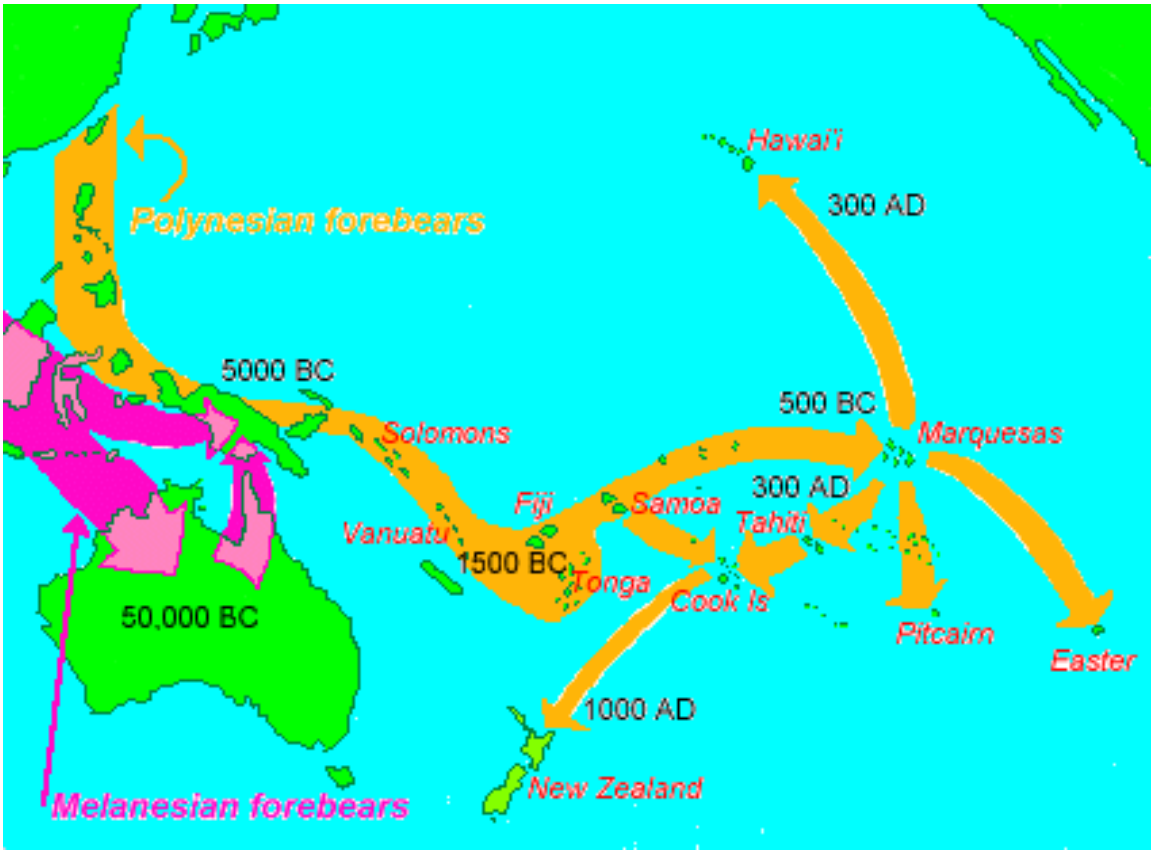
(PolynesiaMigrations2)

The earliest movement into the Pacific has already been mentioned – that is the one to Australia and New Guinea.



(peopling of the Pacific)

