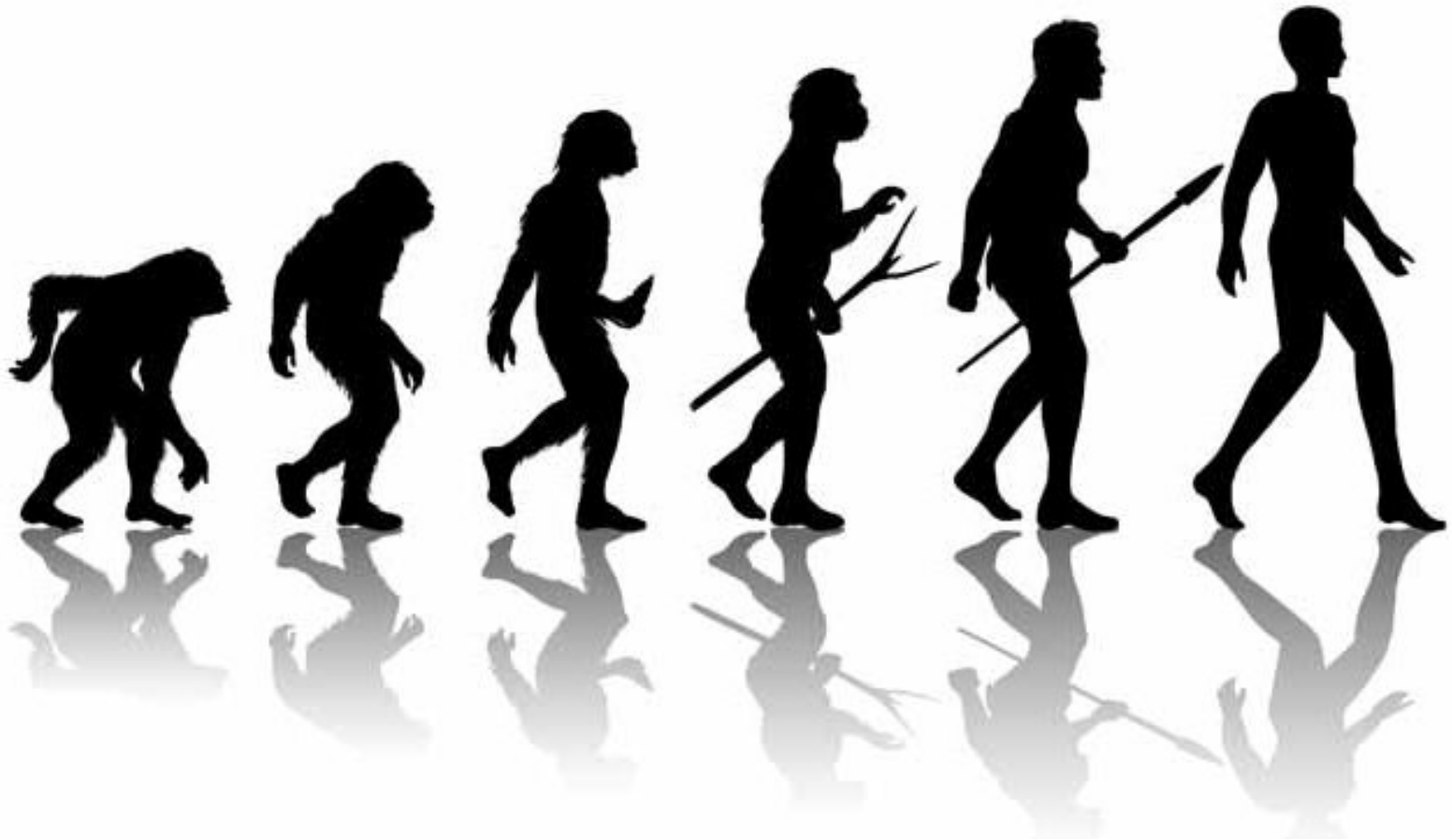
