



# The Creation of Two Worlds

# The Creation of Two Worlds



## Topics of Discussion

- I. The Earth Calendar
- II. 225-200 MYA: Pangaea
- III. Centralization of Evolution
- IV. 200-180 MYA: Break-up of Pangaea
- V. Decentralization of Evolution
- VI. Hominids and Humans
- VII. Culture
- VIII. Migration and the First Americans Debate
- IX. Roughly 10,000 years ago

# The Creation of Two Worlds



## I. The Earth Calendar

[great website](#)

<b>Event</b>	<b>Date (MYA)</b>	<b>Calendar date</b>
Earth formed	4,550	Jan. 01
1st life forms (stromatolites)	3,500	Mar. 25
1st organized cells (eukaryotes)	1,000	Oct. 12
1st land plants	430	Nov. 27
1st fish	400	Nov. 29
1st dinosaurs	250	Dec. 07
1st mammals	200	Dec. 15
1st primates	80	Dec. 25
Extinction of the dinosaurs	65	Dec. 26 9:00 pm
1st apes	25	Dec. 29 midnight
Homo Sapiens sapiens	0.100	Dec. 31 11:55:16 pm
Bering Land Bridge	0.020	Dec. 31 11:58:30
Historical record (Samaria)	0.005	Dec. 31 11:59:25
Columbus crosses Atlantic	0.00050	Dec. 31 11:59:37
Establishment of U.S.	0.00022	Dec. 31 11:59:58.47
Life of a student (20 years)	0.00002	Dec. 31 11:59:59.86

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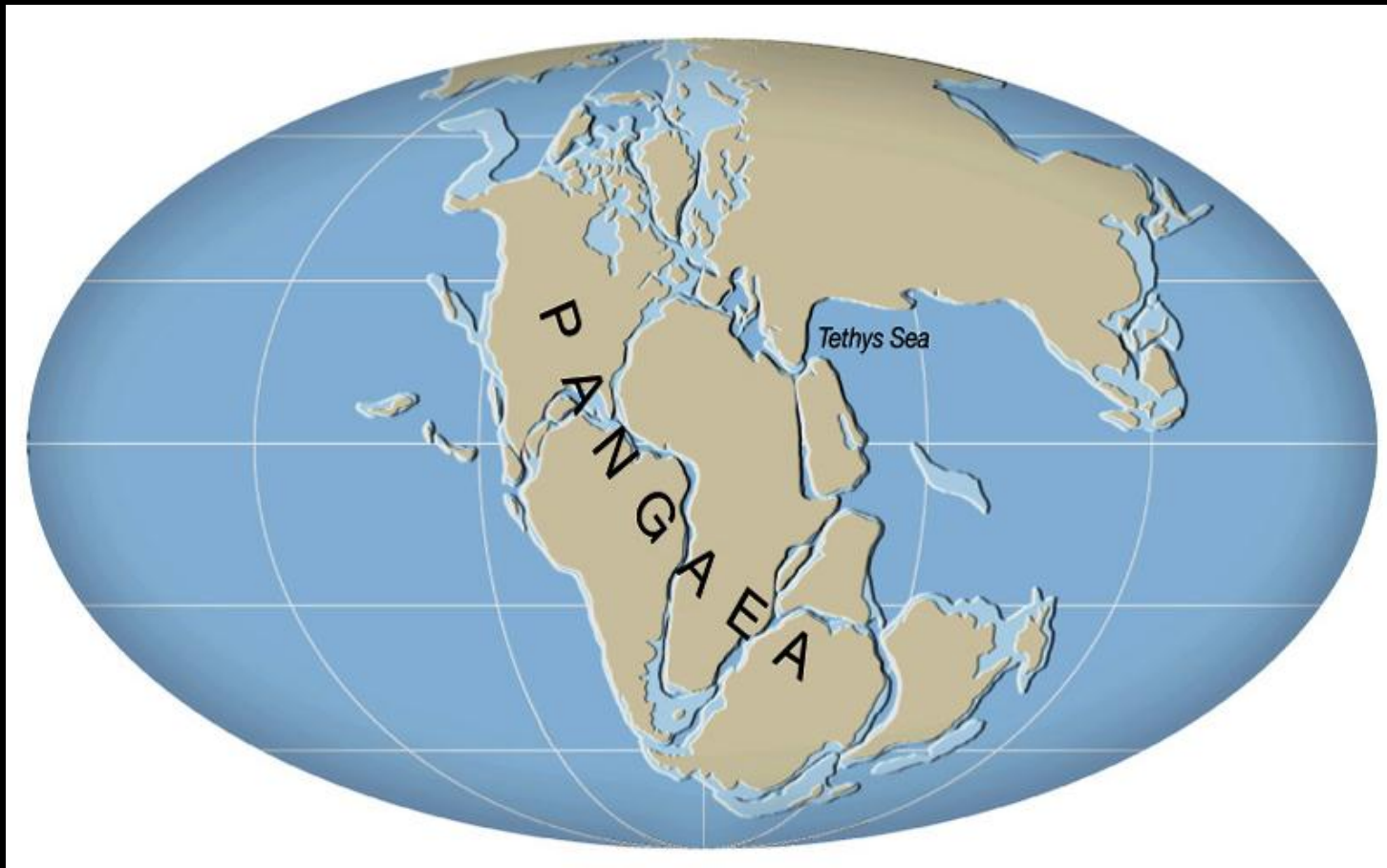
**II. 225-200 MYA: Pangaea**

**What was Pangaea? When did it exist?**

**What evidence is there for its existence?**

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II. 225-200 MYA: Pangaea



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## II. 225-200 MYA: Pangaea



Grooves carved by glaciers (shown by arrows) provided evidence for continental drift. This diagram assumes the continents were in their present-day locations.