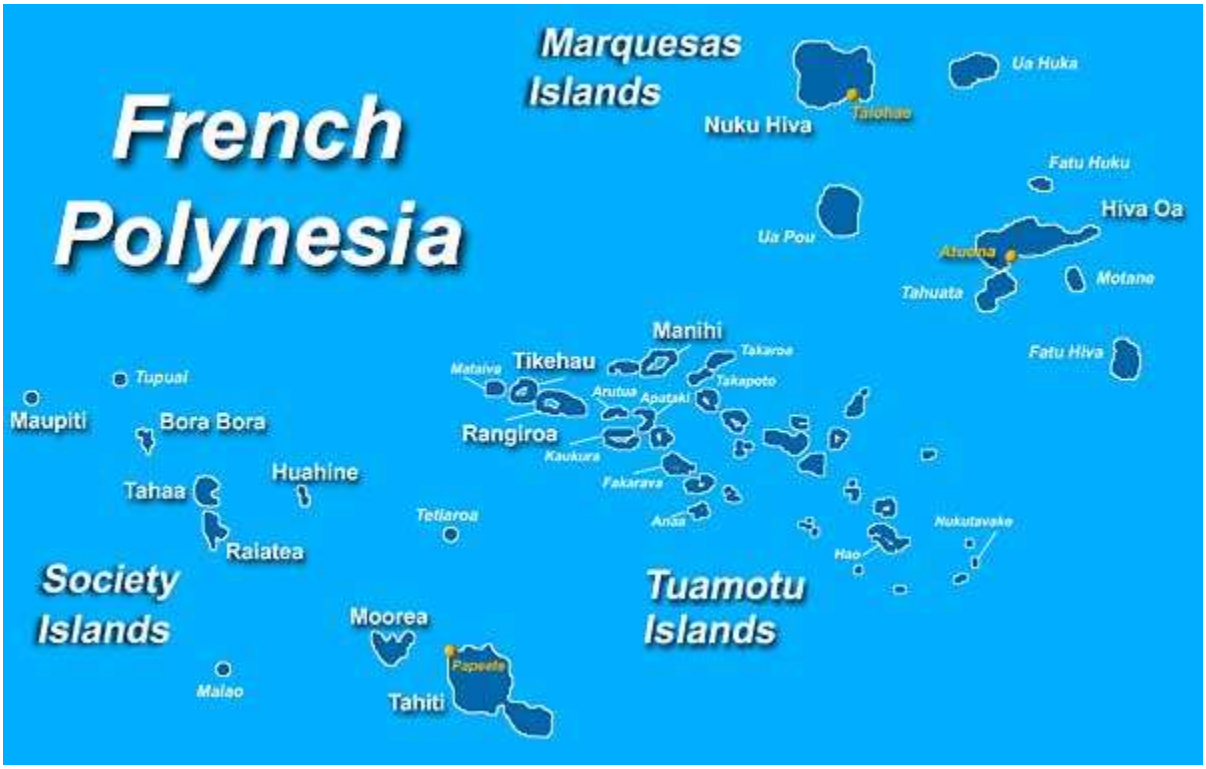
The populating of the rest of the Pacific Islands occurs over centuries.



(PolynesiaMigrations)

Some years ago Thor Heyerdahl thought that people had populated the Pacific from the New World, rather than Asia. To prove his theory, he constructed a raft called “Kon Tiki”

with which he proceeded to sail from South America to French Polynesia

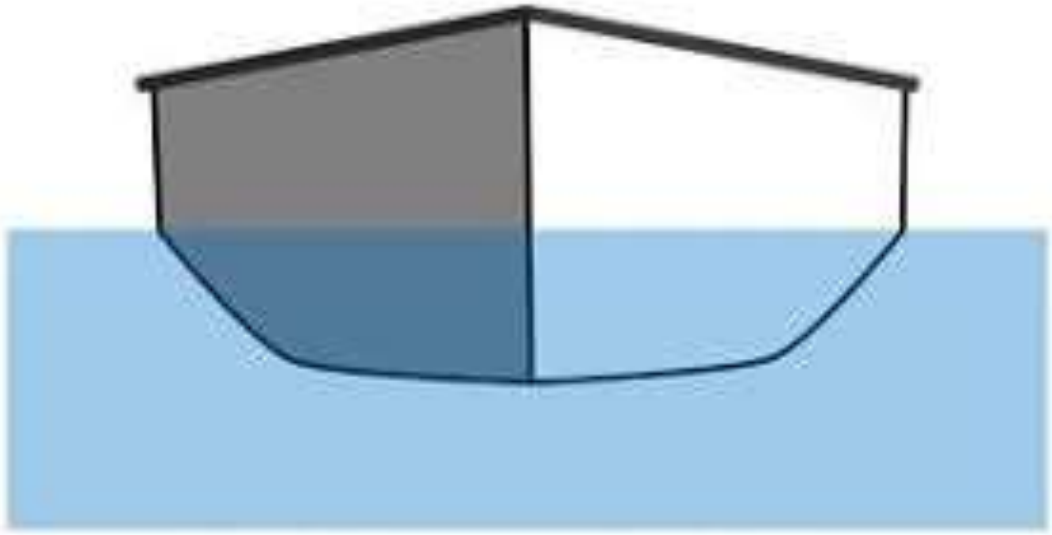


The raft ran aground on a reef in French Polynesia, but Heyerdahl proved it could be done. Many however pointed out that because something could be done, it did not necessarily mean it had been done. Recent DNA testing done on Pacific peoples has failed to show any genetic markers associated with Native American populations, but shows affiliations with Asian ones. This is somewhat odd since Native American populations contain many of the Asian markers.

