Chauvet Cave

- http://www.youtube.com/watch?v=79lUYQwZNh4

Last time...

- What happened in human evolution after 25,000 years ago?
- How did humans change in the last 25,000 years?
    - Anatomically?
    - Behaviorally?
        - How did their technology change?

Peopling of the New World

- When and how did people come to the New World?
- Why is understanding the peopling of the New World important for understanding human evolution?

Neolithic Revolution

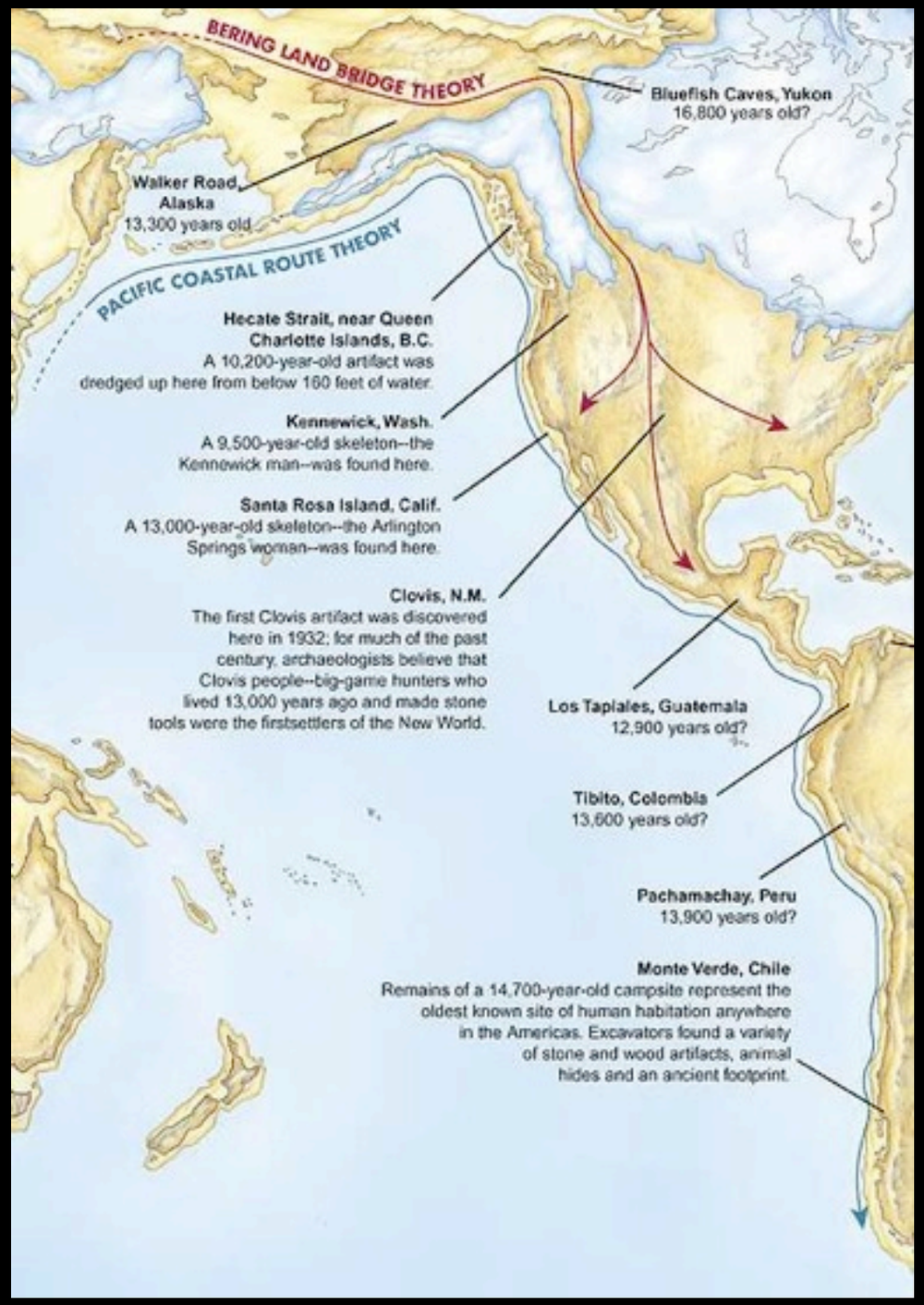
- What was the Neolithic revolution?
- What is domestication?
- How did domestication of plants and animals change the lifeways of Neolithic people?
- How did domestication of plants and animals affect the evolutionary paths of Neolithic peoples who adopted this way of life?

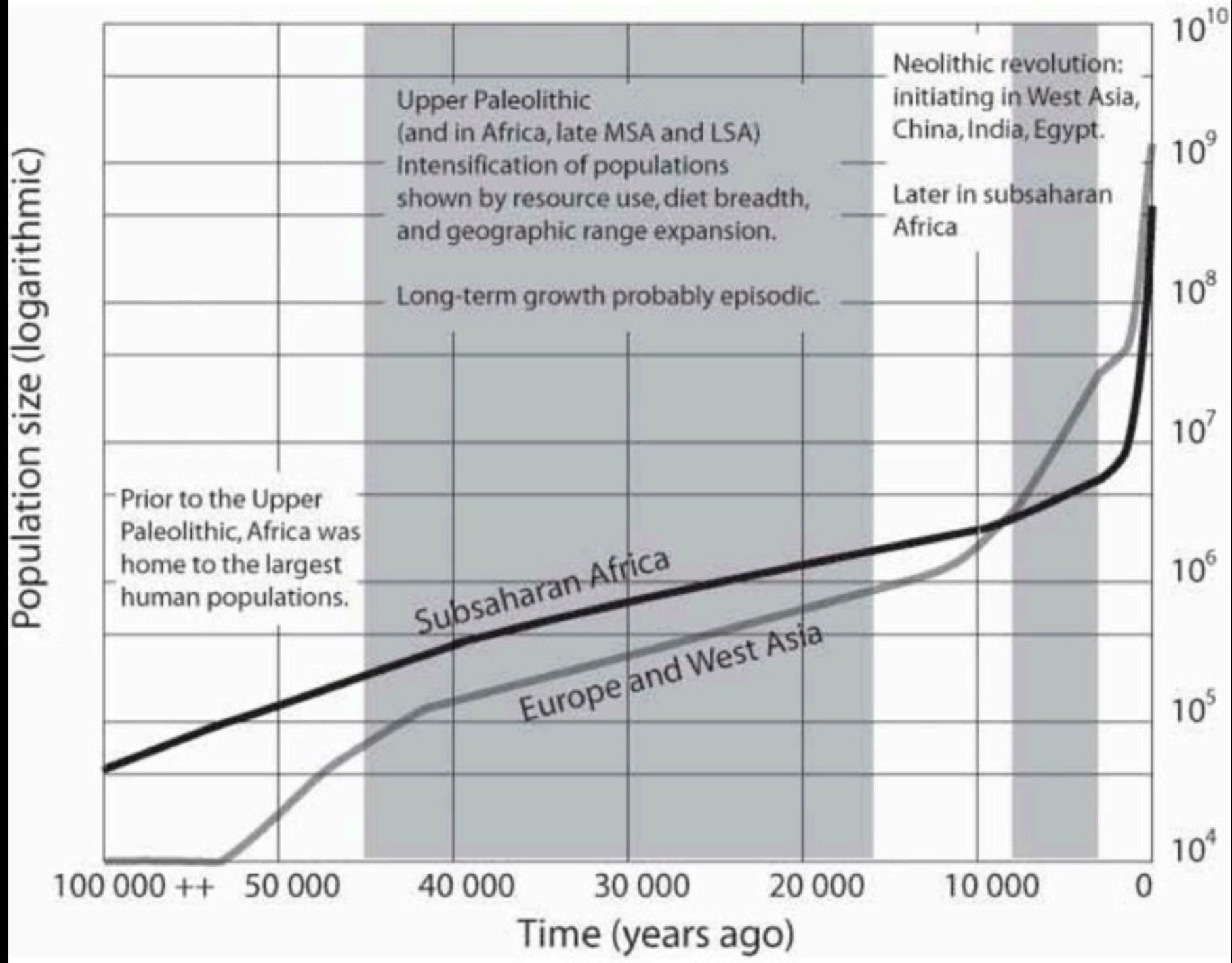
And then what?

- Significant anatomical and behavioral changes
- Modern humans spread around the world
- Population size greatly increases


ARCTIC OCEAN
EUROPE
ASIA
NORTH AMERICA
30
15
40
45
60
50
AFRICA
PACIFIC OCEAN
NORTH ATLANTIC
INDIAN OCEAN
SOUTH ATLANTIC
AUSTRALASIA
SOUTH AMERICA
Populating the Earth
Possible migration patterns of early humans:
Y-chromosome route markers
00 Thousands of years ago
Source: The Genographic Project

Bering Land Bridge


BERING LAND BRIDGE THEORY
Bluefish Caves, Yukon
16,800 years old?
Walker Road, Alaska
13,300 years old
PACIFIC COASTAL ROUTE THEORY
Hecate Strait, near Queen Charlotte Islands, B.C.
A 10,200-year-old artifact was dredged up here from below 160 feet of water.
Kennewick, Wash.
A 9,500-year-old skeleton--the Kennewick man--was found here.
Santa Rosa Island, Calif.
A 13,000-year-old skeleton--the Arlington Springs woman--was found here.
Clovis, N.M.
The first Clovis artifact was discovered here in 1932; for much of the past century, archaeologists believe that Clovis people--big-game hunters who lived 13,000 years ago and made stone tools were the firstsettlers of the New World.
Los Tapiales, Guatemala
12,900 years old?
Tibito, Colombia
13,600 years old?
Pachamachay, Peru
13,900 years old?
Monte Verde, Chile
Remains of a 14,700-year-old campsite represent the oldest known site of human habitation anywhere in the Americas. Excavators found a variety of stone and wood artifacts, animal hides and an ancient footprint.