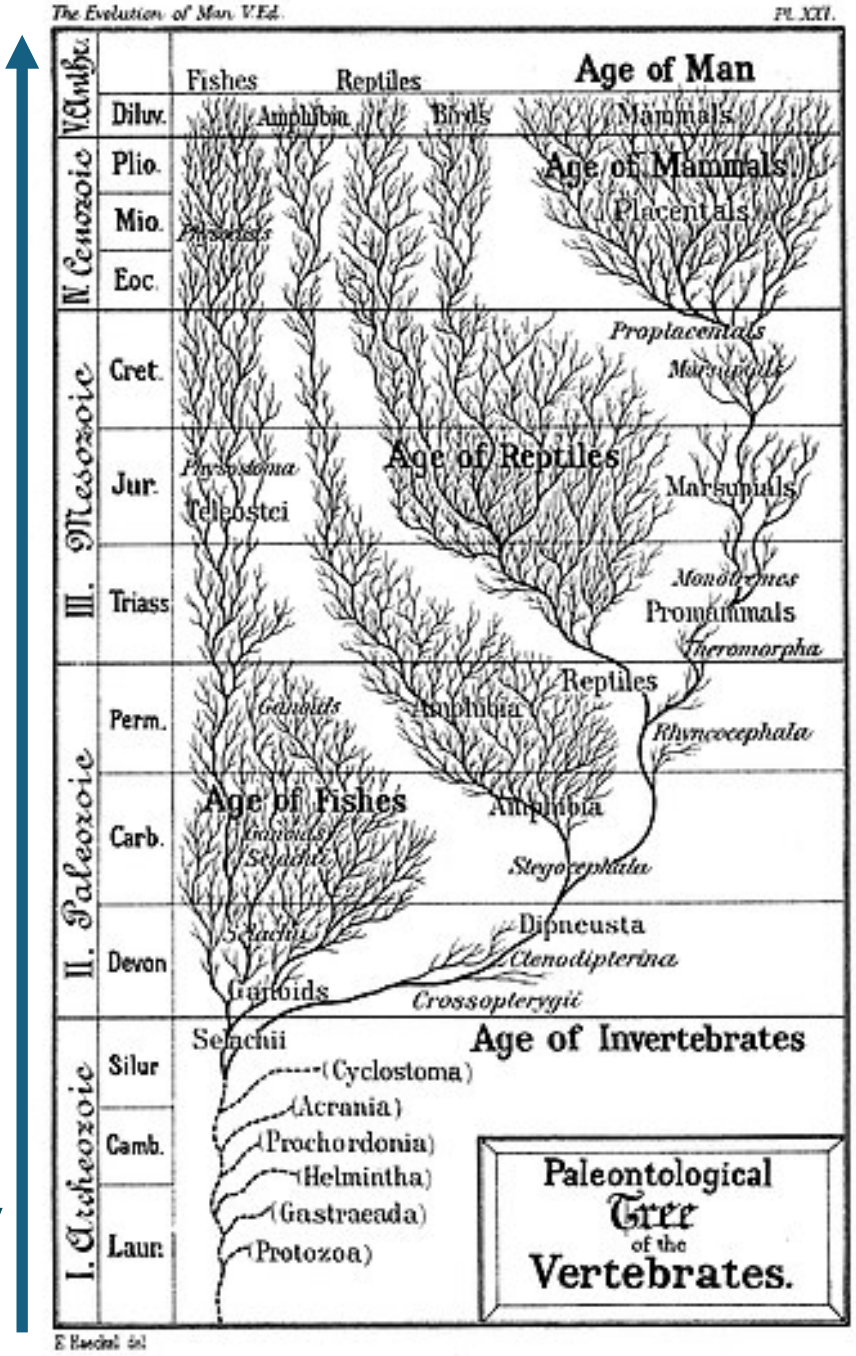
From Australopithecus to Homo sapiens

