

POPULATING THE WORLD

HOW HUMANS MADE THEIR HOME AROUND THE GLOBE

K Kris Hirst, Archeology Expert, About.com

Multiregional Hypothesis

The Multiregional Hypothesis argues that our earliest hominid ancestors radiated out from Africa and Homo sapiens evolved from several different groups of Homo erectus in several places throughout the world.

The main proponent of the multi-regional hypothesis is Milford Wolpoff. But, growing genetic and archaeological evidence seems to suggest that of all the different evolutionary pathways, the Multiregional Hypothesis is looking less and less likely. There actually are more than three theories, but there are three main strains of the argument about how first Homo erectus and then Homo sapiens left Africa.

Out of Africa Hypothesis - Did All Humans Evolve in Africa?

The Out of Africa or African Replacement Hypothesis is a well-supported theory that argues that every living human being is descended from a small group in Africa, who then dispersed into the wider world displacing earlier forms such as Neanderthal and Denisovans. Early major proponents of this theory were led by Chris Stringer. The Out-of-Africa theory was bolstered in the early 1990s by research on mitochondrial DNA studies by Allan Wilson and Rebecca Cann which suggested that all humans ultimately descended from one female: the Mitochondrial Eve.

Today, the vast majority of scholars have accepted that human beings evolved in Africa and migrated out; recent evidence has shown that happened in multiple waves. The number and timing of the waves is still being debated.

Leaving Africa

Scholars largely agree that our modern species (Homo sapiens) originated in east Africa by 195-160,000 years ago. The earliest known pathway Out of Africa probably occurred between Marine Isotope Stage 5e, or between 130,000-115,000 years ago, along the Nile Corridor and into the Levant, evidenced by Middle Paleolithic sites at Qazfeh and Skhul. That migration (sometimes confusingly called "Out of Africa 2" because it was discovered more recently than the next) is generally regarded as a "failed dispersal", because only a handful of Homo sapiens sites have been identified as being this old outside of Africa. However, fossil evidence of any kind this old is pretty rare and it may be too early to completely rule that out.

A later pulse from northern Africa, which was recognized at least thirty years ago, occurred from about 65-40,000 years ago [MIS 4 or early 3], through Arabia: that one, scholars believe, eventually led to the human colonization of Europe and Asia, and the eventual replacement of Neanderthals in Europe.

The fact that these two pulses occurred in the past are largely undebated today. A third, and increasingly convincing, human migration is the southern dispersal hypothesis, which argues that an additional wave of colonization occurred between those two better-known pulses. Growing archaeological and genetic evidence supports the existence of this earlier southern route into South Asia.

Denisovans, Neanderthals and Us

Over the past decade or so, evidence has been piling up that although pretty much all paleontologists agree that humans did evolve in Africa and move out from there, we did meet other human species--specifically Denisovans and Neanderthals--as we moved out into the world. All living humans are still one species--but it is now undeniable that we share differing levels of admixture of species which developed and died out in Eurasia. Those species are no longer with us--except as tiny pieces of DNA.

The paleontological community is still somewhat divided on what that means to this ancient debate: John Hawks (2010) argues "we are all multiregionalists now"; but Chris Stringer recently (2014) disagreed: "we are all out-of-Africanists who accept some multi-regional contributions".

Southern Dispersal Route - Early Modern Humans Leave Africa

The Southern Dispersal Route refers to a theory that an early migration of modern human beings left Africa as least as long ago as 70,000 years and followed the coastlines of Africa, Arabia and India, arriving in Australia and Melanesia at least as early as 45,000 years ago. It is one of what appears to now have been multiple migration paths that our ancestors took out of Africa.

Coastal Routes

Most versions of the southern dispersal hypothesis suggests that modern *H. sapiens* with a generalized subsistence strategy based on hunting and gathering coastal resources (shellfish, fish, sea lions and rodents, as well as bovids and antelope), left Africa between 130,000 and 70,000 years ago [MIS 5], and traveled along the coasts of Arabia, India, and Indochina, arriving in Australia by 40-50,000 years ago.

By the way, the notion that humans frequently used coastal areas as pathways of migration was developed by Carl Sauer in the 1960s. Coastal movement is part of other migration theories including the original out of Africa and the Pacific coastal migration colonizing the Americas ca 15,000 years ago.