Upper Paleolithic
(and in Africa, late MSA and LSA)
Intensification of populations
shown by resource use, diet breadth,
and geographic range expansion.
Long-term growth probably episodic.
Neolithic revolution:
initiating in West Asia,
China, India, Egypt.
Later in subsaharan
Africa
Prior to the Upper
Paleolithic, Africa was
home to the largest
human populations.
Subsaharan Africa
Europe and West Asia
Population size (logarithmic)
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
100 000 ++
50 000
40 000
30 000
20 000
10 000
0
Time (years ago)

New Tools

Mesolithic tools

Mesolithic Canoe

Replica of a Mesolithic Hut

Mesolithic fish trap, Ireland

Mesolithic Painting depicting Bow and Arrow


OKAY. WE'VE DOMESTICATED THE DOG, BUT WE'RE HAVING A LITTLE TROUBLE WITH THE CAT....
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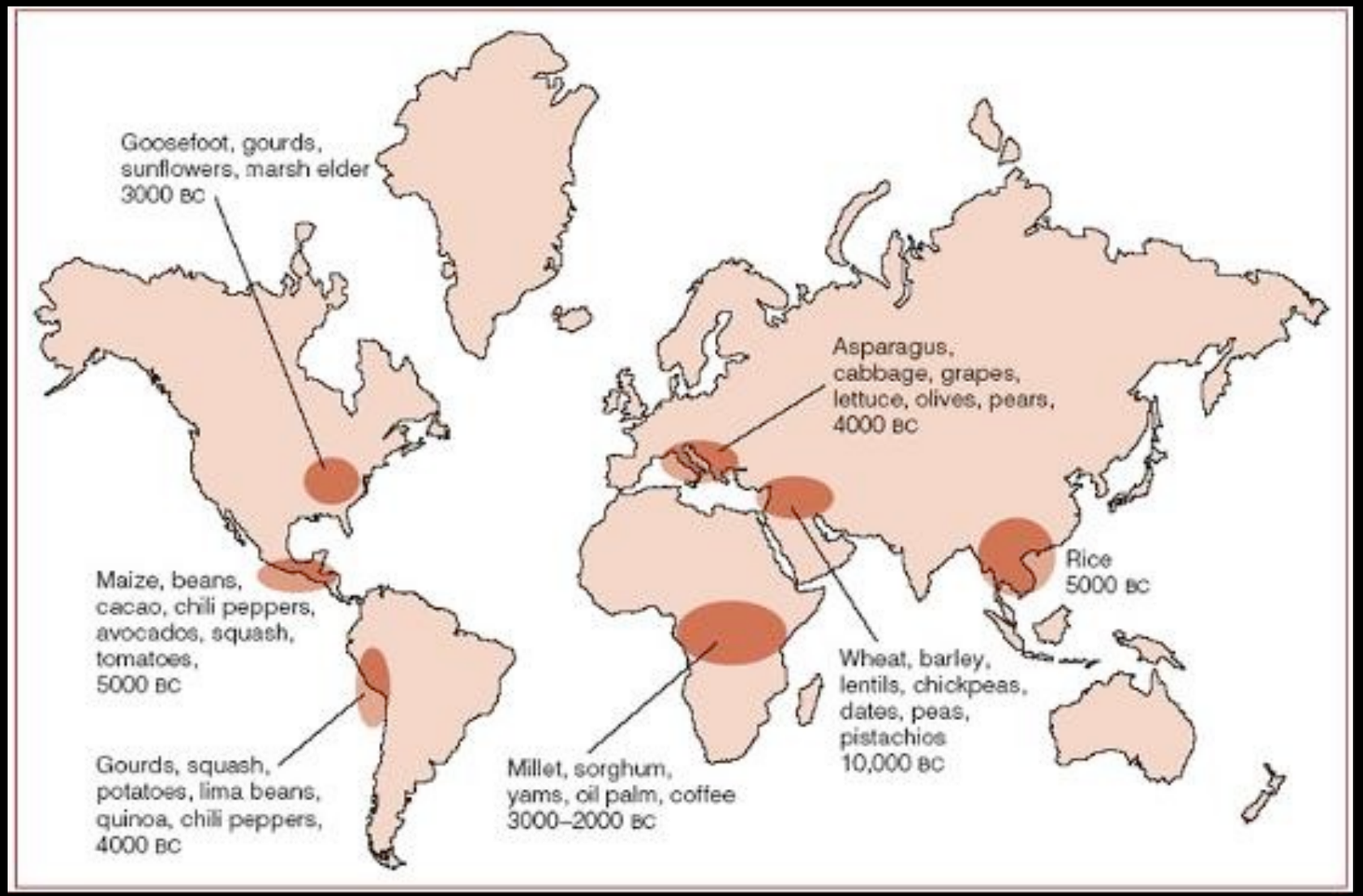
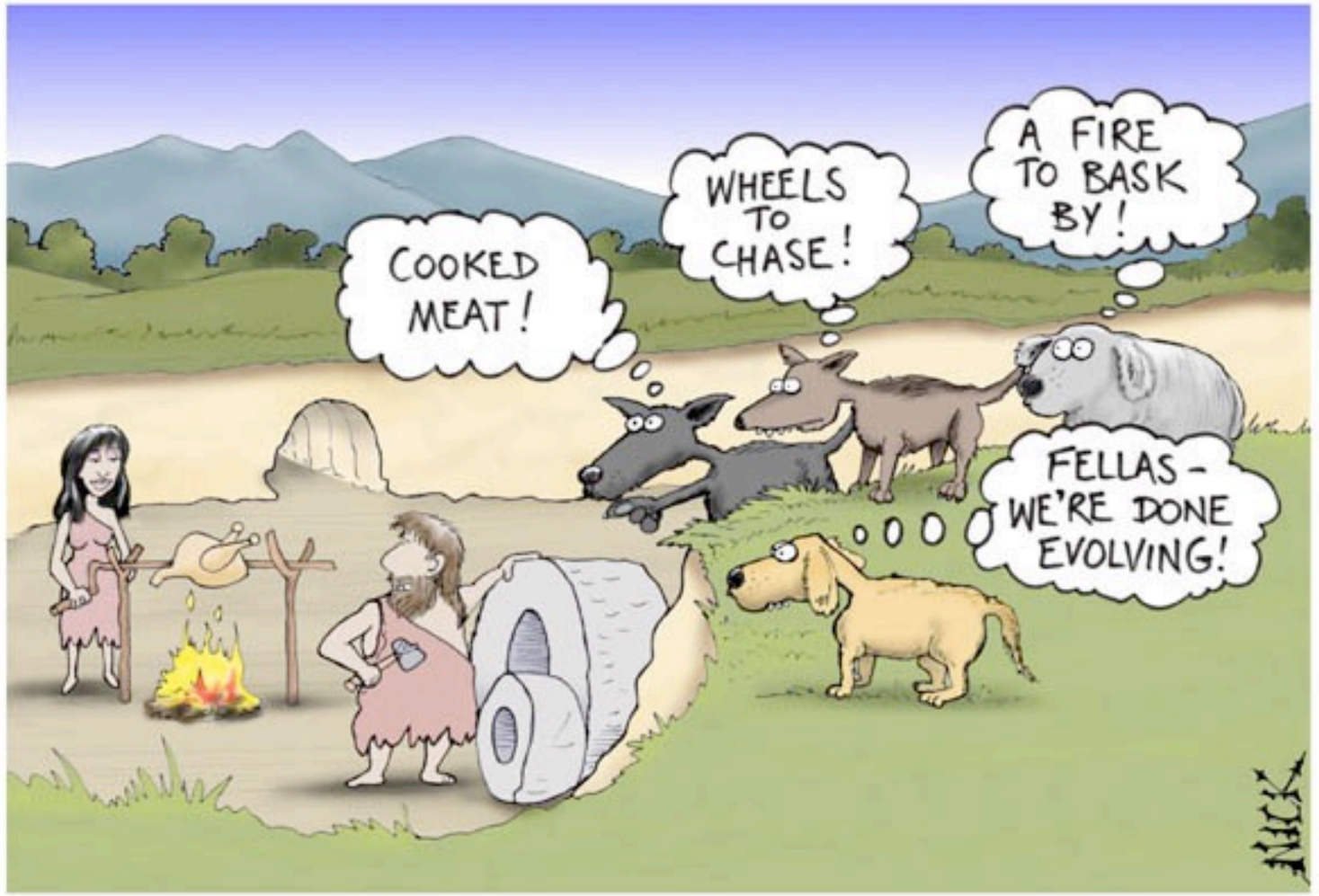

Goosefoot, gourds, sunflowers, marsh elder 3000 BC
Asparagus, cabbage, grapes, lettuce, olives, pears, 4000 BC
Rice 5000 BC
Maize, beans, cacao, chili peppers, avocados, squash, tomatoes, 5000 BC
Wheat, barley, lentils, chickpeas, dates, peas, pistachios 10,000 BC
Gourds, squash, potatoes, lima beans, quinoa, chili peppers, 4000 BC
Millet, sorghum, yams, oil palm, coffee 3000–2000 BC