The Human Story



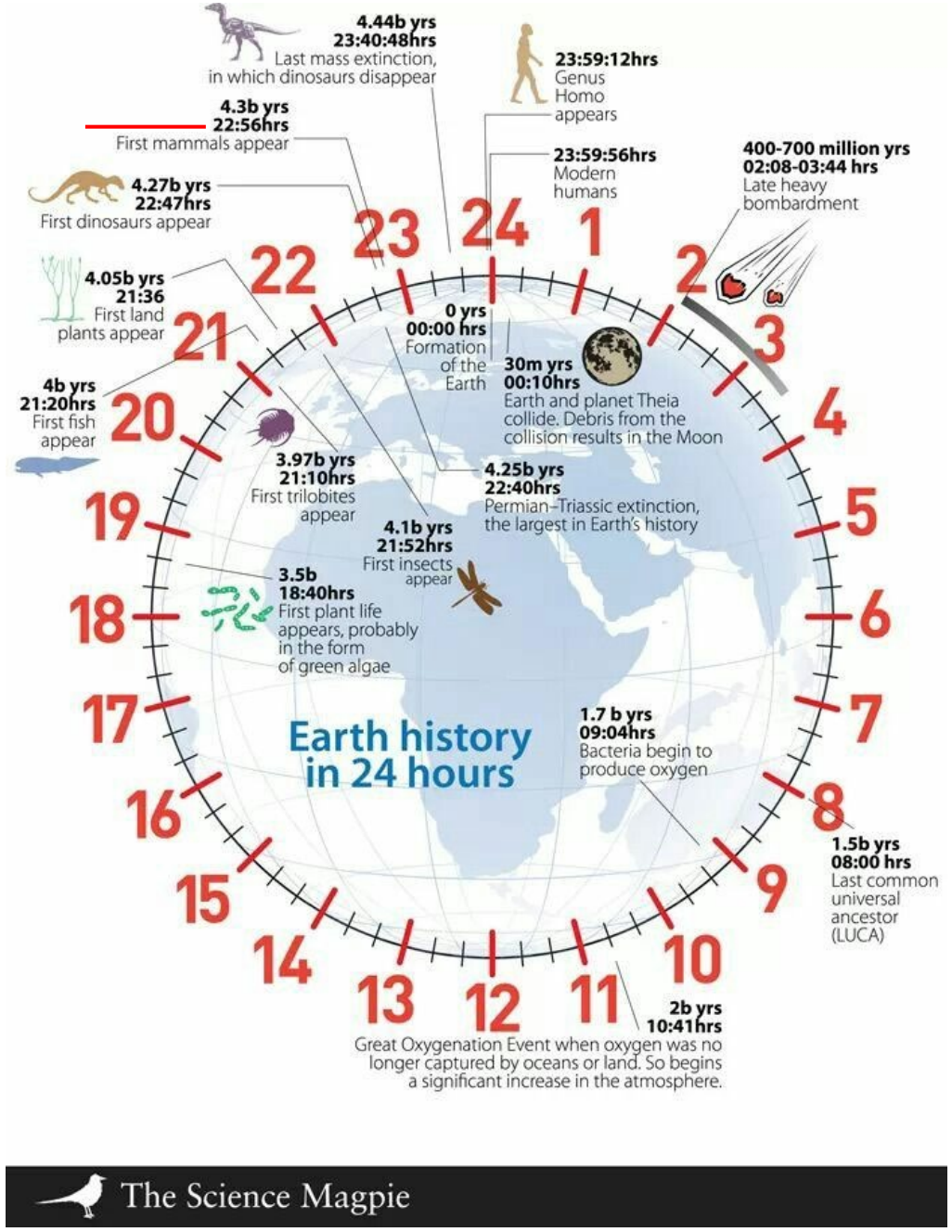
Where do we come from?

A Four Billion Year Journey



How long has it taken?