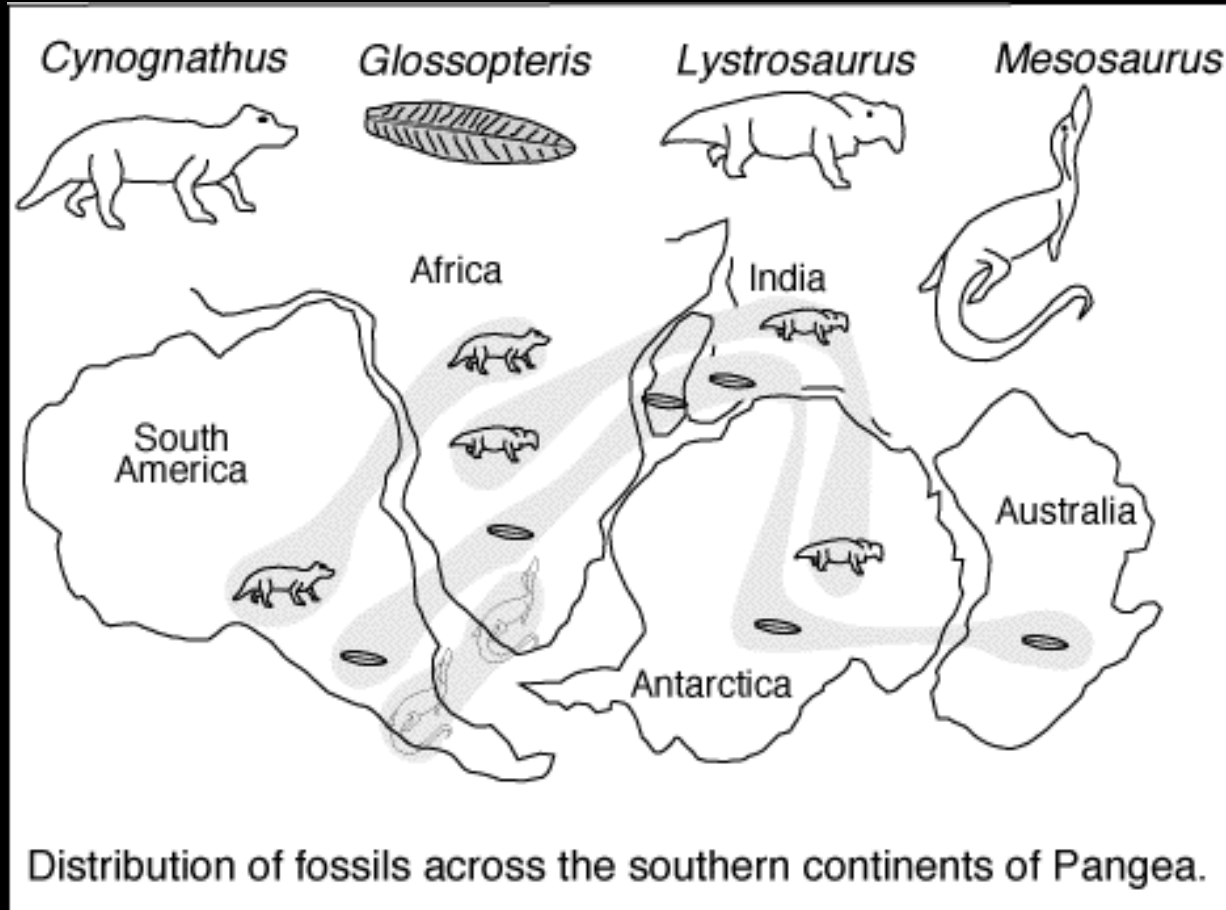


The distribution of glacial features can be best explained if the continents were part of Pangaea.

Evidence of Pangaea's Existence

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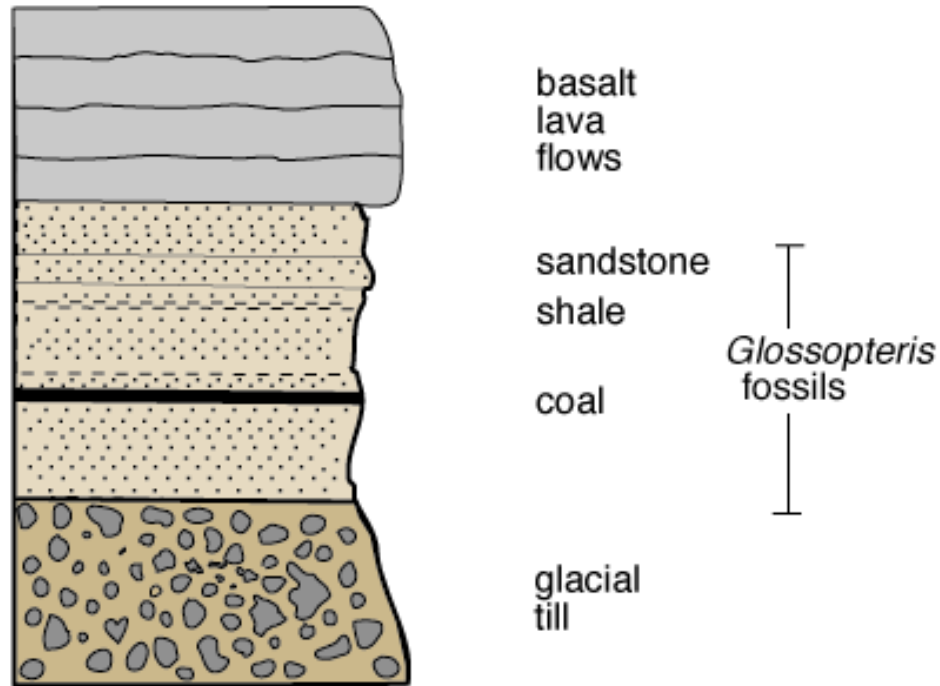
## II. 225-200 MYA: Pangea



Evidence of Pangea's Existence

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## II. 225-200 MYA: Pangea



Similar layers of rock were formed in Antarctica, Australia, South America, Africa, and India before Pangea broke apart. *Glossopteris* fossils were found in the rocks on each continent.

Evidence of Pangea's Existence



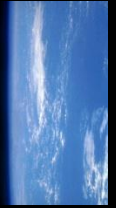
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## III. Centralization of Evolution

**What was special about Pangaea in Crosby's story?**

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## III. Centralization of Evolution

Pangaea stretched over scores of degrees of latitude, and so we can assume that it had some variations in climate; but with only one land mass, there would not have been much variety among its life forms.

One continent meant one arena for competition, and so only one set of winners in the Darwinian struggle for survival and reproduction. Reptiles, including all the dinosaurs, were the dominant kinds of land animals in Pangaea -- and, therefore, the world -- for three times as long as mammals have held that position since.