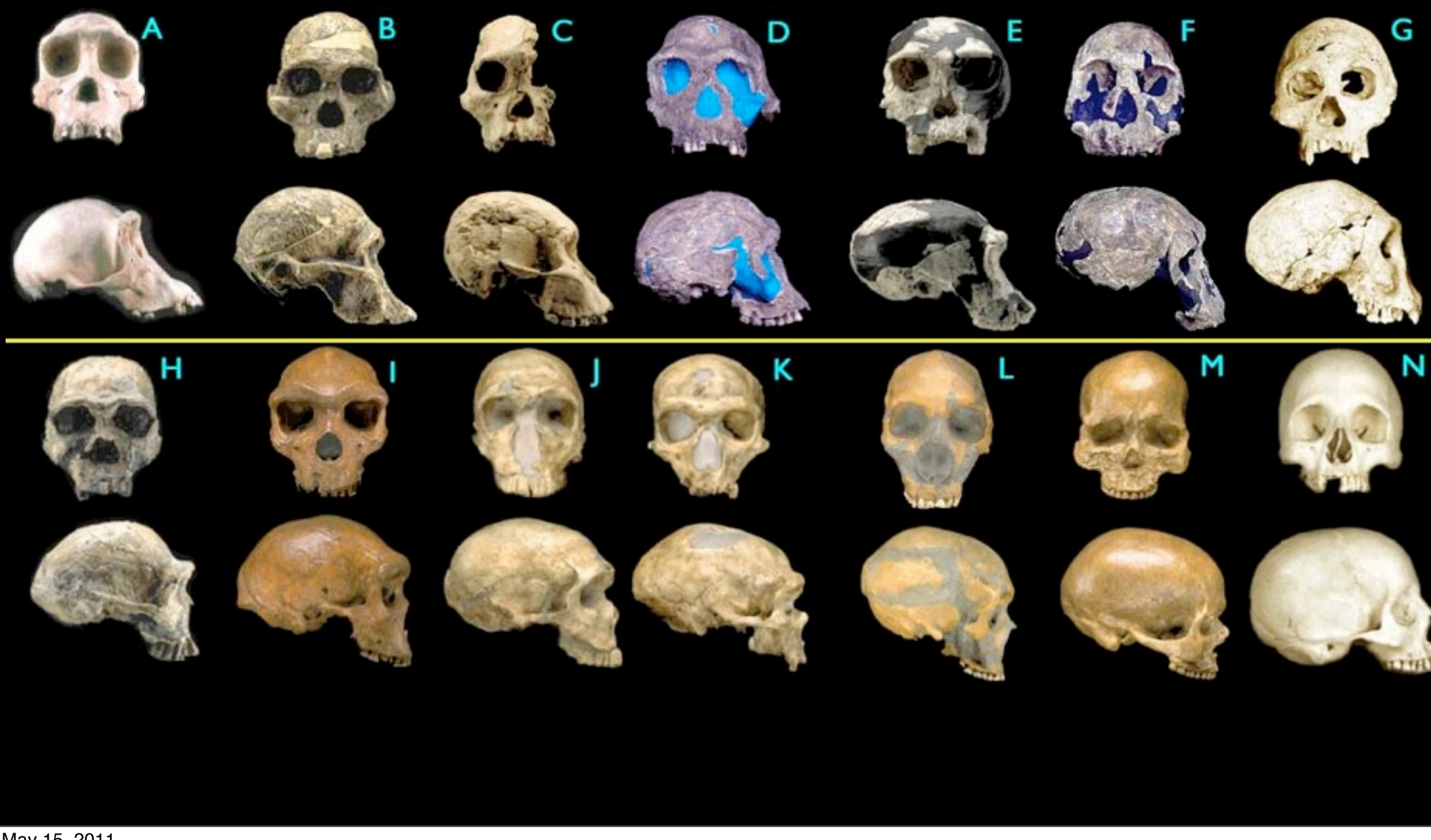
Forget the experts; domestication of the dog only took about 8 seconds.

Neolithic Pots -- About 6000 years old

Where did modern humans come from?

- *Homo erectus* is found throughout the old world
- Archaic humans are found throughout the old world
- Modern humans are found throughout the old world

From *Australopithecus* through *Homo*



Traditional Phylogeny

Homo sapiens

Homo erectus

Homo habilis

Current thought....

- More complicated of course....
- Two camps...
  - May be divided into more species
    - People recognize anywhere from 3 to 9 different species of *Homo*

Possible species of *Homo*

Homo sapiens

Homo heidelbergensis
Homo antecessor
Homo neanderthalensis
Homo floresiensis

Homo ergaster
Homo erectus

Homo habilis
Homo rudolfensis

Traditional Phylogeny

Homo sapiens
(and the rest)

Homo erectus
(H. ergaster)

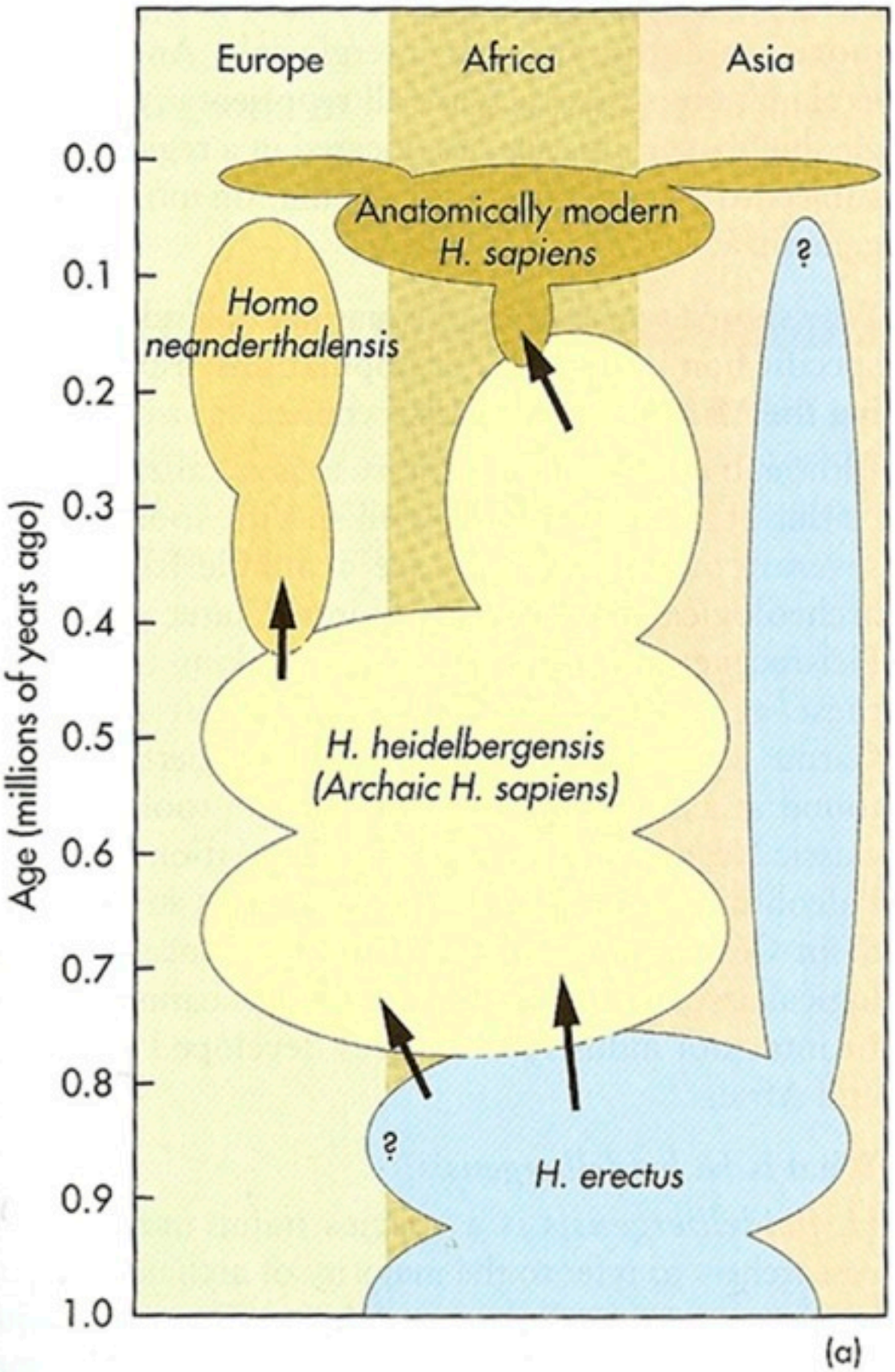
Homo habilis
(H. rudolfensis)

How many species of *Homo* you recognize depends on how you see evolution as having proceeded and how you view variation.

Where did modern humans come from?

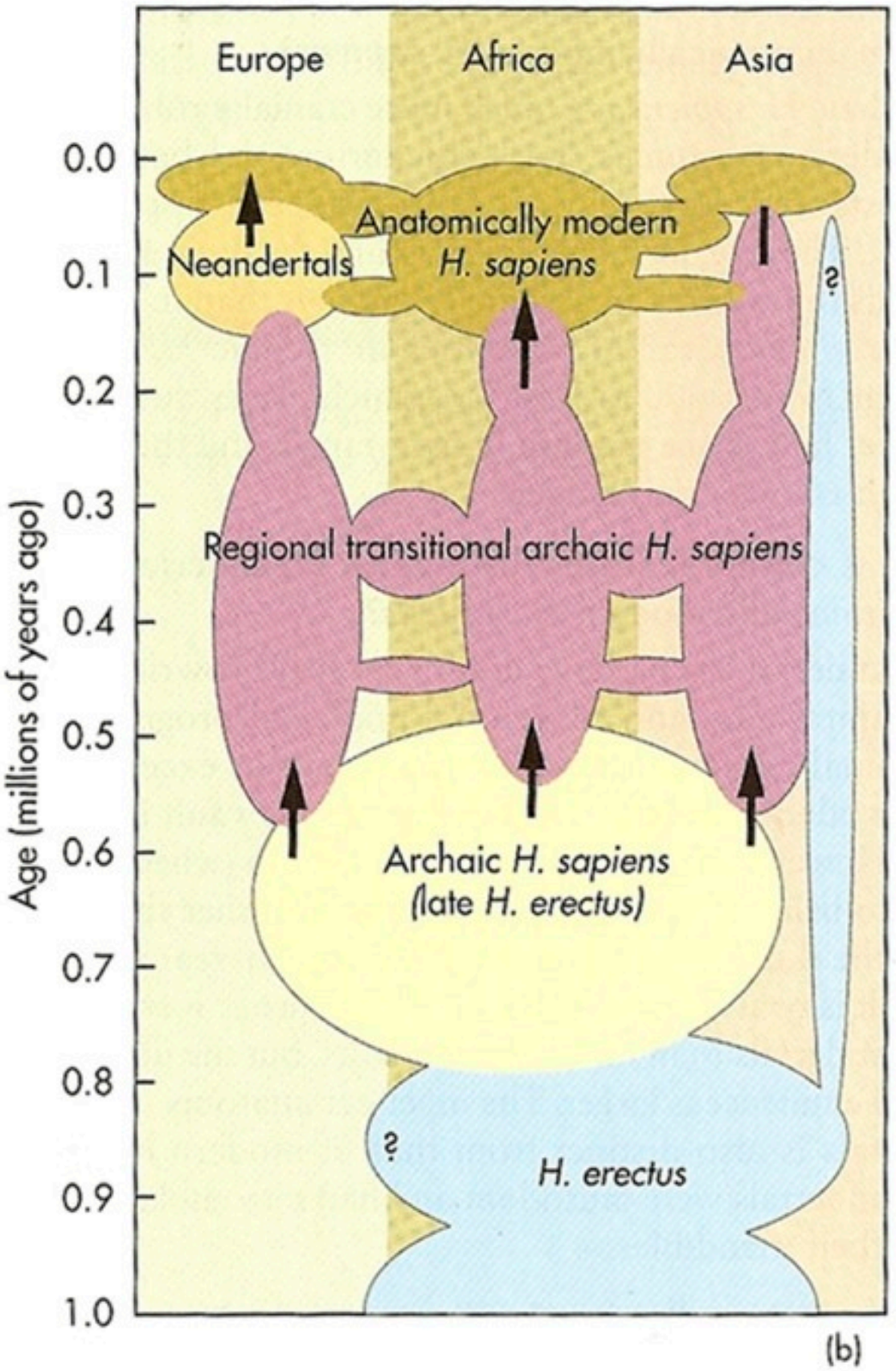
- *Homo erectus* is found throughout the old world
- Archaic humans are found throughout the old world
- Modern humans are found throughout the old world