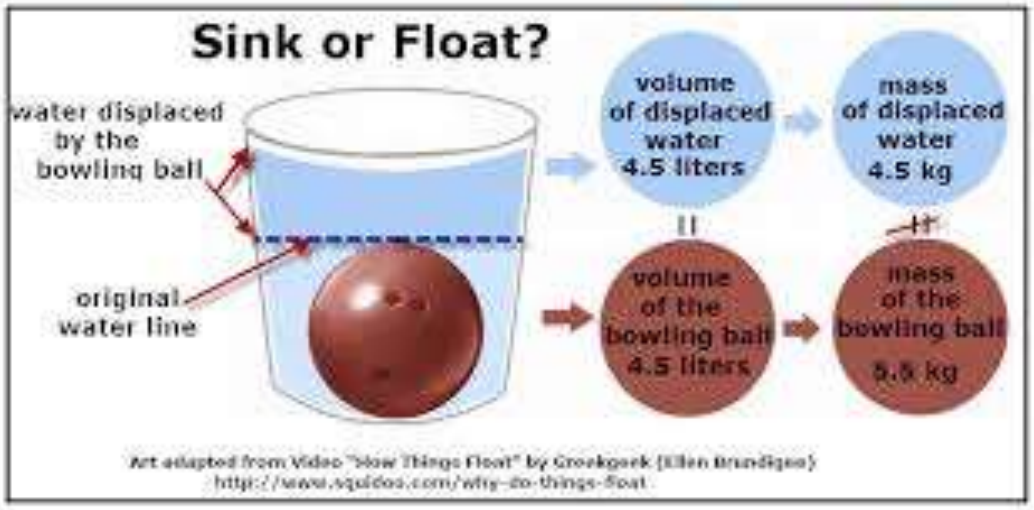
SOME MIGRATIONS, LIKE THOSE IN THE PACIFIC ARE LESS AFFECTED BY THE GEOLOGICAL CHANGES. THE MIGRATIONS IN THE PACIFIC INDICATE A GROWING ABILITY TO TRAVEL ON VAST EXPANSES OF WATER AND THE DEVELOPMENT OF A SYSTEM OF NAVIGATION

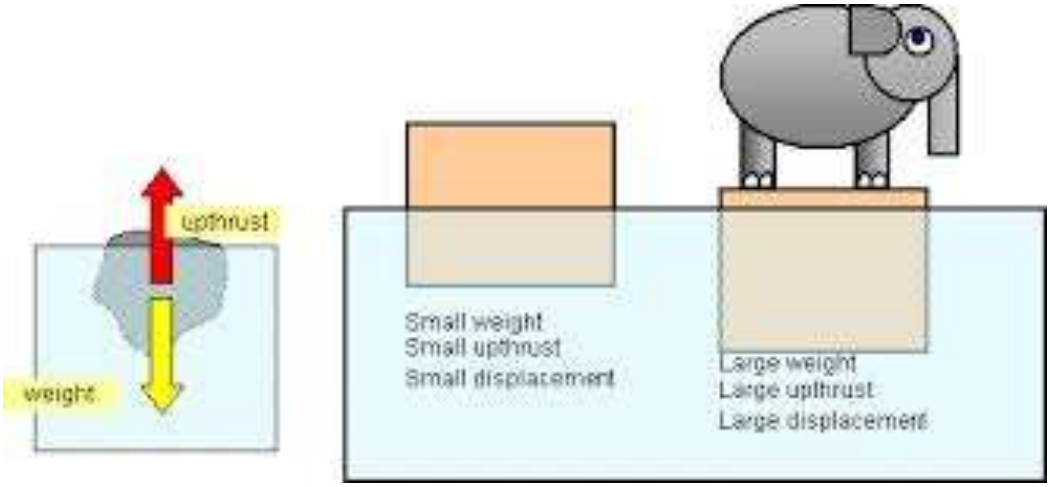
The movement of peoples across expanses of water requires some sort of convenience – a raft or a boat. Swimming is possible for reasonably short distances but not really a form used for migration. Boats and rafts differ in that rafts float because the material they are made of floats without any modification. Boats require displacement.

When any object (boat) displaces a weight of water equal to its own weight, it floats.



Displacement hull





HOW TO GET AROUND THE OCEAN: NAVIGATION
Many people who live near the ocean may venture out onto it on rafts or boats. However, the question of getting around on the water is difficult since there are no “LANDmarks” or “SEAmarks”.

Some peoples rarely go out of the sight of land and so in that case land marks can be used. However open ocean travelling requires something more complicated to get around. The distances involved in navigating the Pacific are far too great to use any kind of land marks. So there has to be another way of getting around. Pacific peoples used several methods for knowing where they were. One of these is astronomical. So here is some astronomy.