Southern Dispersal Route: Evidence

Archaeological and fossil evidence supporting the Southern Dispersal Route includes similarities in stone tools and symbolic behaviors at several archaeological sites throughout the world.

South Africa: Howiesons Poort/Stillbay sites such as Blombos Cave, Klasies River Caves

Tanzania: Mumba Rockshelter

Kenya: Enkapune Ya Muto

United Arab Emirates: Jebel Faya

India: Jwalapuram and Patne

Sri Lanka: Batadomba-lena

Borneo: Niah Cave

Australia: Lake Mungo and Devil's Lair

Chronology of the Southern Dispersal

The site of Jwalapuram in India is key to dating the southern dispersal hypothesis. This site has stone tools which are similar to Middle Stone Age African assemblages, and they occur both before and after the eruption of the



Toba volcano in Sumatra, which has recently been securely dated to 74,000 years ago.

The power of the massive volcanic eruption was largely considered to have created a wide swath of ecological disaster, but because of the findings at Jwalapuram, that has recently come into debate.

Further, the presence of other humans sharing planet earth at the same time as the migrations out of Africa (Neanderthals, *Homo erectus*, Denisovans, Flores, *Homo heidelbergensis*), and the amount of interaction *Homo sapiens* had with them during their sojourns is still widely debated.

More Evidence

Other parts of the southern dispersal route theory not described here are genetic studies examining relict DNA in modern and ancient humans (Fernandes et al, Ghirotto et al, Mellars et al); comparisons of artifact types and styles for the various sites (Armitage et al, Boivin et al, Petraglia et al); presence of symbolic behaviors seen at those sites (Balme et al) and studies of the environments of the coastal routes at the time of the expansion outward (Field et al, Dennell and Petraglia). See the bibliography for those discussions.

Ice Free Corridor - Clovis Pathway into Americas

The Ice Free Corridor hypothesis has been an accepted route for human colonization of the American continents since at least the 1930s. This route was postulated by archaeologists looking for a way by which humans could have entered North America during the late Wisconsinan ice age. Essentially, the hypothesis suggested that Clovis culture hunters arrived in North America chasing after megafauna (mammoth and bison) through a corridor between the ice slabs. The corridor crossed what is now the provinces of Alberta and eastern British Columbia, between the Laurentide and Cordilleran ice masses.

The Ice Free Corridor's usefulness for human colonization is not questioned: the latest theories about the timing of human colonization have ruled it out as the first pathway taken by people arriving from Bering and northeastern Siberia

Questioning the Ice Free Corridor

In the early 1980s, modern vertebrate paleontology and geology was applied to the question. Studies showed that various portions of the 'corridor' were blocked by ice from between 30,000 to at least 11,500 BP (i.e., during and for a long while after the Last Glacial Maximum). Since archaeological sites in Alberta are less than 11,000 years old, colonization of Alberta had to have occurred from the south, and not along the so-called ice free corridor.

Further doubts about the corridor began to arise in the late 1980s when pre-clovis sites--sites older than even 12,000 years (such as Monte Verde, Chile)--began to be discovered. Clearly, people who lived at Monte Verde could not have used the ice free corridor to get there. The oldest site known along the corridor is in northern British Columbia: Charlie Lake Cave, where the recovery of both southern bison bone and Clovis-like projectile points suggest that these colonists arrived from the south, and not from the north.

Clovis and the Ice Free Corridor

Recent archaeological studies in eastern Beringia, as well as detailed mapping of the route of the Ice Free Corridor, have led researchers to recognize that a passable opening between the ice sheets did exist beginning circa 14,000 cal BP (ca. 12,000 RCYBP). While too late to represent a passageway for preclovis peoples, the Ice Free Corridor, sometimes known as the "western interior corridor" or "deglaciation corridor" may well have been the main route taken by Clovis hunter-gatherers, as suggested by W.A. Johnson in the 1930s.

An alternative route for the first colonists has been proposed along the Pacific coast, which would have been ice-free and available for migration for pre-Clovis explorers in boats or along the shoreline. The change of path is both affected by and affects our comprehension of the earliest colonists in the Americas: rather than Clovis 'big game hunters', the earliest Americans ("pre-Clovis") are now believed to have used a broad variety of food sources, including hunting, gathering, and fishing.