SPLITTER VIEW



(a)

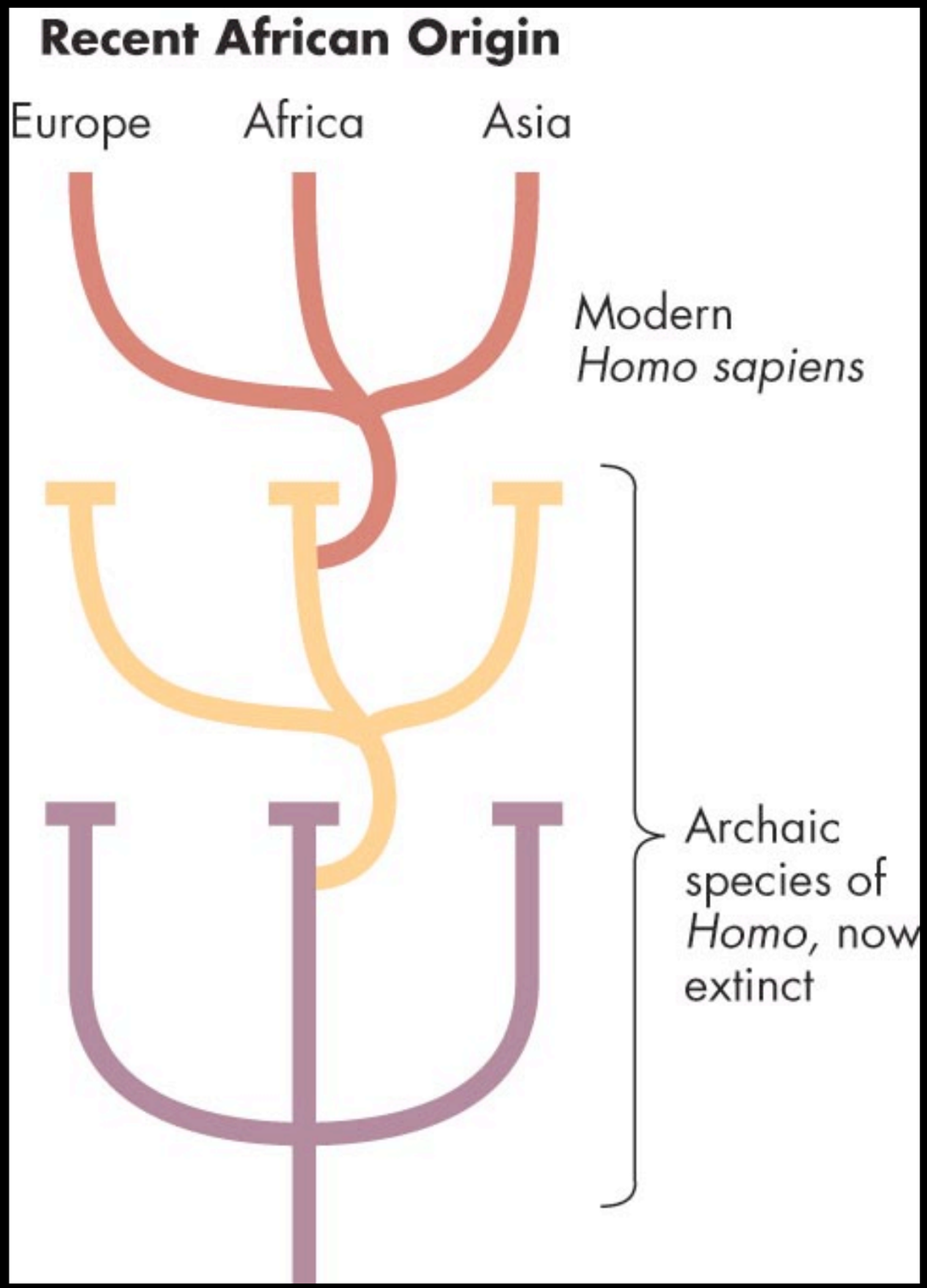
LUMPER VIEW

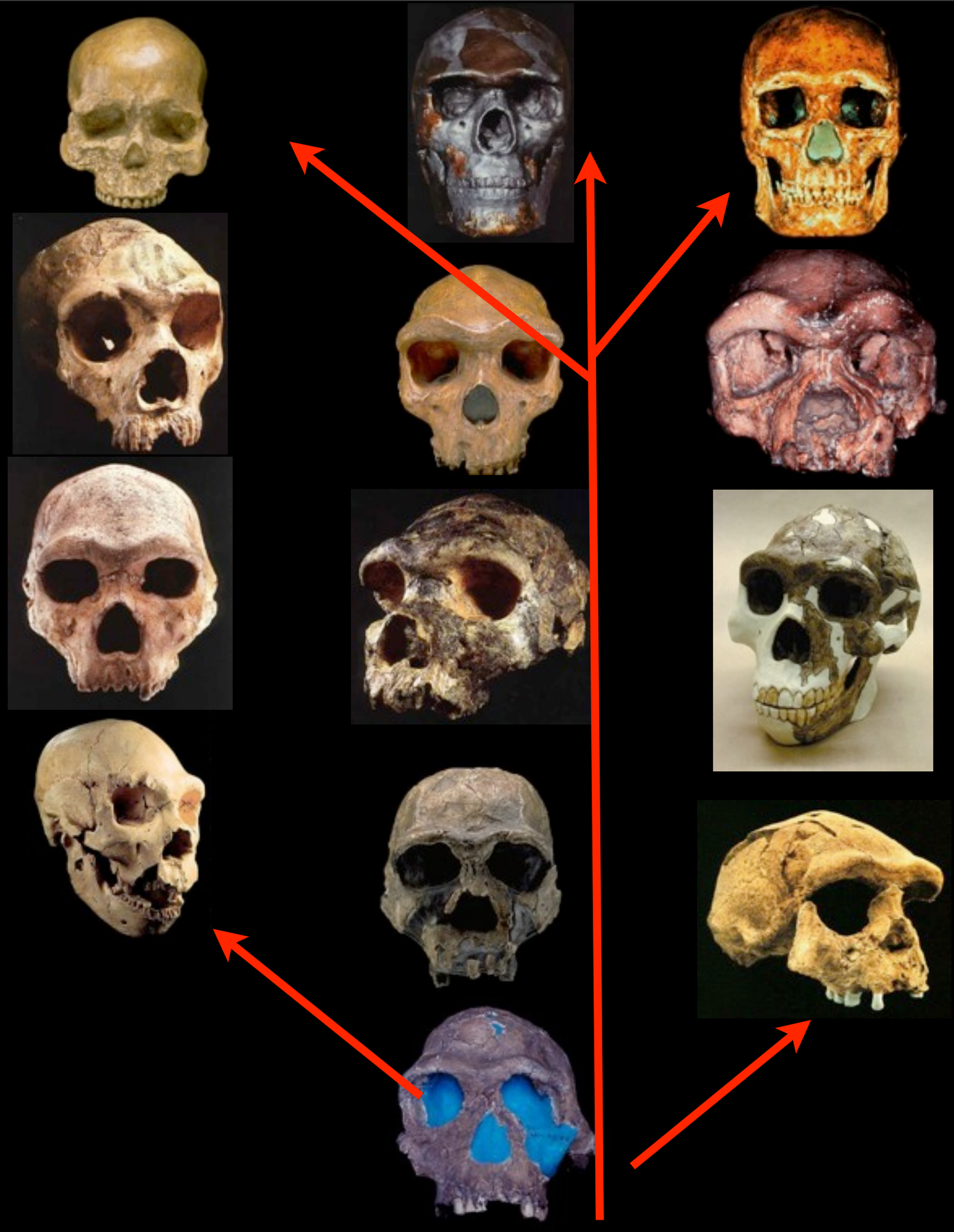


(b)

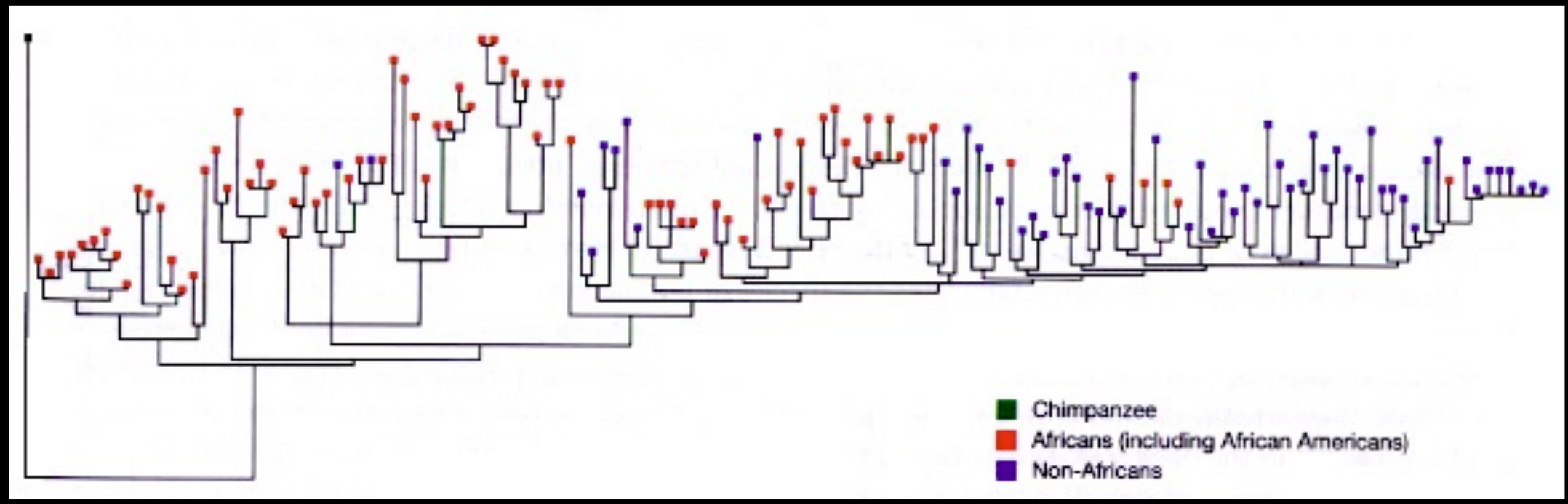
Recent African Origin:

Hypothesis: *Homo sapiens sapiens is a relatively young species that arose from a population of archaic* humans in Africa approximately 150,000 - 200,000 years ago.