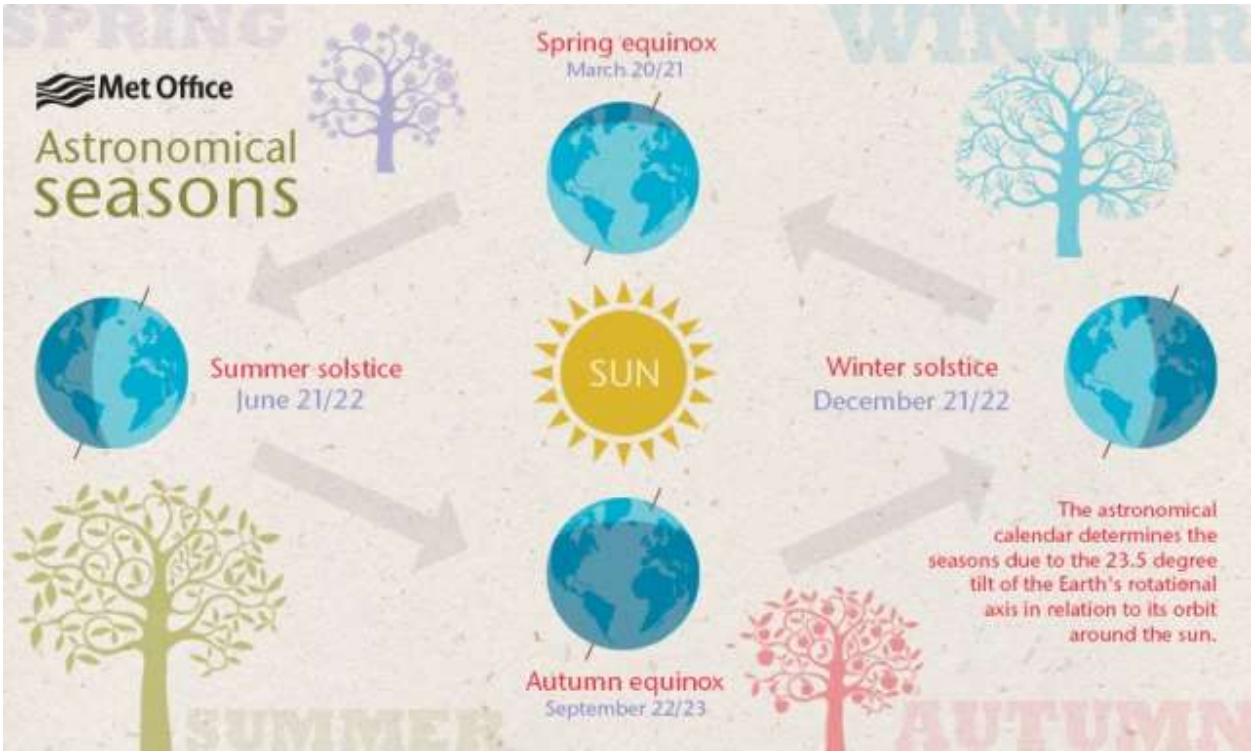
The stars are one possible guide to finding one's direction. We all know the sun rises in the east and sets in the west, except it doesn't. First of all the sun APPEARS to rise in the east and set in the west. It is not the sun that is moving, but the earth that is rotating.

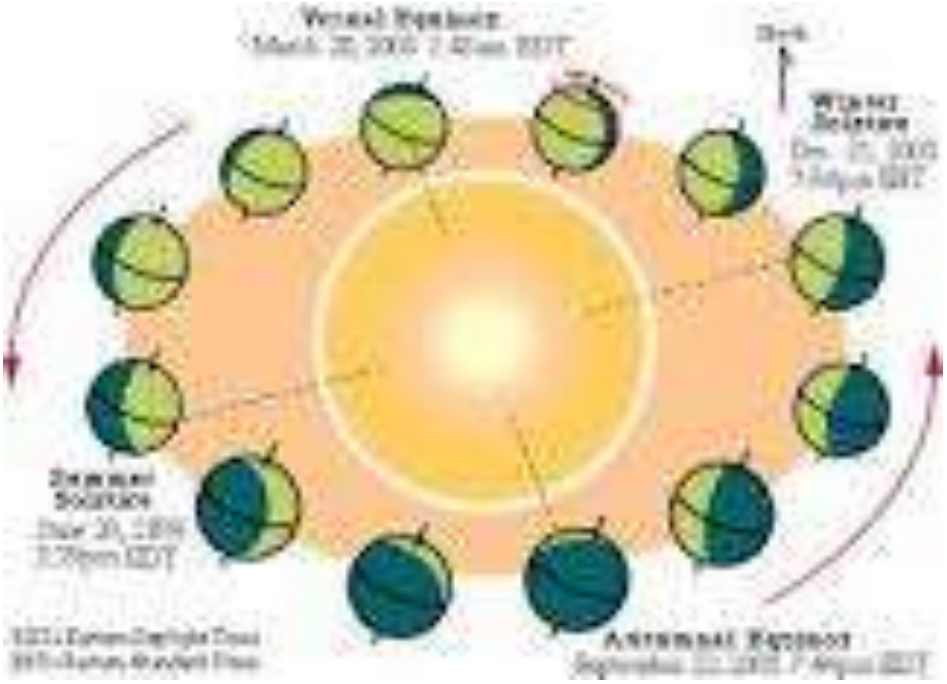
Secondly, the sun does not rise in the east – at least not due east, except twice a year – once on or about March 21 and once on or about Sept. 21. These are the dates of the vernal and autumnal equinoxes. After March 21, the sun "rises" and "sets" further and further north each day until about June 21 (the summer solstice and the longest day of the year). After that is starts to set further and further south each day. One Sept 21 it rises due east and there are 12 hours of daylight and 12 hours of darkness. From the autumnal equinox on, the sun continues to move further south until Dec. 21 – the winter solstice and the shortest day of the year). It appears in roughly the same position for about 3 days and then starts the journey north again.