- Alfred Crosby, "Pangaea Revisited," from *Ecological Imperialism*

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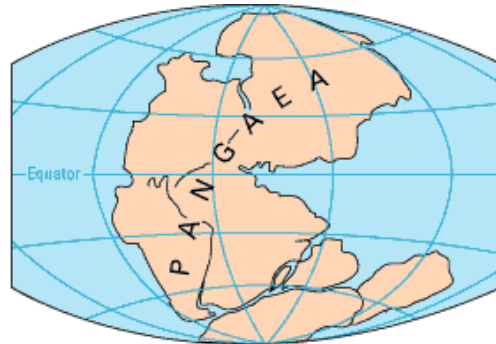


## IV. 200-180 MYA: Break-up of Pangaea

**When did Pangaea break up and why should we care?**

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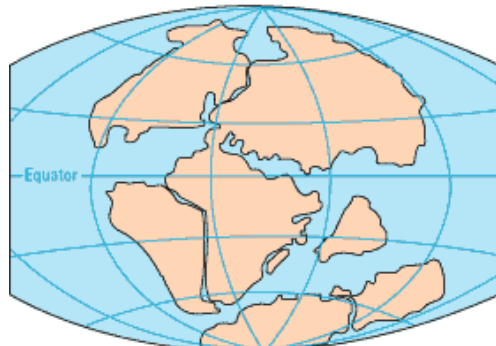
## IV. 200-180 MYA: Break-up of Pangaea



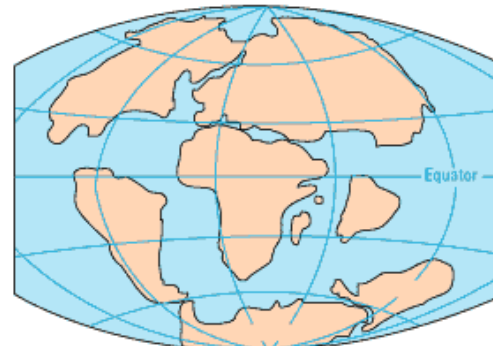
PERMIAN  
225 million years ago



TRIASSIC  
200 million years ago



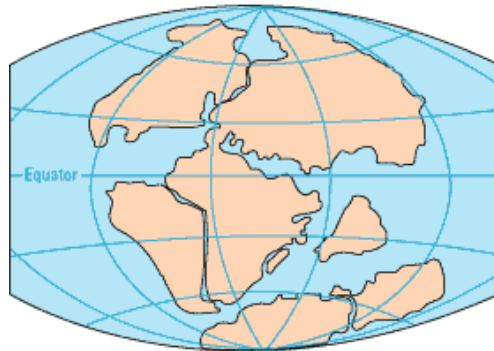
JURASSIC  
135 million years ago



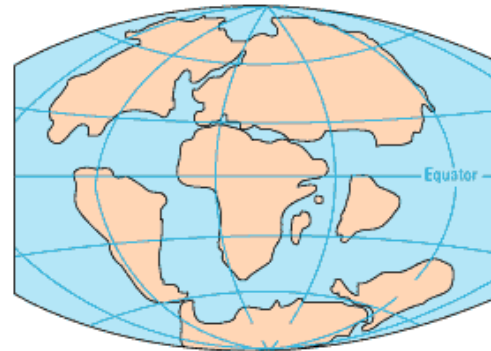
CRETACEOUS  
65 million years ago

# The Creation of Two Worlds

## IV. 200-180 MYA: Break-up of Pangaea



JURASSIC  
135 million years ago



CRETACEOUS  
65 million years ago



PRESENT DAY

# The Creation of Two Worlds



## V. Decentralization of Evolution

With the breakup of Pangaea, the decentralization of the processes of evolution began 180 or 200 million years ago. For almost all the time since . . . centrifugal forces have prevailed in the evolution of life forms.

- Alfred Crosby, "Pangaea Revisited," from *Ecological Imperialism*

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## VI. Hominids and Humans

[great website](#)

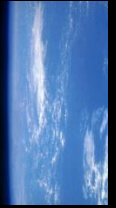
[great website](#)

What about the evolution of our species, *Homo sapiens*?

Specifically, when did hominids first appear?

When did our species first appear?

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## VI. Hominids and Humans

[great website](#)

[great website](#)

As life evolved over millions of years, new species emerged on each of the continents that had once been part of Pangaea.

Roughly 2.5 million years ago, our genus – *Homo* – appeared.

The *Homo* genus includes modern humans and their close relatives.

The genus evolved from Australopithecine ancestors -- see the Lucy skeleton -- when *Homo habilis* appeared.



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## VI. Hominids and Humans

[great website](#)

[great website](#)

### **Homo habilis 2.4 to 1.5 MYA.**

H. habilis, the first species of the genus Homo, evolved in East Africa, when it diverged from the Australopithecines. H. habilis had smaller molars and larger brains than the Australopithecines, and made stone tools.