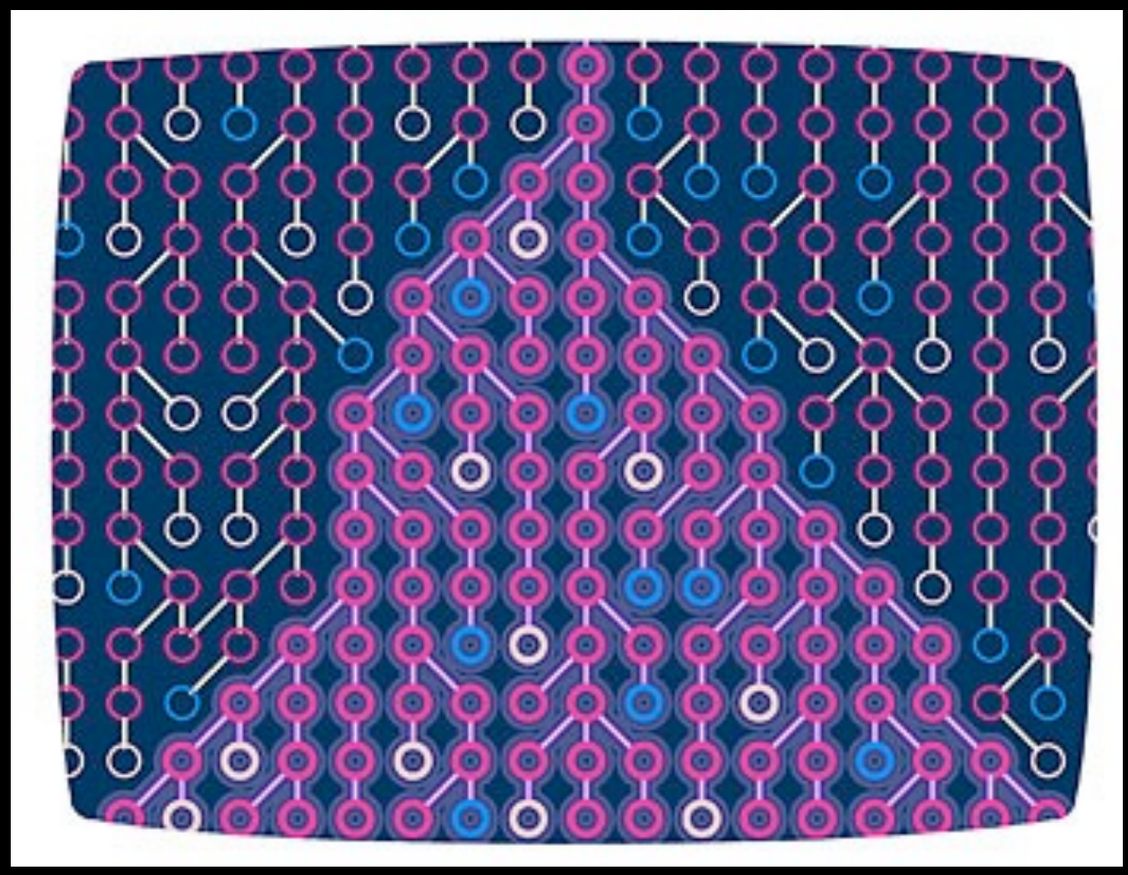


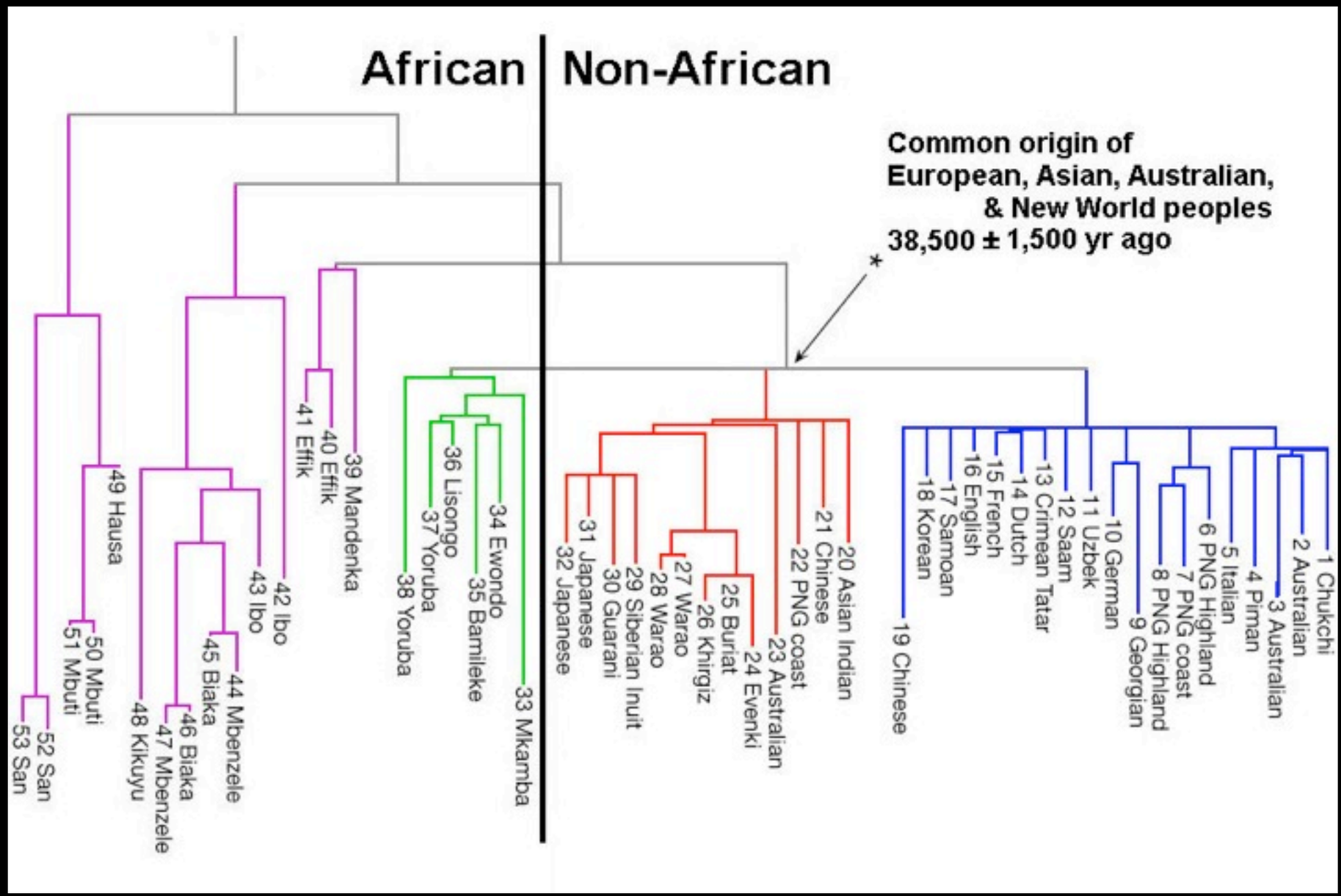


Earliest “moderns” found in Africa



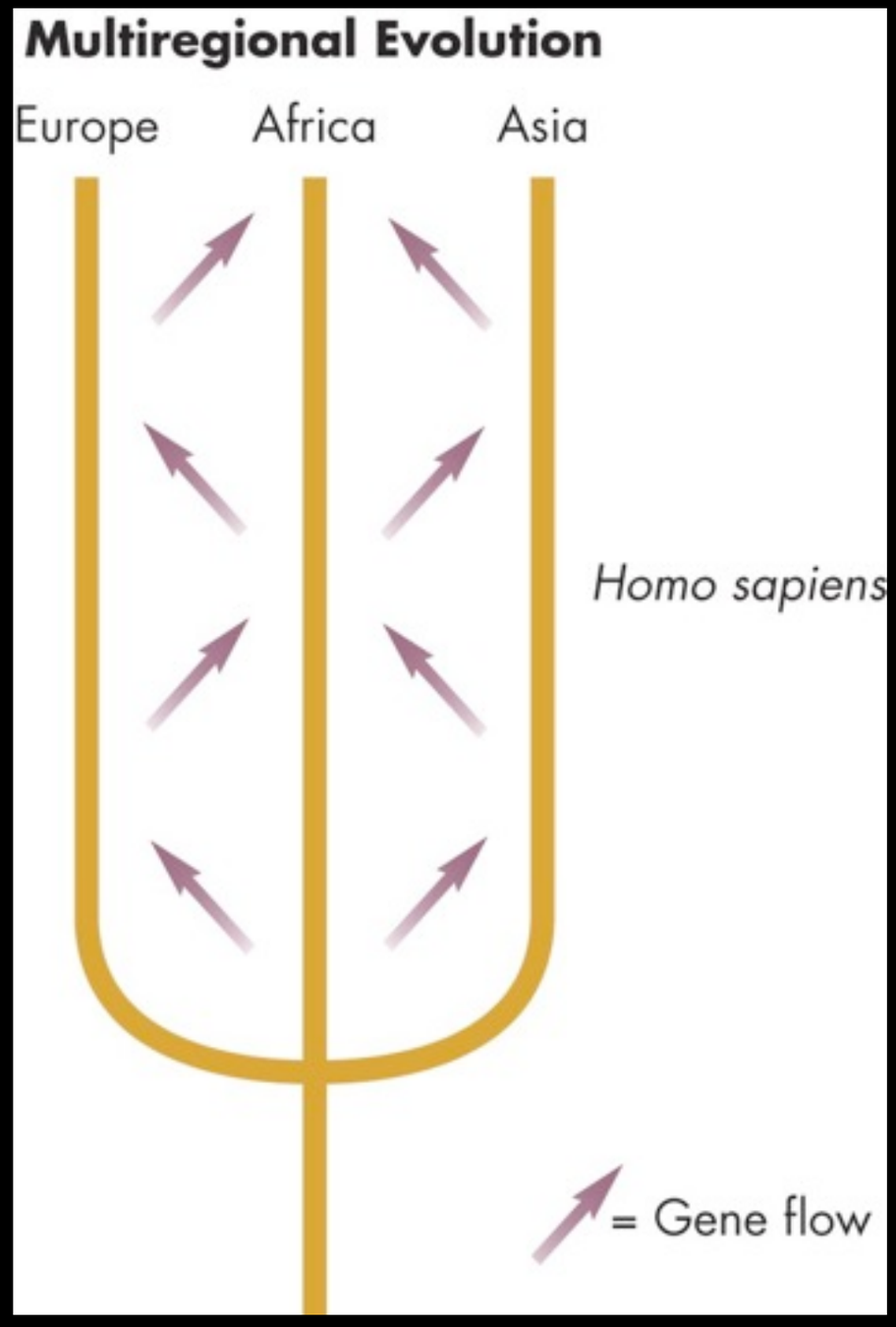
Mitochondrial DNA

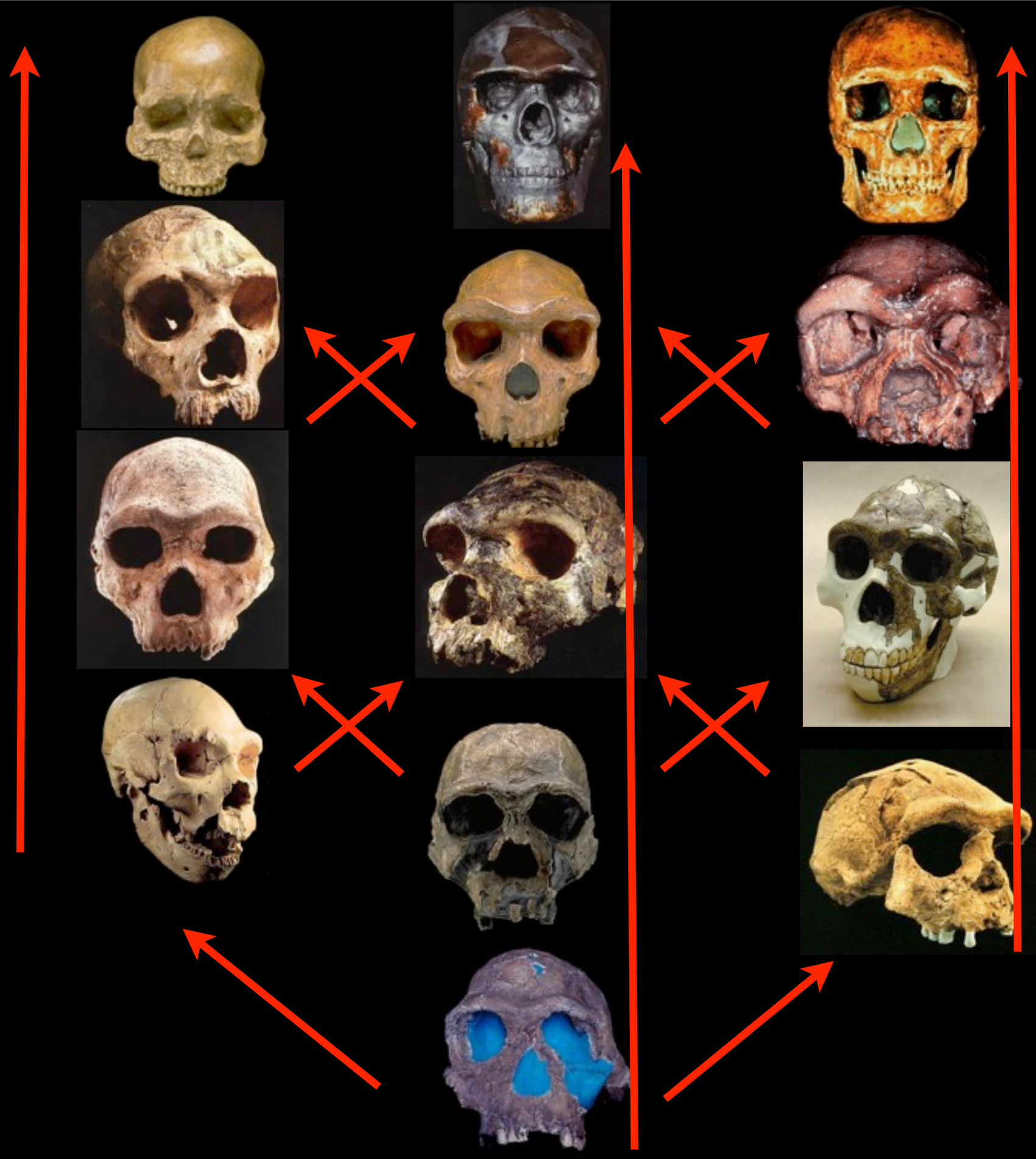



African
Non-African
Common origin of
European, Asian, Australian,
& New World peoples
38,500 ± 1,500 yr ago
1 Chukchi
2 Australian
3 Australian
4 Piman
5 Italian
6 PNG Highland
7 PNG coast
8 PNG Highland
9 Georgian
10 German
11 Uzbek
12 Saam
13 Crimean Tatar
14 Dutch
15 French
16 English
17 Samoan
18 Korean
19 Chinese
20 Asian Indian
21 Chinese
22 PNG coast
23 Australian
24 Evenki
25 Buriat
26 Khirgiz
27 Warao
28 Warao
29 Siberian Inuit
30 Guarani
31 Japanese
32 Japanese
33 Mkamba
34 Ewondo
35 Bamileke
36 Lisongo
37 Yoruba
38 Yoruba
39 Mandenka
40 Effik
41 Effik
42 Ibo
43 Ibo
44 Mbenzele
45 Biaka
46 Biaka
47 Mbenzele
48 Kikuyu
49 Hausa
50 Mbuti
51 Mbuti
52 San
53 San

Multiregional Evolution

Hypothesis: all humans in the last 1.7 my have been members of the same species, Homo sapiens, and over time all populations have undergone similar patterns of change, resulting in modern human morphology





Sunday, May 15, 2011

Continuity in China

Lager Velho 1

The facial and appendicular remains provide a morphological mosaic, with the mandibular mentum osseum and dental proportions, as well as mandibular ramal, antebrachial features, and pubic size, aligning the specimen with European early modern humans. The mastoid region