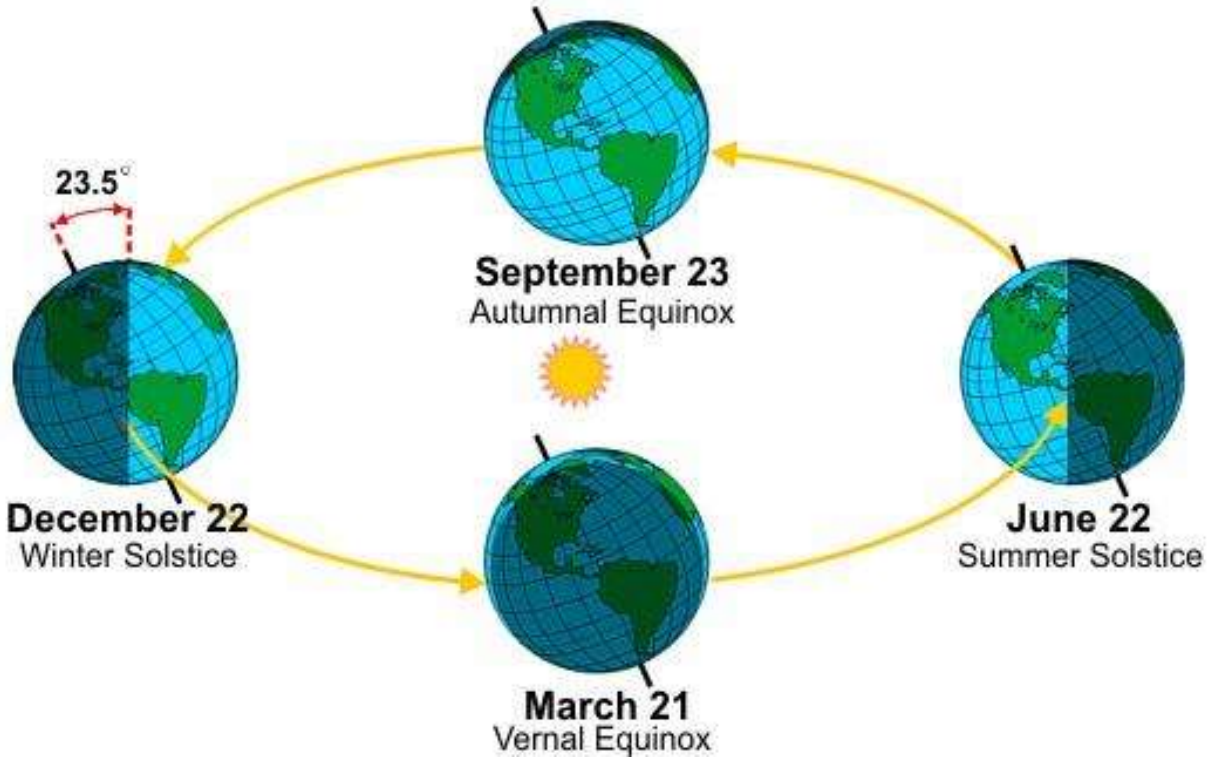
So while the sun more or less rises in the east and sets in the west, it is only a general direction. Some peoples in the world

have 4 directions – NSEW while others have a different 4 - NE, SE, NW, SW. These are the four points that mark the extreme positions of the suns rising and setting. The “Tropic of Cancer” is the furthest point north of the equator where the sun can appear directly overhead. The “Tropic of Capricorn” is the same in the southern hemisphere. The dates on which this happens are the solstices. It happens at the equator on the equinoxes.