### **Homo erectus 1.8 MYA to 0.07 MYA.**

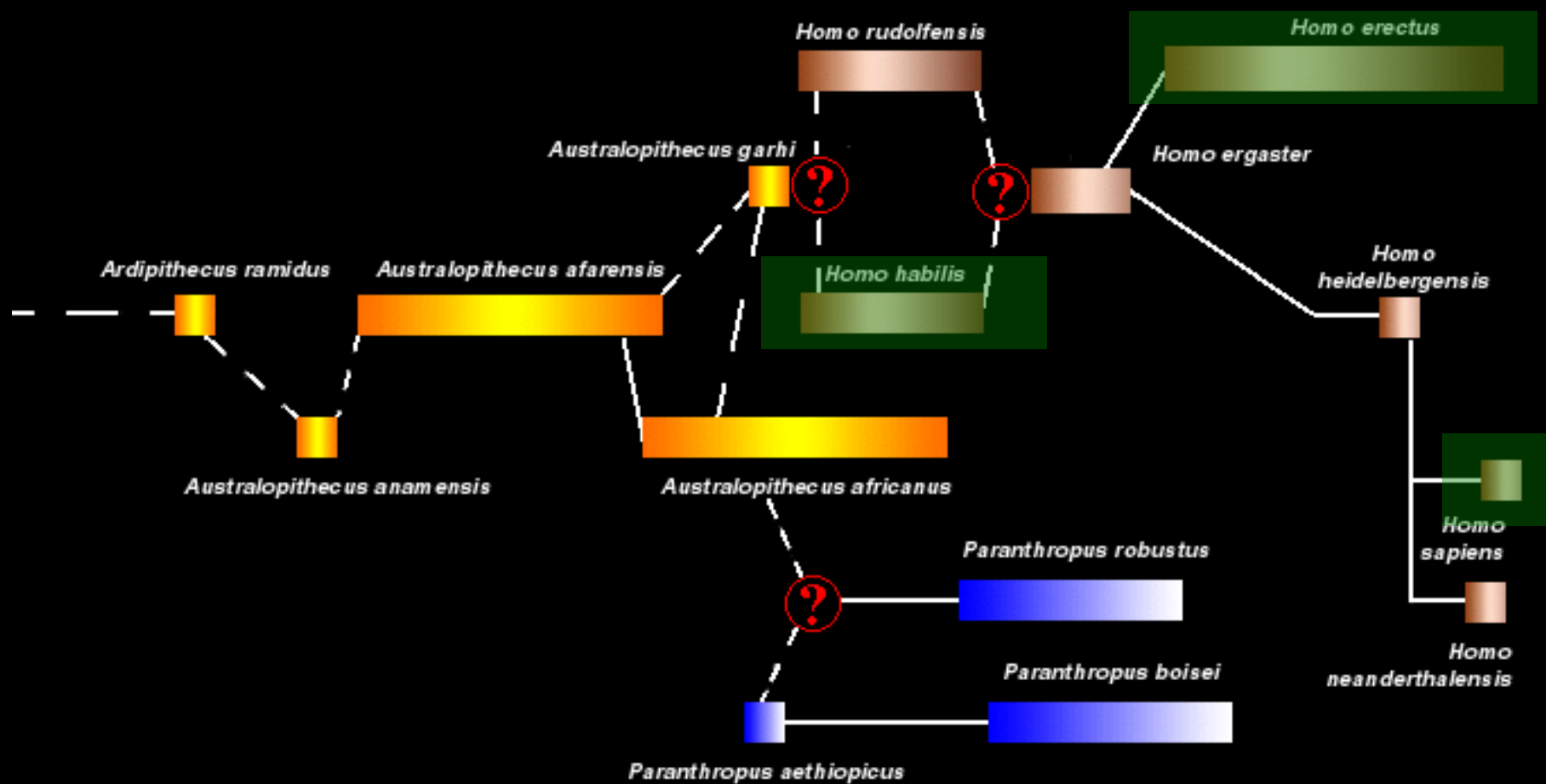
In Africa, Asia, and Europe, Homo habilis evolved larger brains and made more elaborate stone tools. They probably used fire to cook their meat.

### **Homo sapiens 200 TYA to the present.**

Between 400,000 years ago and 250,000 years ago, the trend in cranial expansion and the elaboration of stone tool technologies developed, providing evidence for a transition from H. erectus to H. sapiens. The earliest fossil evidence of anatomically modern H. sapiens comes from sites in Africa and the Near East dating between 130,000 and 90,000 years ago.

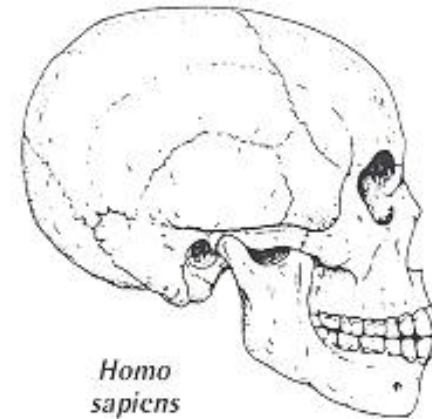
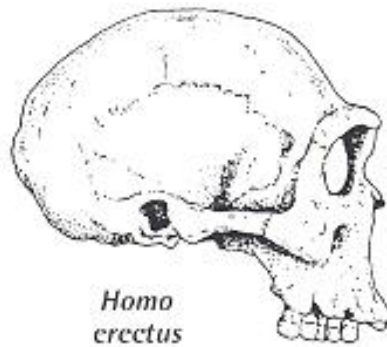
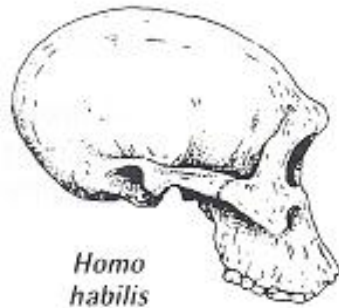
# Millions of Years Ago

5.0 4.0 3.0 2.0 1.0 Present



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## VI. Hominids and Humans



**Evolution of the Human Brain** These drawings of skulls show the extensive cranial changes associated with the increase in brain size during the 3 million years from *Homo habilis* to *Homo sapiens sapiens*.

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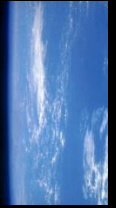
## VII. Culture

What sets humans apart from other animals?

Or

What does the term "culture" mean to Crosby?  
Why is culture so significant?

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## VII. Culture

Culture is a system of storing and altering patterns of behavior not in the molecules of the genetic code but in the cells of the brain. That change made the members of the genus *Homo* nature's foremost specialists in adaptability.

Other creatures had to wait for specific genetic changes to enable them to migrate into areas radically different from those of their ancestors -- had to wait for incisors to lengthen into daggers before they could compete successfully with hyenas on the veldt, or had to wait for hair to thicken into fur before they could live in the north -- but not humans nor hominids. They made not a specific but rather a generalized genetic change: They developed bigger and better brains wired for the use of language and for manipulation of tools.

- Alfred Crosby, "Pangaea Revisited," from *Ecological Imperialism*

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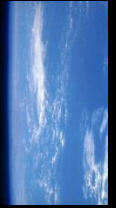


## VIII. Migration and the First Americans Debate

**When did people move into Europe and Asia?  
Australia? The Americas (in Crosby 's view)?**

**How were the peoples in the Americas isolated?**

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## VIII. Migration and the First Americans Debate

With their newly developed cultures, humans migrated from their ancestral homeland in Africa to Asia, Europe, Australia and the islands of the Indian Ocean.