is intermediate; however, the femorotibial length proportions and lower limb hypertrophy reflect arctic body proportions, and these features, along with the mandibular symphyseal retreat and thoracohumeral muscle hypertrophy, indicate affinities to the Neandertals. This mosaic indicates admixture between late archaic and early modern humans in Iberia, refuting hypotheses of complete replacement of the Neandertals by early modern humans and underlining the complexities of the cultural and biological processes and events that were involved in modern human emergence.

The Tianyuan remains display diagnostic features of modern *H. sapiens*. But co-author Erik Trinkaus and his colleagues argue, controversially, that the bones also display features characteristic of earlier human species, such as relatively large front teeth.

The most likely explanation, they argue, is interbreeding between early modern humans emerging from Africa and the archaic populations they encountered in Europe and Asia.

"The pattern we see across the Old World is basically a modern human in terms of its newly emerged characteristics, but also a minority of traits that are absent or lost in the earliest modern humans in East Africa," Professor Trinkaus told the BBC News website.

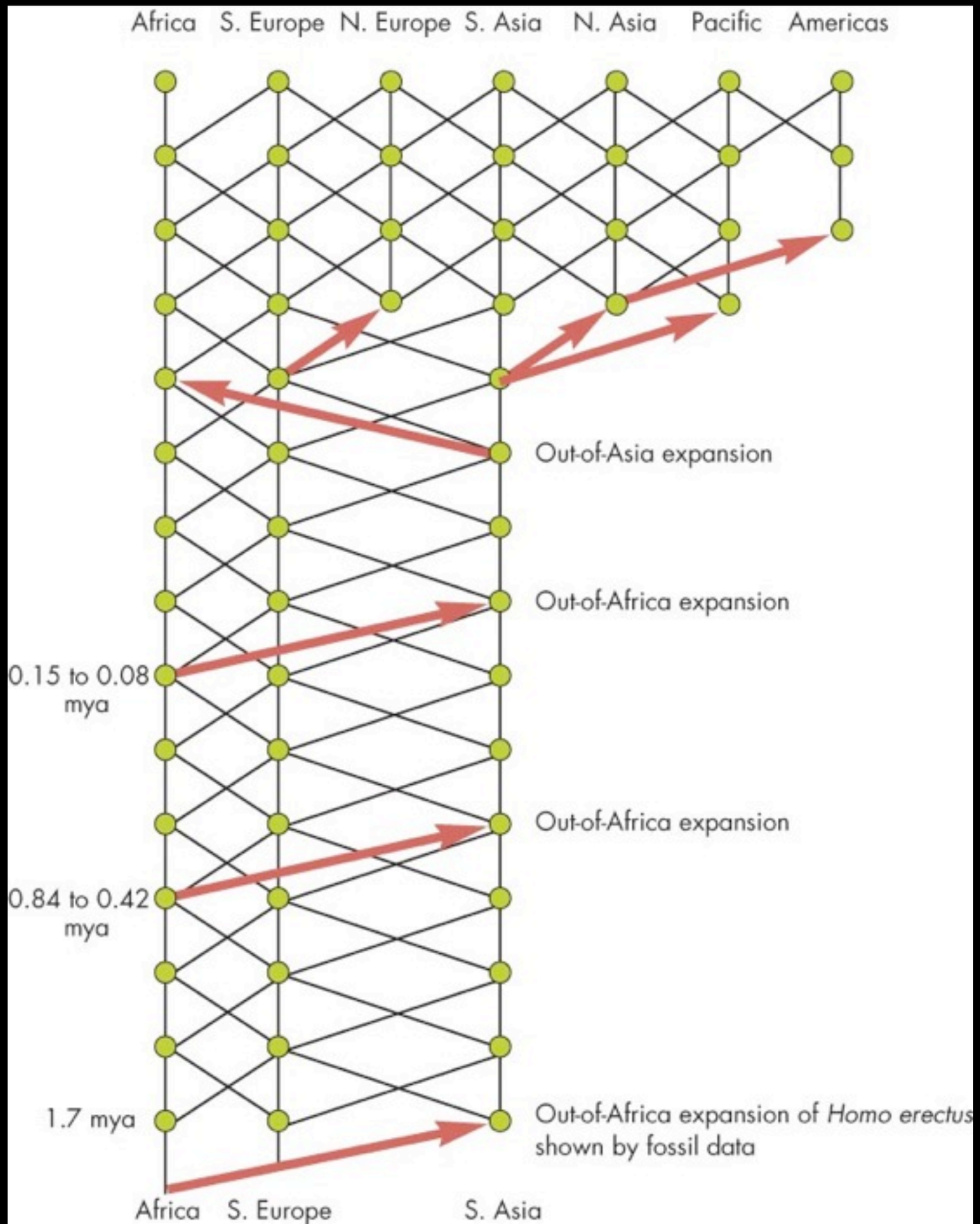
"The question is where did they get them from? Either they re-evolved them, which is not very likely, or, to some degree, they interbred with archaic groups.