The reason for all of this is that the earth is tilted at about 23.5 degrees to the earth’s path around the sun. This is what gives us “seasons”, and explains why the northern hemisphere has winter when the southern hemisphere has summer and vice versa.







How the stars appear to rise and set varies with ones LATITUDE

The stars rotate around a “fixed” position which is marked in the

sky by the “North Star” called Polaris. At the North Pole, Polaris would be directly overhear. On the equator it would be on the horizon.

So at the North Pole, stars do not rise and set, but circle around the sky. None rise and set.

At the equator ALL stars except Polaris rise and set. Between the two extremes, some rise and set and some do not. Those that do not are called circumpolar stars.

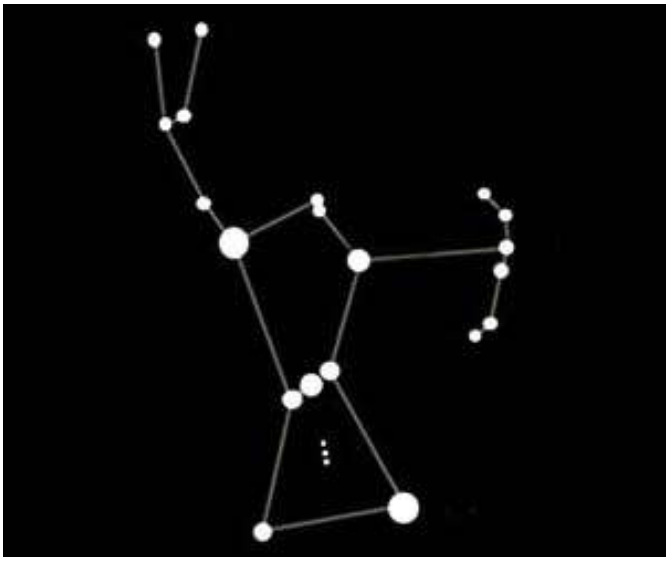
Since the Polaris is directly overhead at the North Pole, and directly on the equator on the equator, then one can tell ones latitude in the northern hemisphere by measuring the number of degrees Polaris is above the horizon.

So Latitude is measured in degrees from the equator (0 degrees) to the North Pole (90 degrees North Latitude) or to the South Pole (90 degrees South Latitude). New York is about 40° 45.102' N. latitude. (You must **ALWAYS** indicate N or S latitude!)

When one travels south of the equator, Polaris disappears below the horizon. There is no nicely placed star over the South Pole the way Polaris is so a different method needs to be used there.

For the Pacific Islanders whose travels take them on either side of the equator a different system was used.

For the West, constellations are figures made by a kind of “connect the dots” approach. Figures are seen like “Orion” or the big dipper (an asterism or a part of a constellation in the case Ursa Major or the Greater Bear).



Pacific Island navigation is able to construct “linear” constellations – that is to say a string of stars all of which rise at the same point. So when one of these is over head you would know your latitude!

The Pacific Islanders also “read” currents – the general movement of the water. Between the stars and the currents, they are able to find their way fairly accurately. They also know the positions of certain islands and would be able to recognize them when nearby.

Islands also tend to have clouds over or around them and so seeing specific localized clouds would also be a clue to their position. In some instances, for example at night, the sound of the waves on a beach would indicate there was an island nearby.

The Pacific Islanders made charts showing the currents and the islands and the stars. Some of these are on exhibit in the Peoples of the Pacific Hall at the Museum of Natural History. See if you can find them in the Hall.

HISTORICAL EVENTS LED TO AN AGE OF EXPLORATION

WHICH INVOLVED EUROPEANS SETTING OUT TO FIND NEW TRADING PARTNERS. THESE LED TO THE EUROPEANS DISCOVERING NEW PLACES – BOTH LANDS AND SEAS

In 711, the Moslems had taken over Spain. The Spanish fought them for many years and finally forced the Moslems were driven out Jan 2 1492. This is the same year that Columbus heads out to the New World. A number of explorers travelled to Africa and the "New World" looking for passages to Asia and new trading partners.