A Four Billion Year Journey



To get to you, it has taken

100,000,000,000,000

successful reproductions

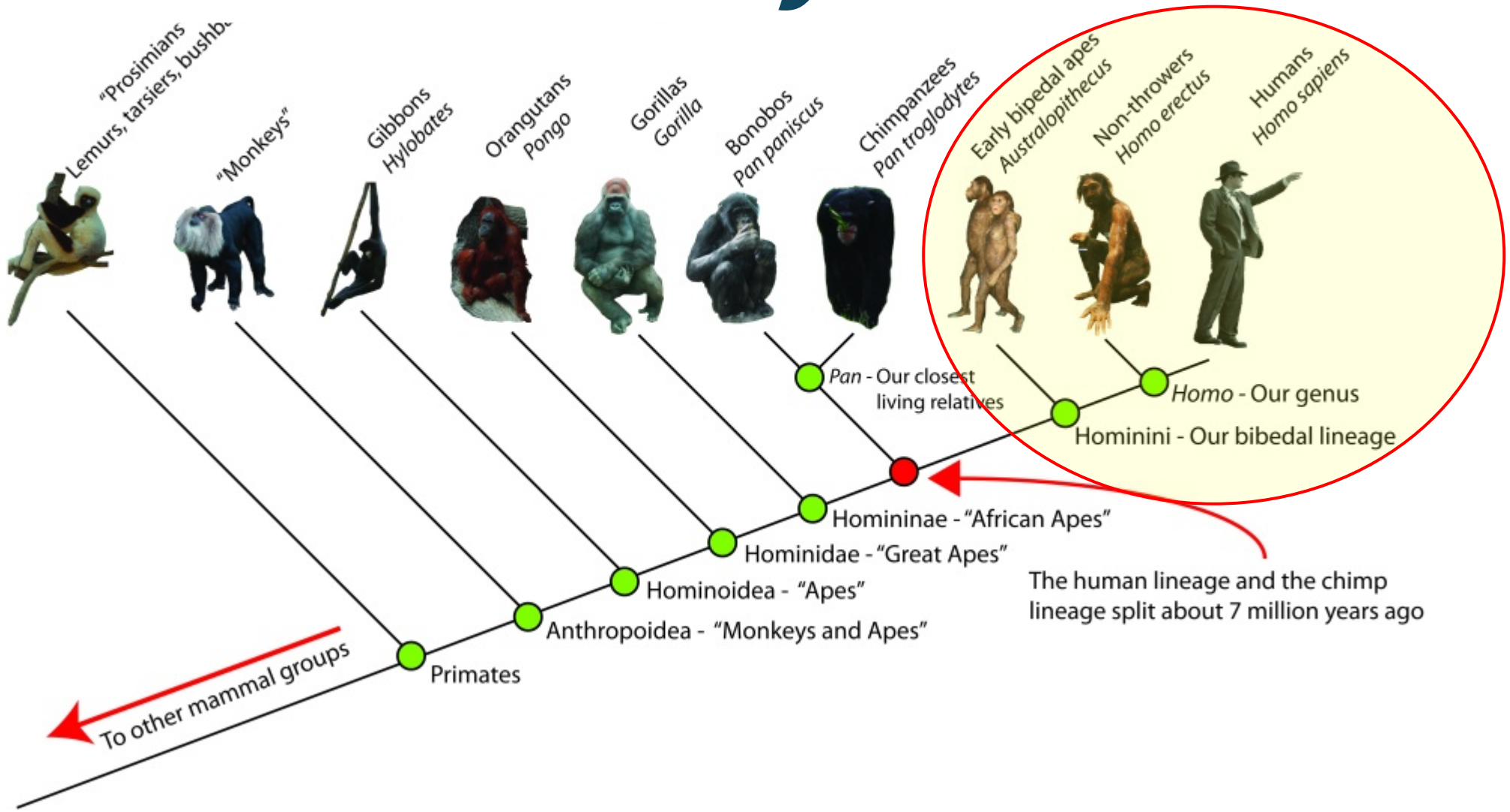
You are a miracle!

If someone gave you a million dollars every minute, how long would it take to have 100 trillion dollars?