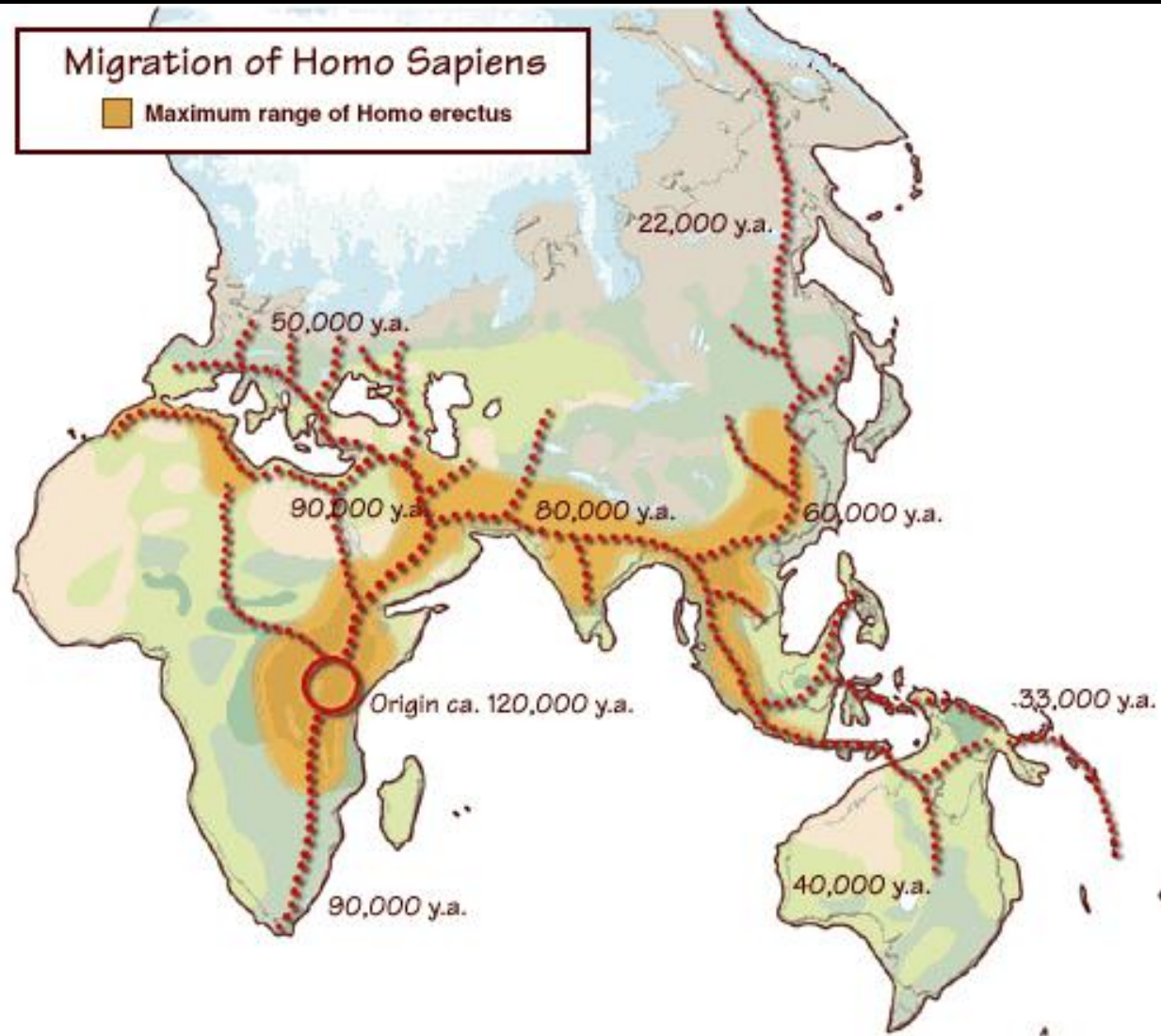
By 40,000, humans were living all over Africa, Europe, and Asia.

They benefited from advanced hunting techniques, the use of fire, language, and other cultural developments.

- Alfred Crosby, "Pangaea Revisited," from *Ecological Imperialism*

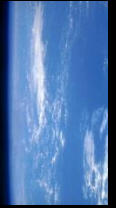
## Migration of Homo Sapiens

■ Maximum range of Homo erectus





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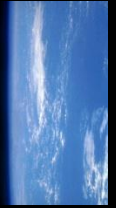
## VIII. Migration and the First Americans Debate

Now humans were about to do something of the same magnitude as moving from earth to another planet.

They were about to leave a world -- the riven core of Pangaea, Eurasia plus Africa -- of life forms with which their ancestors had lived for millions of years and go to worlds where neither humans nor hominids nor apes of any kind had ever existed, worlds dominated by plants, animals, and microlife whose forms had often diverged sharply from the patterns of life in the Old World.

- Alfred Crosby, "Pangaea Revisited," from *Ecological Imperialism*

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## VIII. Migration and the First Americans Debate

The big question that is currently the focus of much debate:  
when did the first humans move into North America?

Two different models:

The **SHORT chronology** model: the traditional, undisputed evidence for the presence of the Clovis culture throughout most of the continent between about 12,500-13,000 years ago.

The **LONG chronology** model: new evidence of sites in Americas dating before 13,000 years ago (and maybe even before).

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## VIII. Migration and the First Americans Debate

The **SHORT chronology** model: Humans in New World 13,000 years ago.