From the beginning of the 15th Century, there was a European exploration of the world. Among them were

a. Christopher Columbus (1492) reaches islands in Caribbean
b. Portuguese reach west Pacific (Arabs precede them) and Spanish reach Eastern Pacific
c. Ponce de Leon (Florida 1513);
d. Hernán Cortés (arrived NW 1511 Conquest of Mexico 1591-21)
e. Ferdinand Magellan (1521) first to cross the Pacific
f. Francisco Pizzaro who explored Peru and battle the Inca (1524 and 1526; 1532- 33 conquest of Peru)
g. Fernando De Soto who traveled through the SE US as far as the Mississippi (1539)

Colonies form

a. Roanoke Colony formed and vanishes 1585 (Birthplace of Virginia Dare – first British Child born in NW Becomes the "Lost Colony"
b. Jamestown 1607 (First permanent English settlement)
c. Plymouth 1620

Captain James Cook:

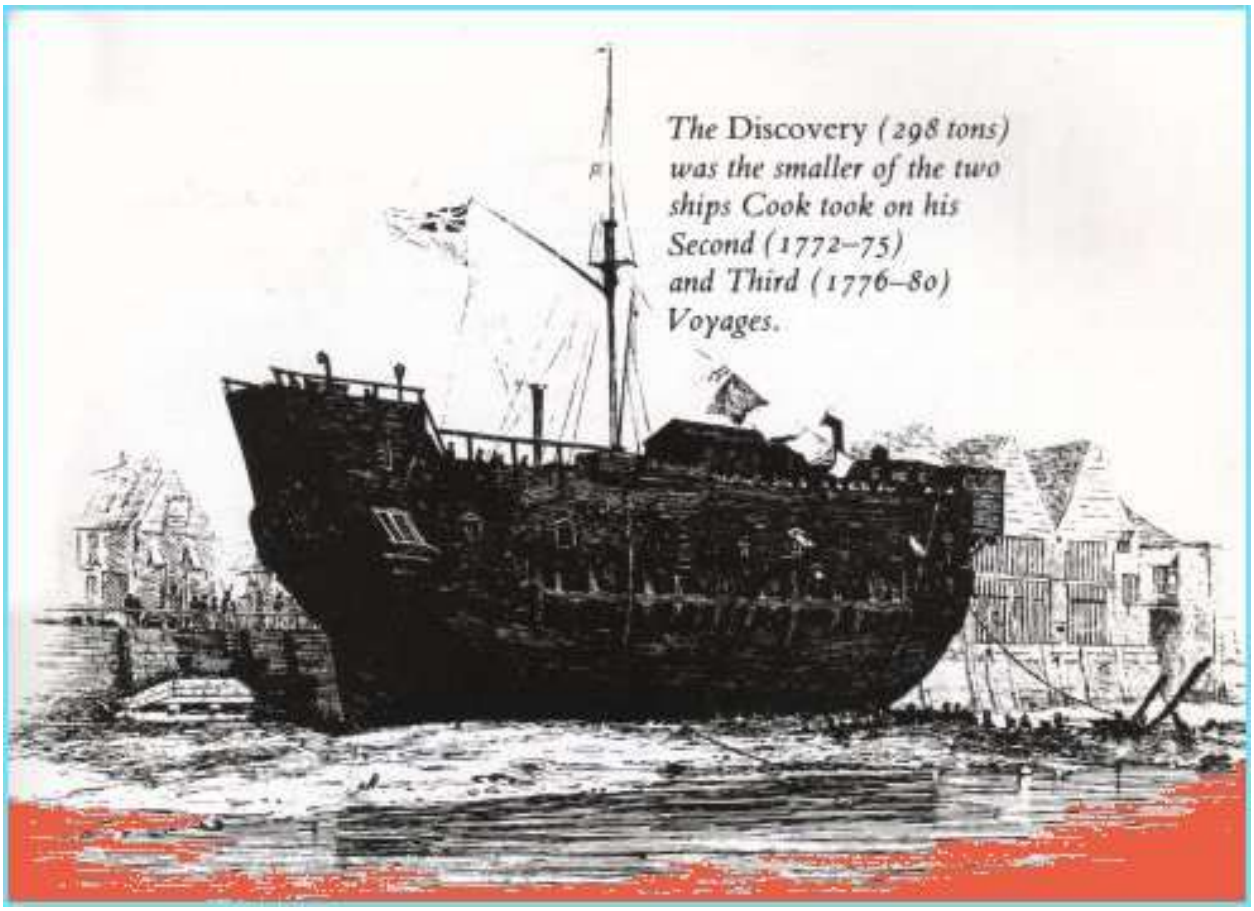
James Cook made three expeditions into the Pacific. The first of the three voyages were 1768-1771

These early expeditions are of course on square rigged ships (mast go across the ship from starboard to port. Crew has to climb in the rigging to haul sails in and so on.