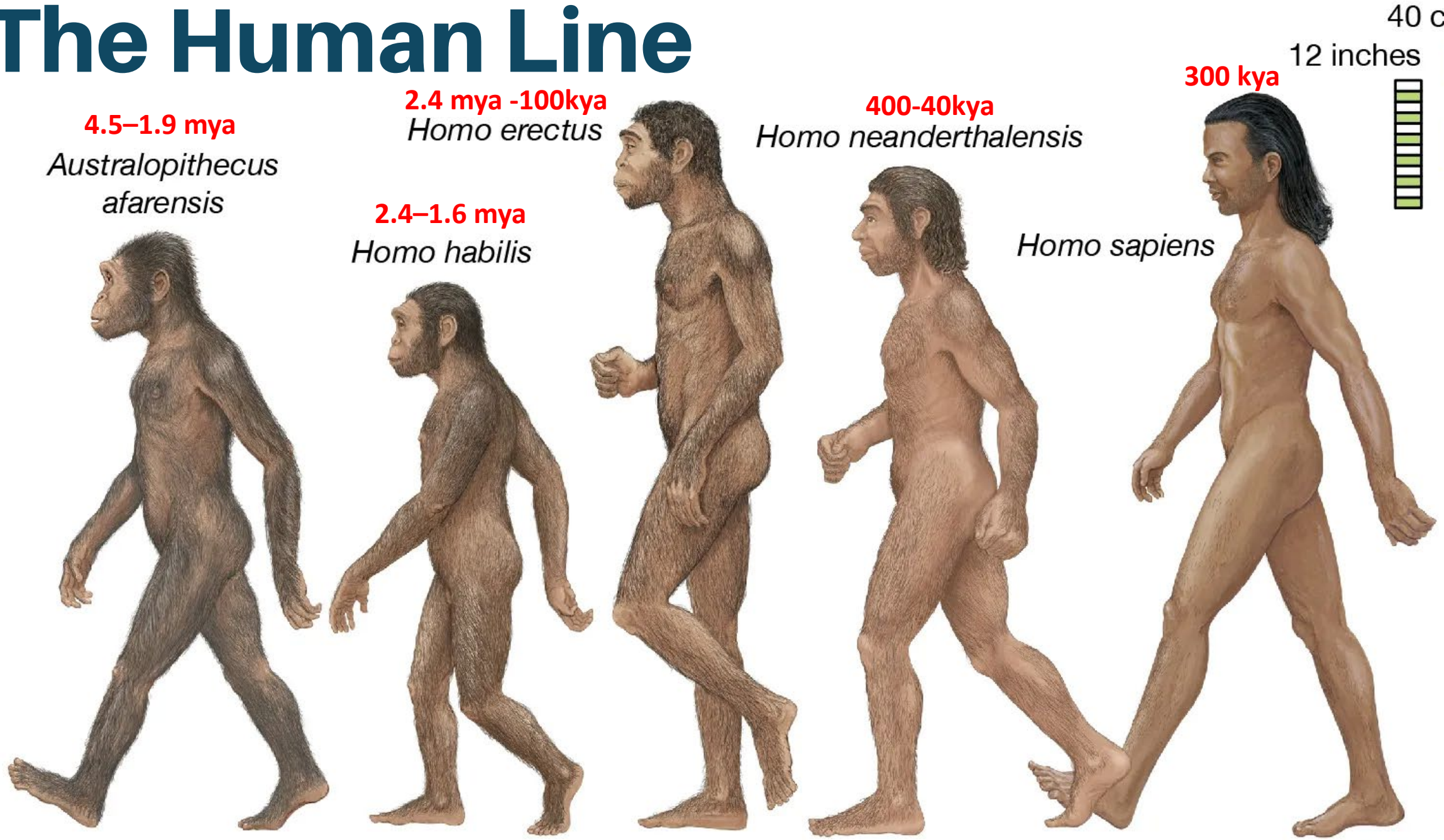
190 years!