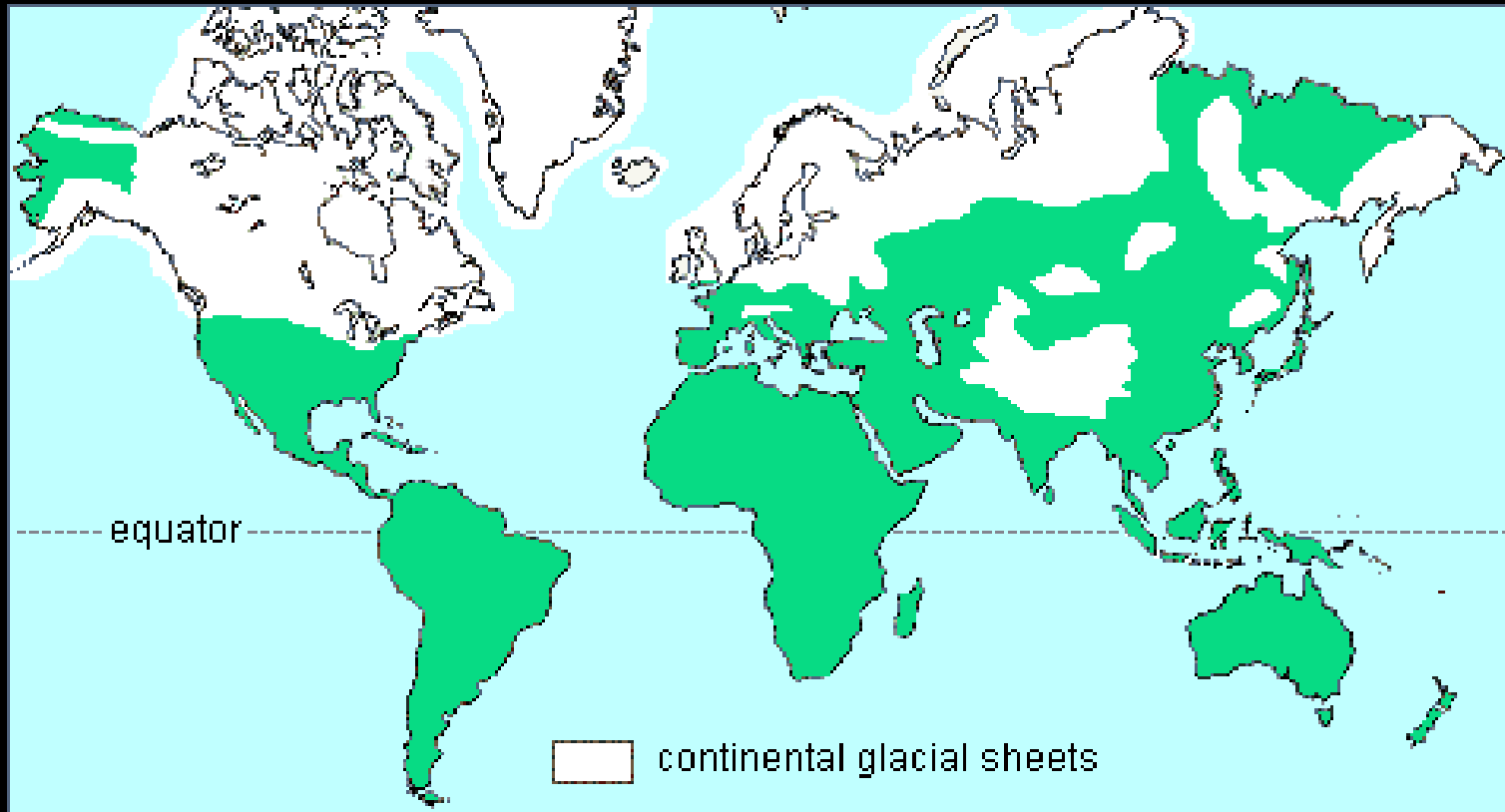
Humans crossed Bering Land Bridge during last glacial maximum, when two major ice sheets - Laurentide (C. Canada) and Cordilleran (W. Canada) - covered North America and lowered sea levels by 200 feet.

As the world warmed, an ice free corridor developed (roughly 13,000 to 12,000 years ago) and hunters moved south into the modern U.S.

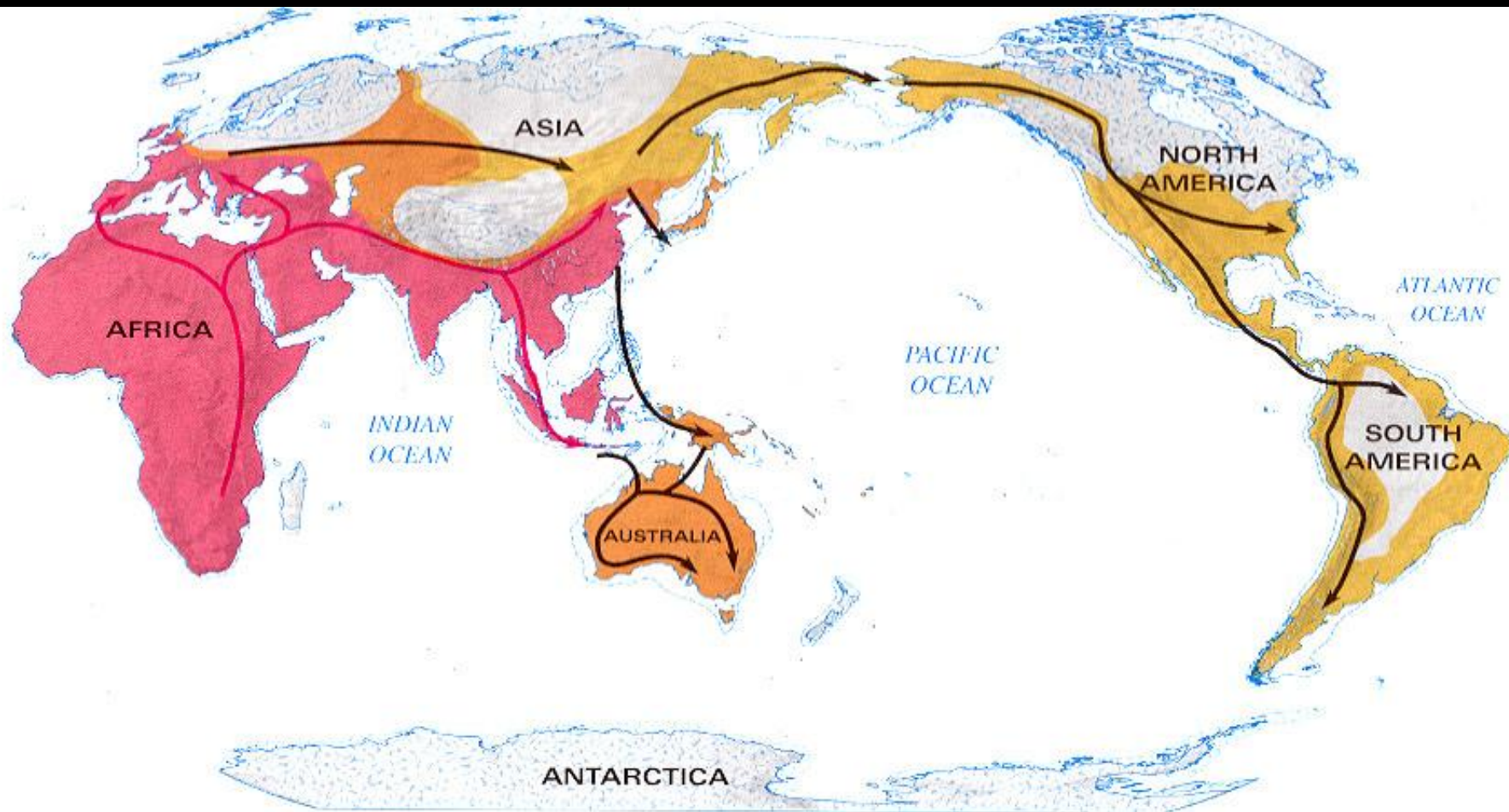
People carried large spears -- with Clovis Points -- and lived in highly mobile groups traveling rapidly across N. America into S. America. Paleo-Indians.