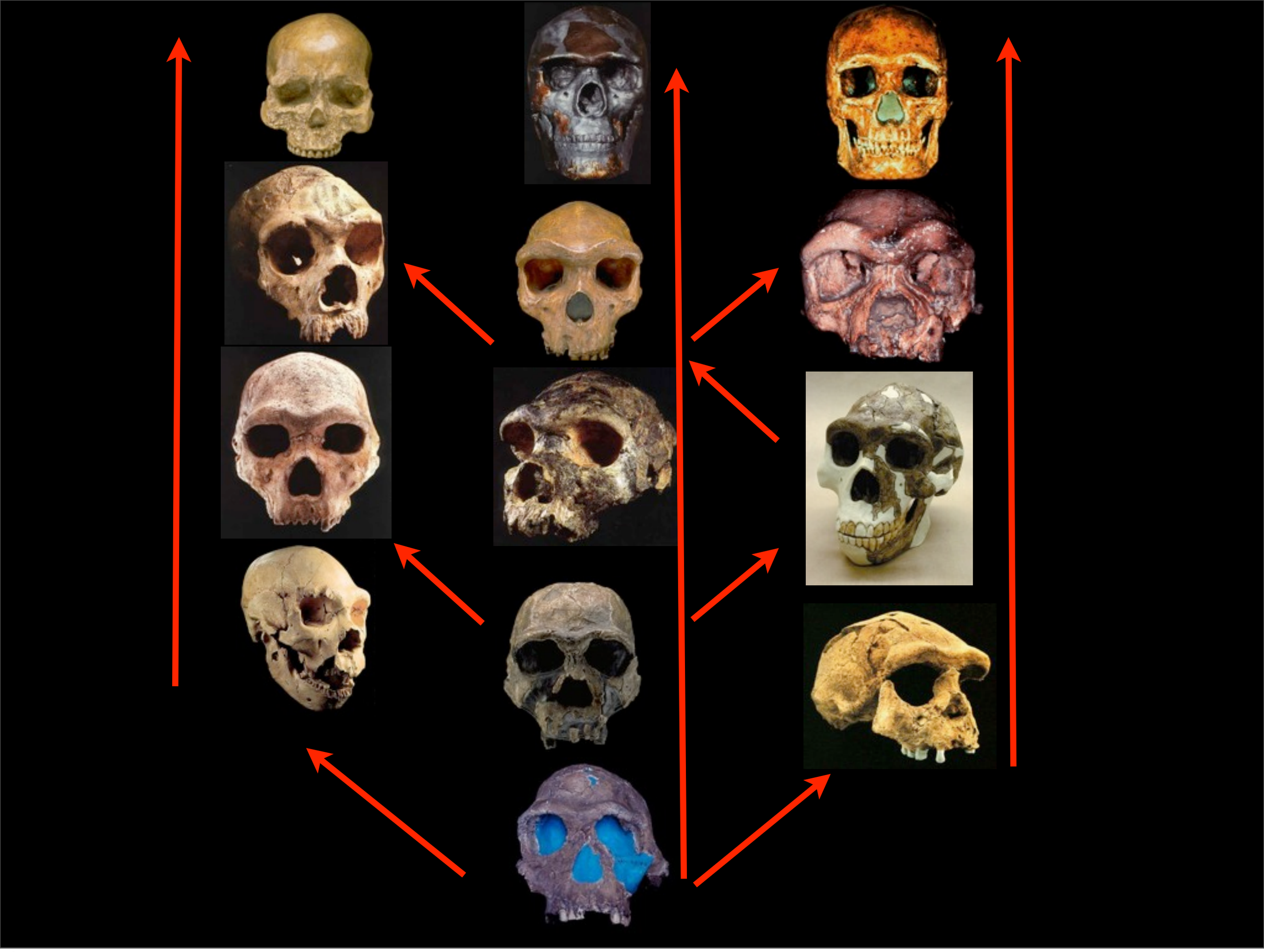
"Sex happens. I find this neither disturbing nor surprising."

Multiple Dispersals

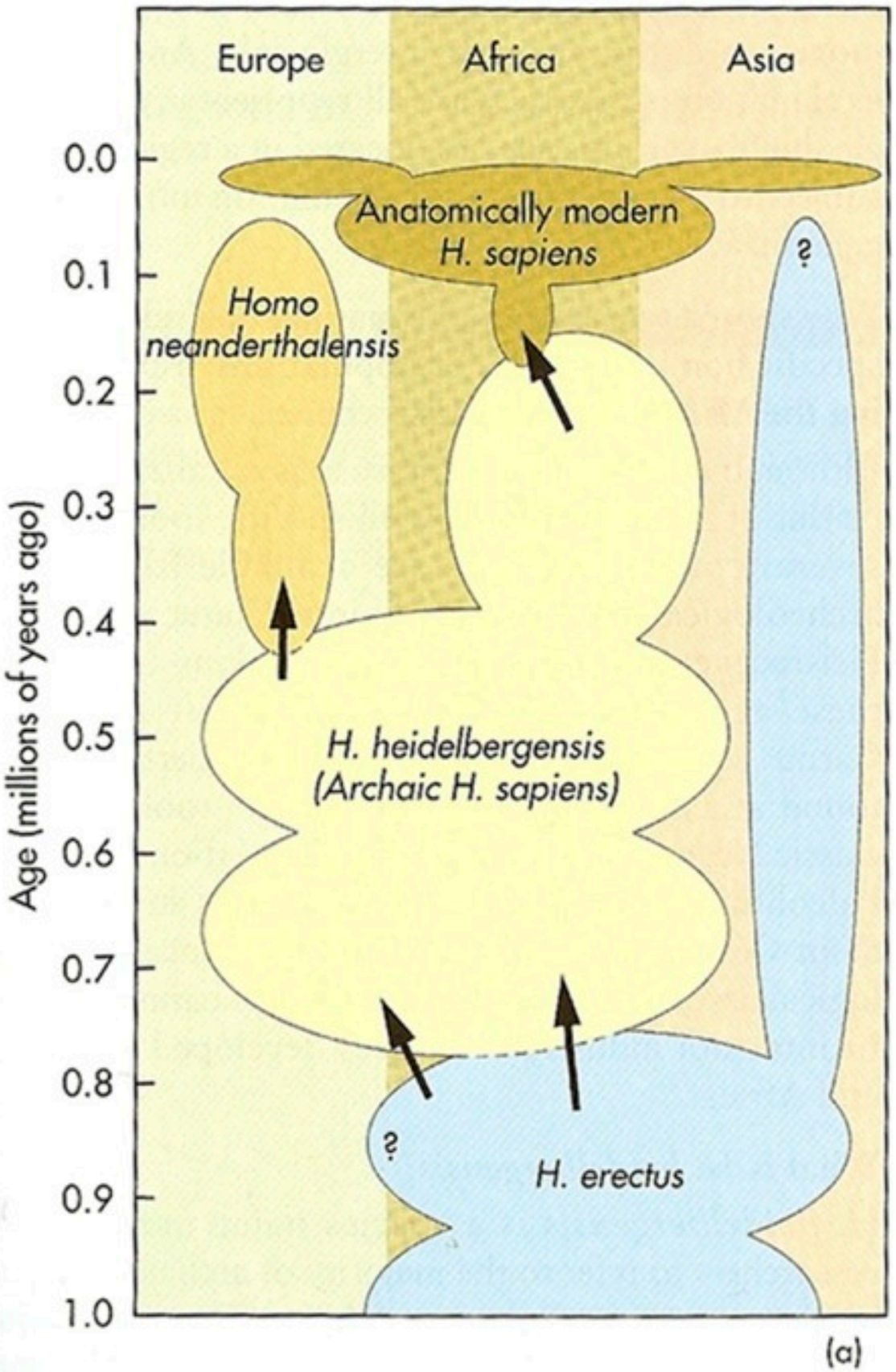
Multiple times in human history people dispersed from Africa, and then Asia, spreading their genes to the remaining populations, all the while gene flow providing an important source of admixture