Pacific Coast Migration Model - Prehistoric Highway Into the Americas

The Pacific Coast Migration Model is a theory concerning the original colonization of the Americas that proposes that people entering the continents followed the Pacific coastline, hunter-gatherer-fishers traveling in boats or along the shoreline and subsisting primarily on marine resources.

The PCM model was first considered in detail by Knut Fladmark, in a 1979 article in *American Antiquity* which was simply amazing for its time. Fladmark argued against the Ice Free Corridor hypothesis, which proposes people entered North America through a narrow opening between two glacial ice sheets. The Ice Free Corridor was likely to have been blocked, argued Fladmark, and if the corridor was open at all, it would have been unpleasant to live and travel in.

Fladmark proposed instead that a more suitable environment for human occupation and travel would have been possible along the Pacific coast, beginning along the edge of Beringia, and reaching the unglaciated shores of Oregon and California.

Support for the Pacific Coast Migration Model

The main hitch to the PCM model is the paucity of archaeological evidence for a Pacific coastal migration. The reason for that is fairly straightforward--given a rise in sea levels of 50 meters (~165 feet) or more since the Last Glacial Maximum, the coastlines along which the original colonists might have arrived, and the sites they may have left there, are out of present archaeological reach.

However, a growing body of genetic and archaeological evidence does lend support to this theory. For example, evidence for sea-faring in the Pacific Rim region begins in greater Australia, which was colonized by people in water craft at least as long ago as 50,000 years. Maritime foodways were practiced by the Incipient Jomon of the Ryukyu Islands and southern Japan by 15,500 cal BP. Projectile points used by the Jomon were distinctively tanged, some with barbed shoulders: similar points are found throughout the New World. Finally, it is believed that the bottle gourd was domesticated in Asia and introduced into the New World, perhaps by colonizing sailors.

The earliest archaeological sites in the Americas--such as Monte Verde and Quebrada Jaguay--are located in South America and date to ~15,000 years ago. If the Pacific coast corridor was only truly navigable beginning around 15,000 years ago, that suggests that a full-out sprint along the Pacific coast of the Americas had to have occurred for those sites to be occupied so early. But new evidence from the Aleutian Islands suggests the sea coast corridor was opened at least 2,000 years longer ago than previously believed.

In an August 2012 article in *Quaternary Science Reviews*, Misarti and colleagues report on pollen and climatic data that provide circumstantial evidence supporting the PCM, from Sanak Island in the Aleutian Archipelago. Sanak Island is a small (23x9 kilometers, or ~15x6 miles) dot about the midpoint of the Aleutians extending off Alaska, capped by a single volcano called Sanak Peak. The Aleutians would have been part--the highest part--of the landmass scholars call Beringia, when sea levels were 50 meters lower than they are today.

Archaeological investigations on Sanak have documented more than 120 sites dated within the last 7,000 years--but nothing earlier. Misarti and colleagues placed 22 sediment core samples into the deposits of three lakes on Sanak Island. Using the presence of pollen from *Artemisia* (sagebrush), *Ericaceae* (heather), *Cyperaceae* (sedge), *Salix* (willow), and *Poaceae* (grasses), and directly tied to radiocarbon-dated deep lake sediments as an indicator of climate, the researchers found that the island, and surely its now-submerged coastal plains, was free of ice nearly 17,000 cal BP.

Two thousand years seems at least a more reasonable period in which to expect people to move from Beringia southward to the Chilean coast, some 2,000 years (and 10,000 miles) later. That is circumstantial evidence.

Kelp Highway Hypothesis

The Kelp Highway Hypothesis is a theory concerning the original colonization of the American continents. The theory builds on the Pacific Coast Migration Model, which proposes that the first Americans reached the New World by following the coastline along Beringia and into the American continents.

Archaeologist Jon Erlandson and colleagues published their variation on the PCM Model in 2007. They suggest that travelers along the Pacific coast relied on a specific route and diet: the kelp forests of the Pacific rim.

Kelp forests are extremely rich and diverse environments, supporting an abundance of shellfish, marine mammals, seabirds and seaweeds. They are found along the entire Pacific Rim except for the tropics, and would have provided a substantial marine subsistence base for the putative colonists of the Americas. Recent reconstructions of the coastal range of Beringia suggest that its margins would have been highly convoluted and island-rich, hence supporting kelp forests. Erlandson and colleagues postulate a virtual Kelp Highway, providing algae, seaweed, fish, birds, and other resources for migrating populations in a long linear pathway down the American coasts.