Rapid expansion of humans in conjunction with warmer climate (around 10,000 years ago) caused Pleistocene Die-Off -- extinction of megafauna in New World.

Many archaeological sites date to this period - Clovis, NM; [Gault, TX](#)



Extent of major glaciers at the height of the last ice age (18,000 b.c.)



**Areas of human occupation**

- 100,000 years ago
- 100,000–40,000 years ago
- 40,000–10,000 years ago

**Probable migration routes**

- H. erectus*, 1,000,000–450,000 years ago
- H. sapiens*, after 100,000 years ago

- Probable coastline, 20,000 years ago
- Ice sheets, 20,000 years ago



ARCTIC OCEAN

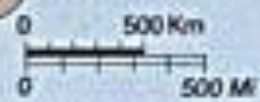
Arctic Circle

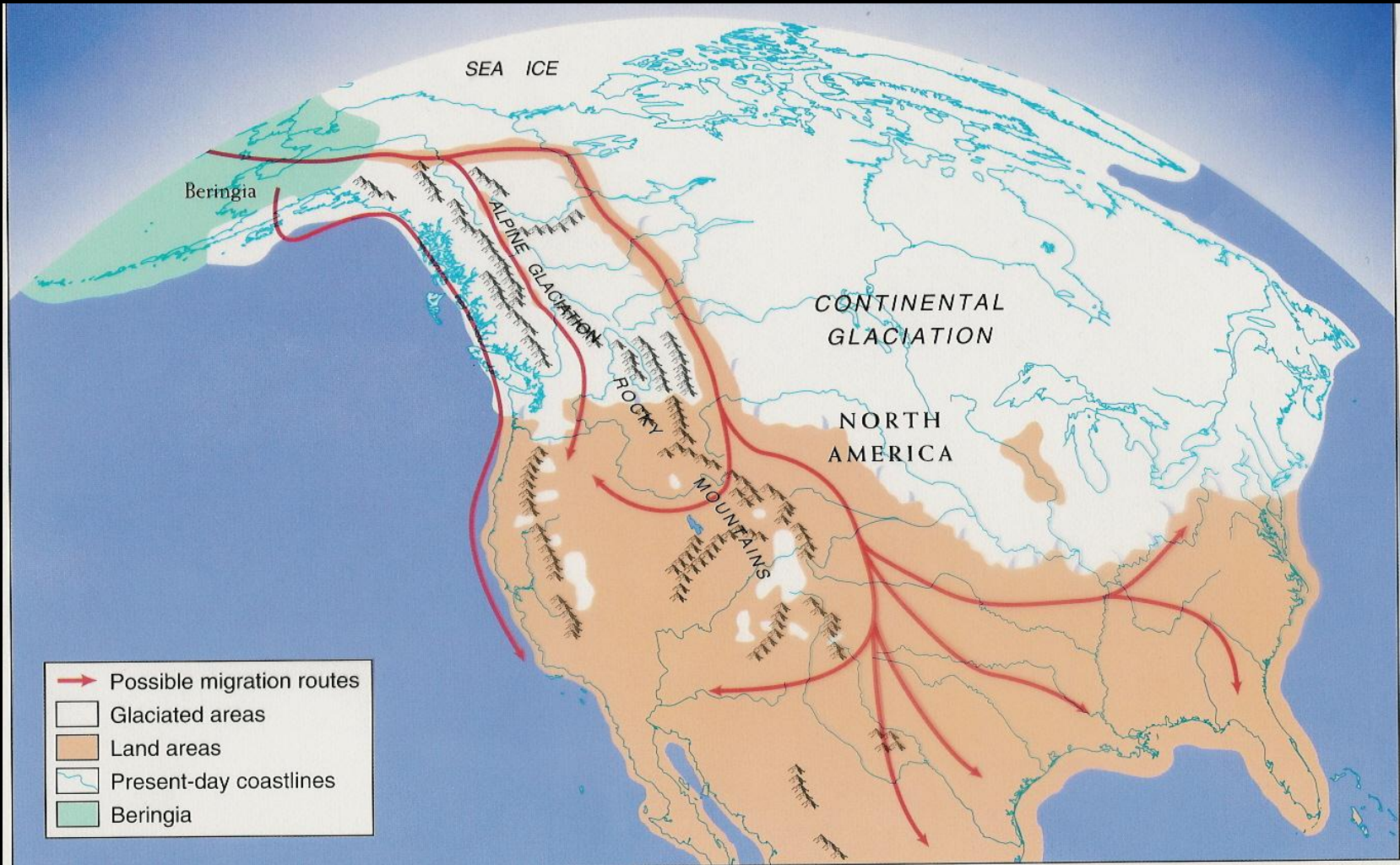
BERINGIA

SIBERIA

ALASKA

BERING SEA

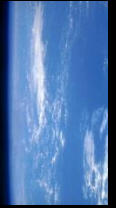








# The Creation of Two Worlds



## VIII. Migration and the First Americans Debate

The **LONG chronology** model: Humans in New World pre 13,000 years ago

Humans in many migrations in New World, as early as 20,000.

Smaller groups than indicated by Clovis hypothesis

Postulated due to recent finds of sites which date to before 15,000.