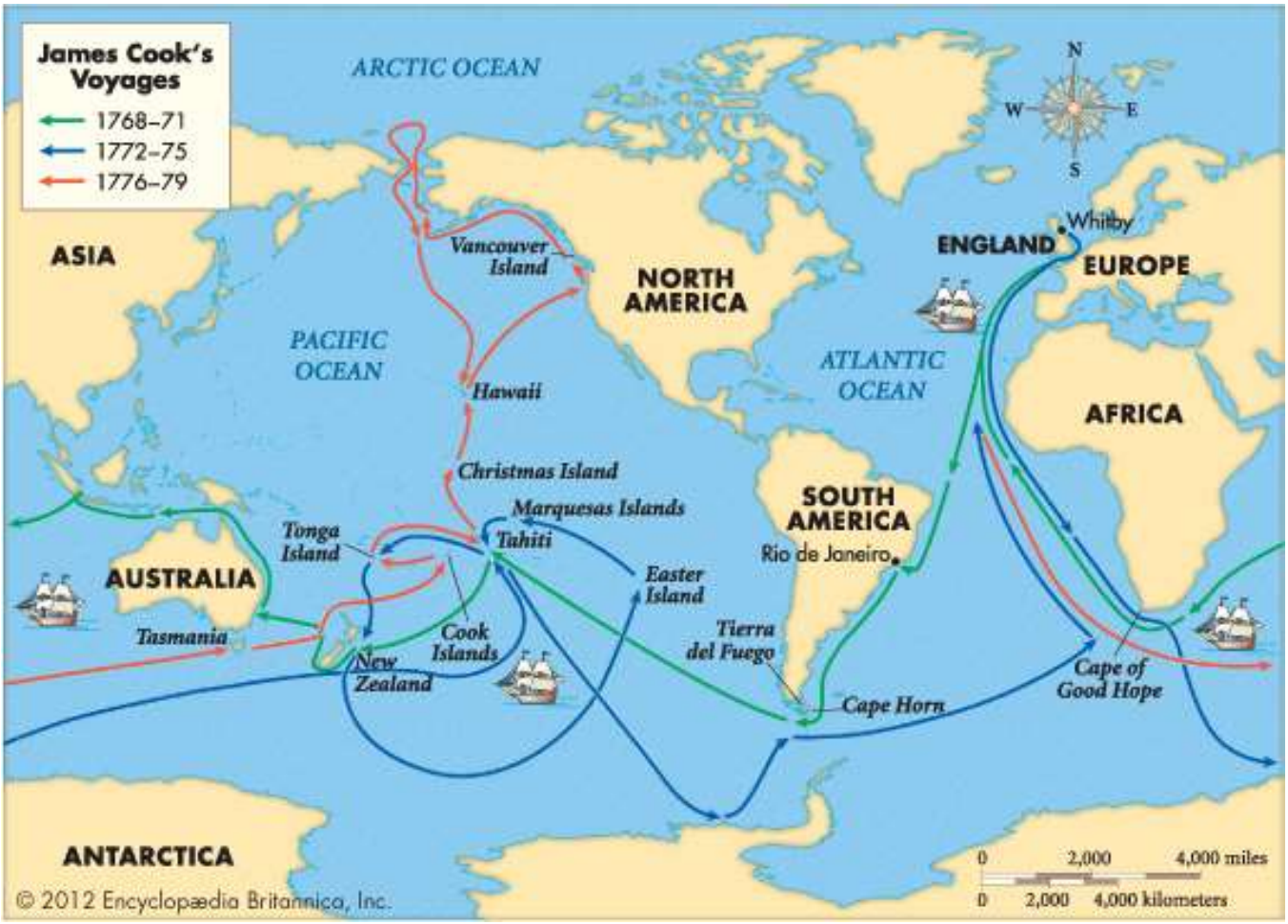
His first ship was the Endeavour, on the second and third voyage his ship was the Resolution. On voyage II he was accompanied by another ship called the Adventure and on the third voyage he was accompanied by the Discovery

The Endeavour (replica)

The Resolution (painting)


The Discovery (298 tons)
was the smaller of the two
ships Cook took on his
Second (1772–75)
and Third (1776–80)
Voyages.

Discovery



CAPT. COOK'S VOYAGES

Captain James Cook set out to locate and map the Islands of the pacific. He made three voyages. On the first his locations on the map were quite good, but on the second voyage they were better. This accuracy was caused by an invention called the chronometer which aided in navigation.

He is known as the first person to circumnavigate the globe in 1771 during which time he made maps of the East Coast of Australia and of New Zealand. He watched diet carefully for his crew and eliminated scurvy a disease caused by a deficiency of vitamin C, characterized by swollen bleeding gums and the opening of previously healed wounds, which particularly affected poorly nourished sailors until the end of the 18th century.

He tried to find a Northwest passage from the Atlantic to the Pacific and found there was none (at the time). He had gotten furs in this area.

He returned to the Hawaiian Islands in the winter of 1778–1779 and was killed in Kealakekua Bay on Valentine's Day 1779 His sailors found that the furs brought huge amounts of money in China and nearly mutinied to go back to Alaska and get more. This is the start of the fur trade