Still all one species...with multiple population expansions



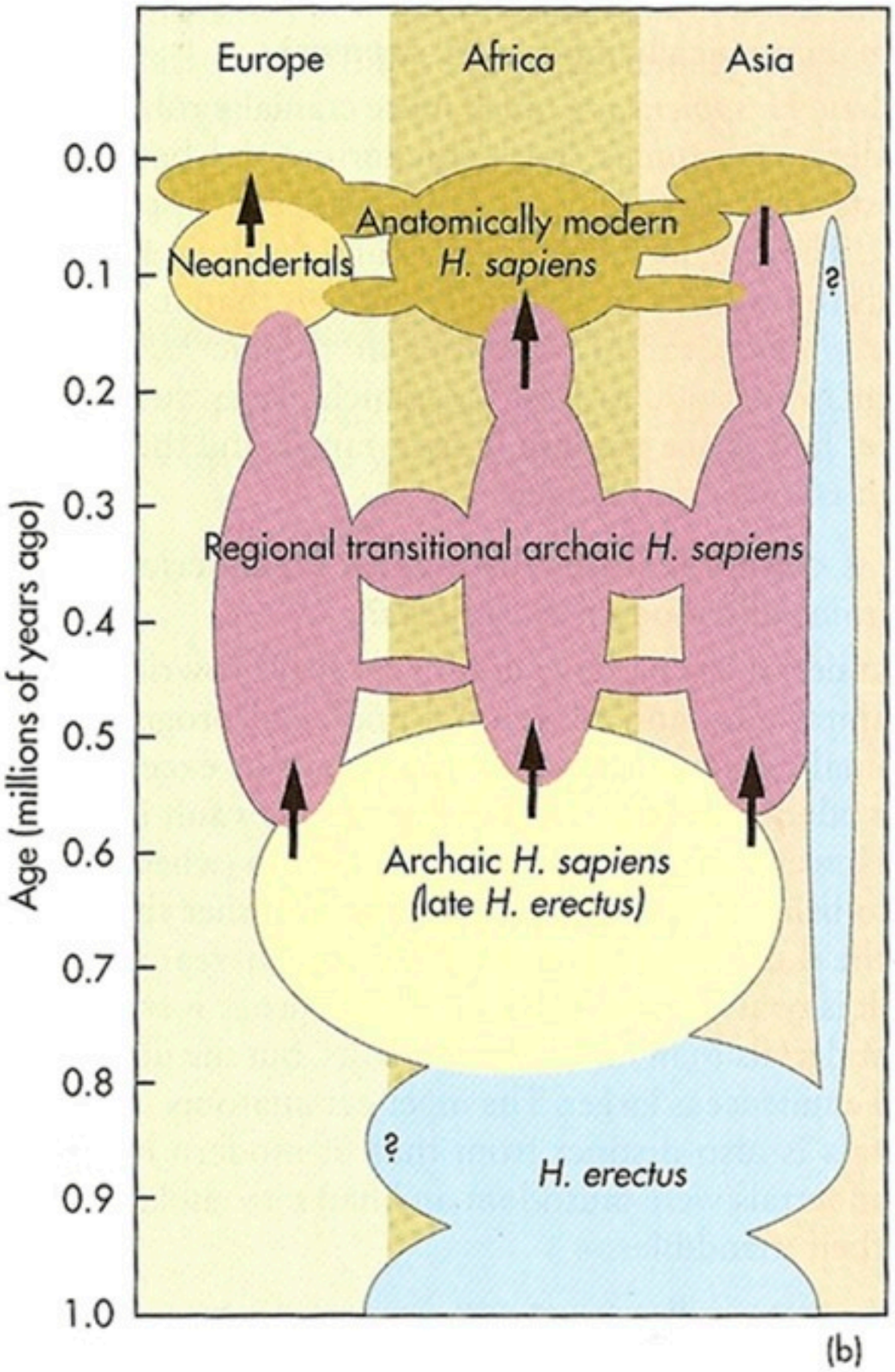


SPLITTER VIEW

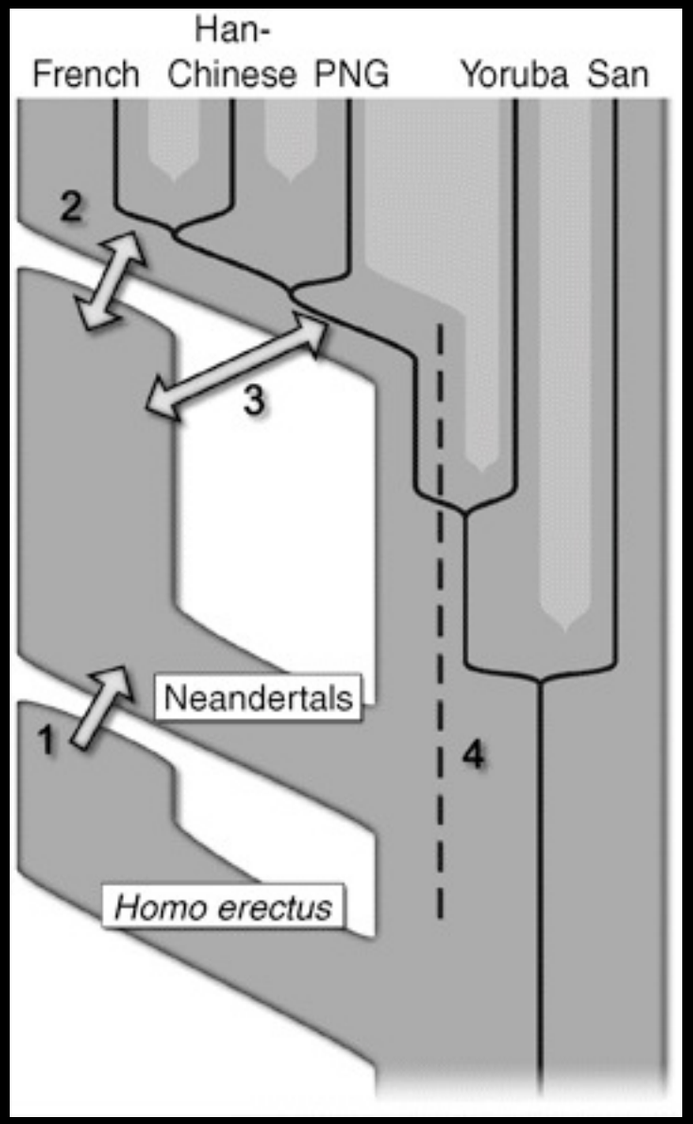


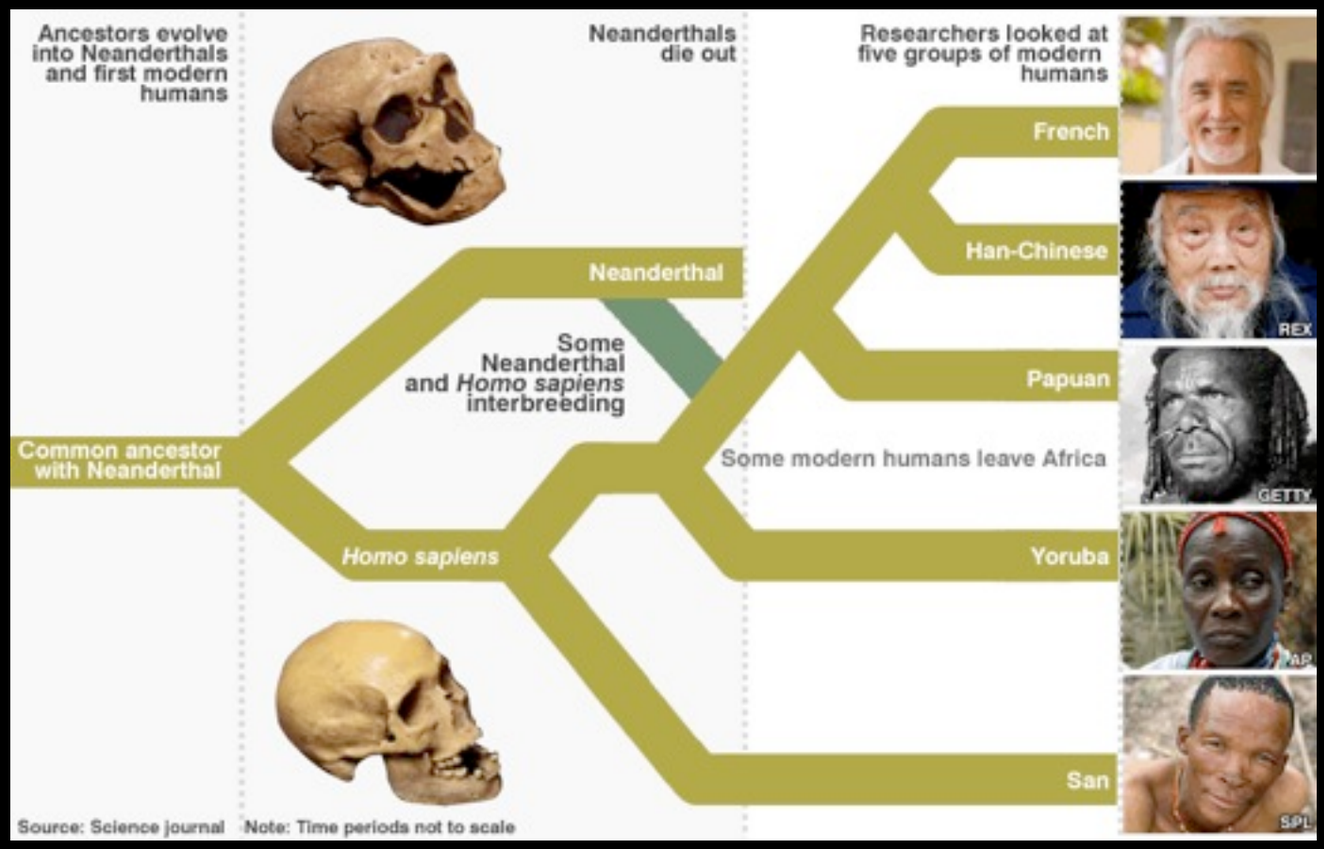
(a)

LUMPER VIEW



(b)


Han-
French
Chinese
PNG
Yoruba
San
2
3
Neandertals
1
4
Homo erectus


Ancestors evolve into Neanderthals and first modern humans
Neanderthals die out
Researchers looked at five groups of modern humans
French
Han-Chinese
Papuan
Yoruba
San
Neanderthal
Some Neanderthal and Homo sapiens interbreeding
Common ancestor with Neanderthal
Some modern humans leave Africa
Homo sapiens
REX
GETTY
AP
SPL
Source: Science journal
Note: Time periods not to scale