The Primates

Our Extended Family



The Human Line

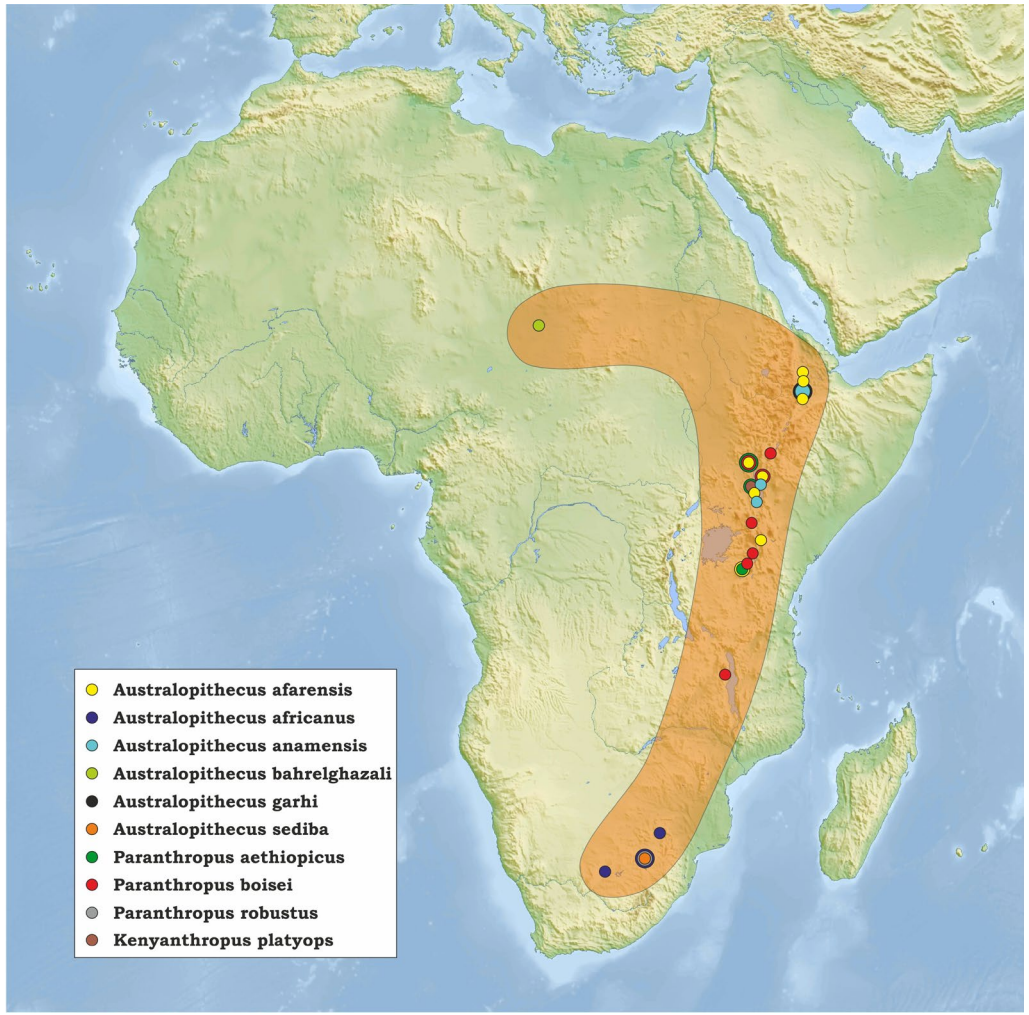


Who is this?

Australopithecus

4.5 and 1.9 million years ago

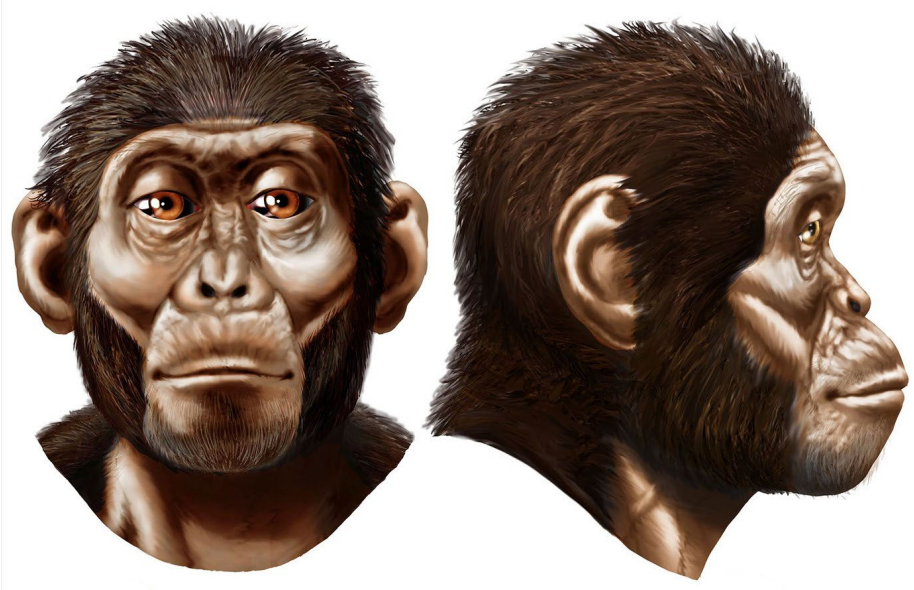
- **Location:** Across East Africa
- **Size:** Small 1-1.2m tall, 25–45 kg.
- **Brain size:** 400 cc, only slightly larger than modern chimpanzees.
- **Teeth:** Smaller canines than apes
- **Diet:** fruits, leaves, nuts, seeds, roots, sometimes small animals.
- **Social life: lived in groups for safety and cooperation**
- **Tool use:** simple tools (stones, sticks)



Australopithecus

4.5 and 1.9 million years ago

What's special about them?