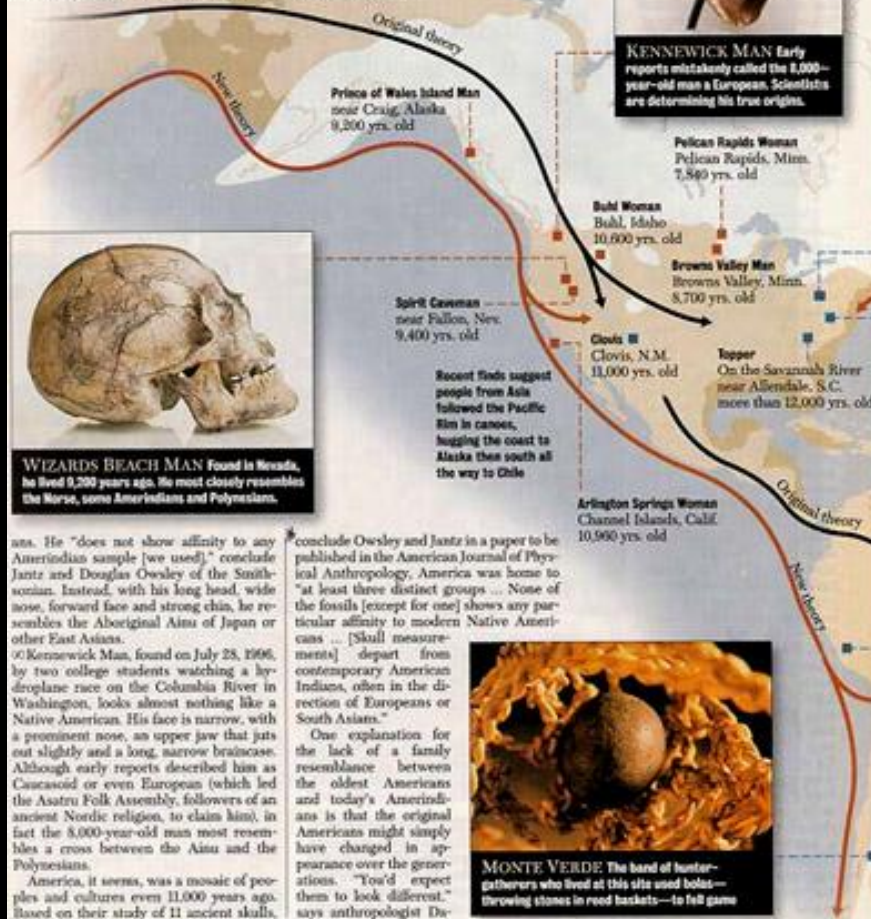
Meadowcroft Rockshelter, PA (14,000+) -- stone blades, scrapers & knives.

Cactus Hill, VA (14,000+)

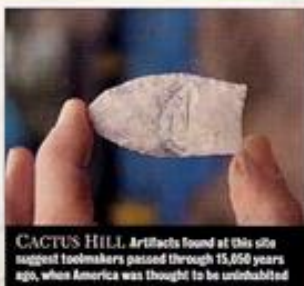
Monte Verde, Chile -- dates to 13,000 -- houses, preserved by an overlayer of peat. Wood, bone, skin, meat, botanicals are extremely well preserved.

# One If by Land, Two If by Sea: Coming to America

The old theory is simple: the original Americans were East Asians of Mongoloid stock who trekked across the Bering Strait. But new finds suggest the migrants came both by land and by sea from several regions of Asia and even from Europe.



**KENNEWICK MAN** Early reports mistakenly called the 8,000-year-old man a European. Scientists are determining his true origins.



**CACTUS HILL** Artifacts found at this site suggest toolmakers passed through 15,050 years ago, when America was thought to be uninhabited

A new theory has the First Americans traveling by boat along the frozen shoreline from Europe into North America

ble." That conclusion, even if proved, has no direct legal ramifications for Native Americans' hard-won gains, such as the right to fish ancestral waters and the right to establish casinos. "But it may be just a step before legislation starts being rolled back," Thomas warns. Some Americans resent the newfound wealth of some tribes, and "if the discoveries make today's Native Americans just another Ellis Island group, it makes it hard for them to preserve their sovereignty."

Already, Native Americans are protesting this line of research. The Shoshone-Bansock demanded custody of Buhl Woman and rebuffed her. The Northern Paiute are asking that Spirit Cave man be reburied, and the Umatilla of Washington want Kennewick Man. "We know that our people have been part of this land since the beginning of time," said Armond Mithamb, a Umatilla religious leader, in a statement. "Scientists believe that because [Kennewick Man's] head measurement does not match ours, he is not Native American. Our elders have told us that Indian people did not always look the way we do today."

The determined band passed up the quartz in the nearby deposits, trekking beyond the Green River in what is now Wyoming and Utah, all the way to the northern Big Horn, 600 miles away. There they found the obsidian and quartz crystal they would fashion into stone points and flakes—and never use. Instead, they would bury their caches on a layer of compacted red ochre. Their neighbors had equally strong preferences, but for them the quartz was not for exotic materials but for sources imbued with spiritual significance. Rejecting the local quartz, they climbed the peaks to chip out red jasper found at 9,000 feet and flake it into stone tools that they, too, would cache, unused. Stones that lay nearer their gods would make a fitting offering.

For years, no authority would accept any deviation from the party line that the First Americans were the Clovis people of 11,000 years ago. But in 1977, archaeologist Tom Dillehay of the University of Kentucky began excavating a site deep in the Chilean hills called Monte Verde. There, some 30 hunter-gatherers lived beside a creek 35 miles inland of the Pacific until a rising post bog pushed them out—and preserved the site like volcanic ash over Patagonia. The



**MONTE ALEGRE** More than 11,800 years ago, Paleo-painters depicted birds and handprints on their rock walls

Qebraide Jeguay, for instance, had a stone spear point in his hip. Its shape suggests it came from what scientists call the Cascade culture, people who were just moving into the area. "It may be a sign of ethnic conflict," says anthropologist James Chatters, who first inspected K Man.

The possibility that today's Native Americans are not the descendants of the original Americans is not going down easily. "If you tell the Native Americans that they weren't first," says Thomas, "you're asking for trouble."



■ Archaeologists digging at Cactus Hill, Virginia, and several other sites have unearthed artifacts that suggest human habitation before the arrival of hunters using Clovis points. The foreground objects are laid out clockwise by apparent age, with the most recent at the top. Clovis-like spearheads appear in the second group. The third and fourth groups, taken from lower layers of soil, are thought to be older items, some reaching back well beyond 14,000 years. With the most primitive tools, it becomes difficult to separate implements made by humans from natural rock fragments.

# The Creation of Two Worlds



## IX. Roughly 10,000 years ago

Some **10,000 years ago all the larger ice caps melted**, excepting those in Antarctica and Greenland, and the oceans rose to approximately their present levels, inundating the plains that had connected Australia with New Guinea, and Alaska with Siberia, and **isolating** the avant-garde of humanity in their new homelands.

For the next few millennia genetic drift and, for the first time, cultural drift were in perfect consonance with continental drift.

- Alfred Crosby, "Pangaea Revisited," from *Ecological Imperialism*