Australopithecus

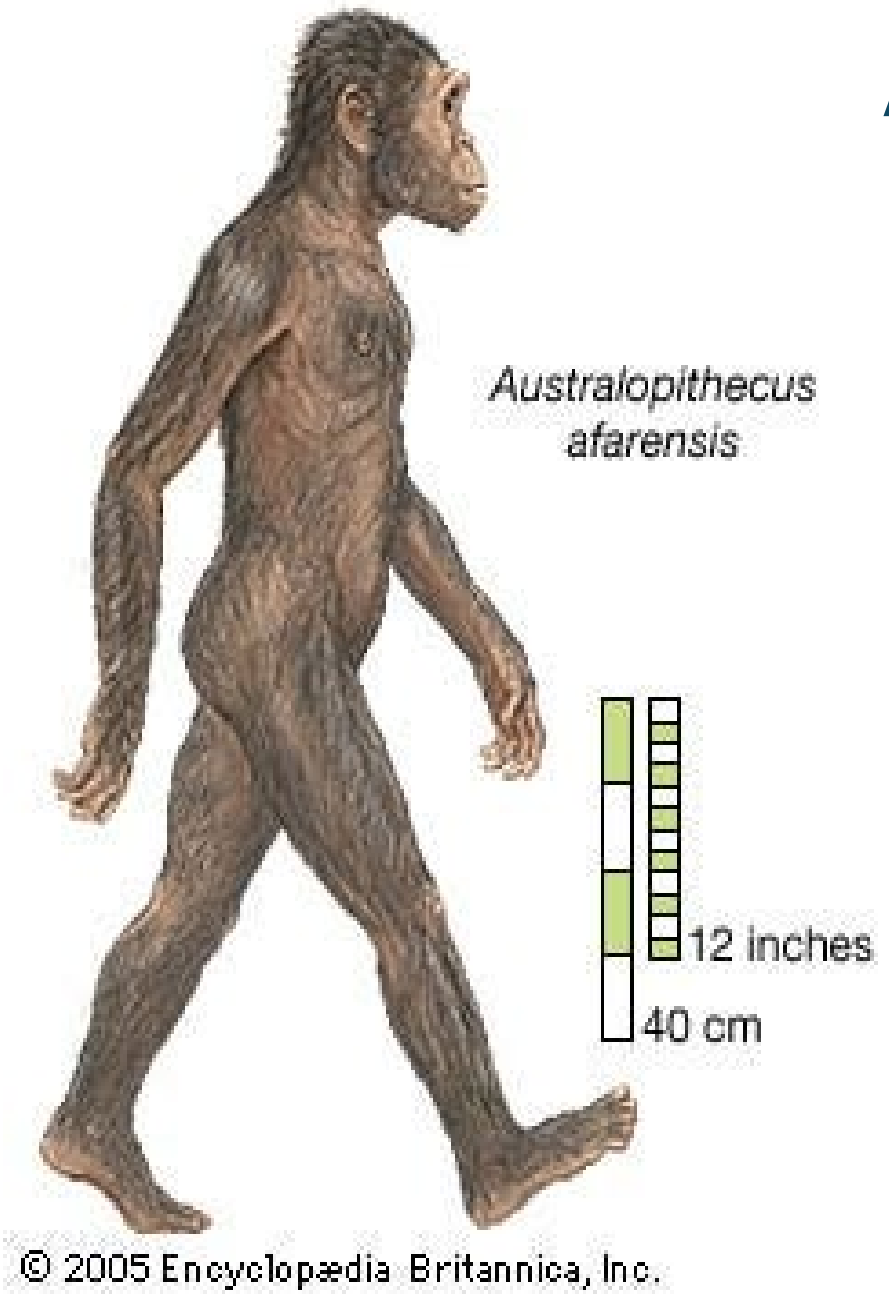
4.5 and 1.9 million years ago

First habitual bipeds

Why did they come out the trees and start walking?

Australopithecus

Why bipedalism?



- **Changing environment:**
  forest giving way to savanna
- **Seeing further:**
  spotting predators and food over tall grass
- **Freeing hands:**
  carry food and tools (sticks)
- **Energy efficiency:**
  travel further distances for food and resources
- **Group defence:**
  Signal danger and appear larger to predators

Australopithecus

What else is special about them?
(another evolutionary step)

Australopithecus Value of Group Living

- **Safety in numbers**

protection against predators on the savanna.

- **Shared awareness**

more eyes and ears to spot danger**.**

- **Caring for young**

group support helped raise vulnerable offspring.

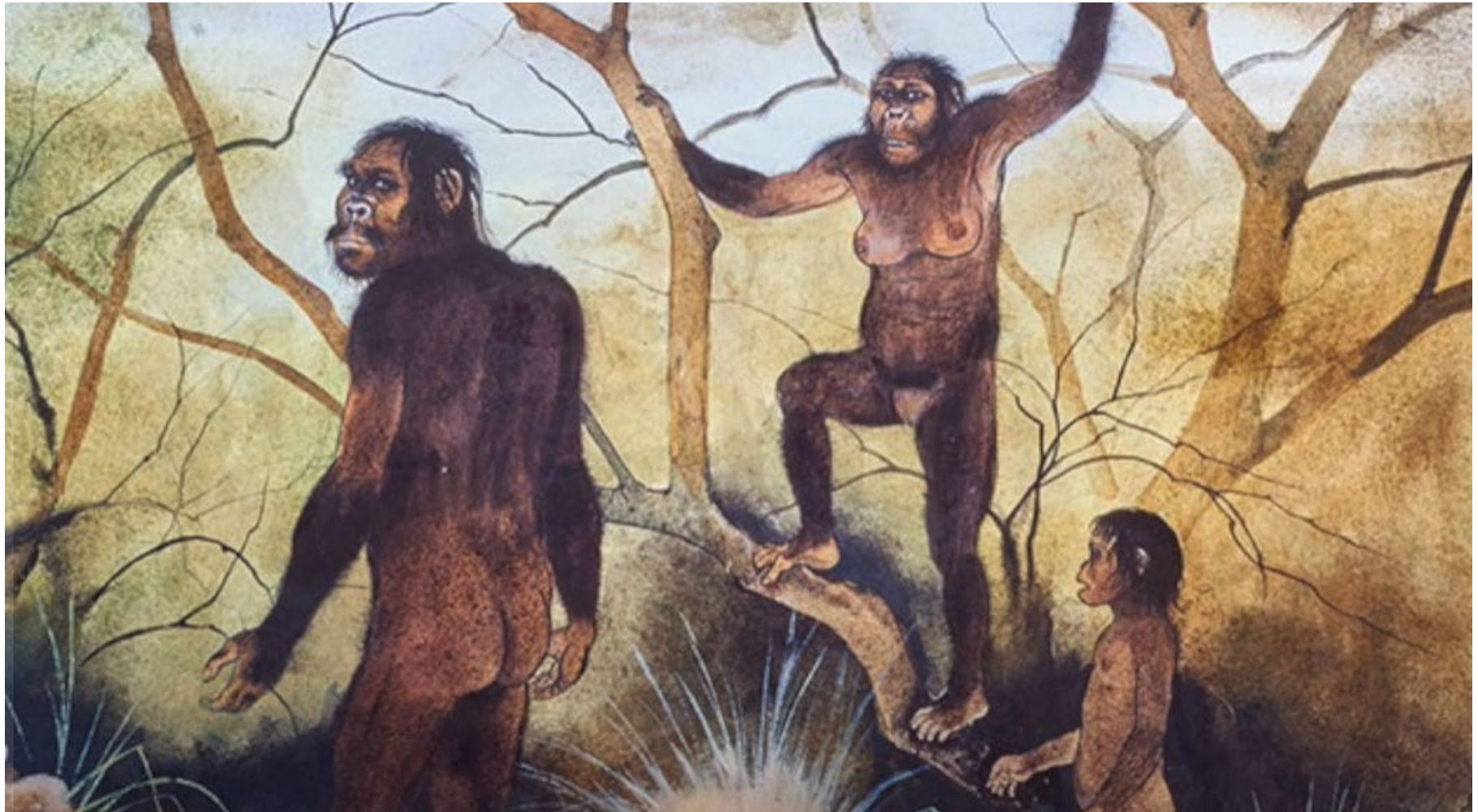
- **Cooperation**

smaller canines suggest less aggression and more social bonds.

- **Foundation**

group life laid the groundwork for later human cooperation.

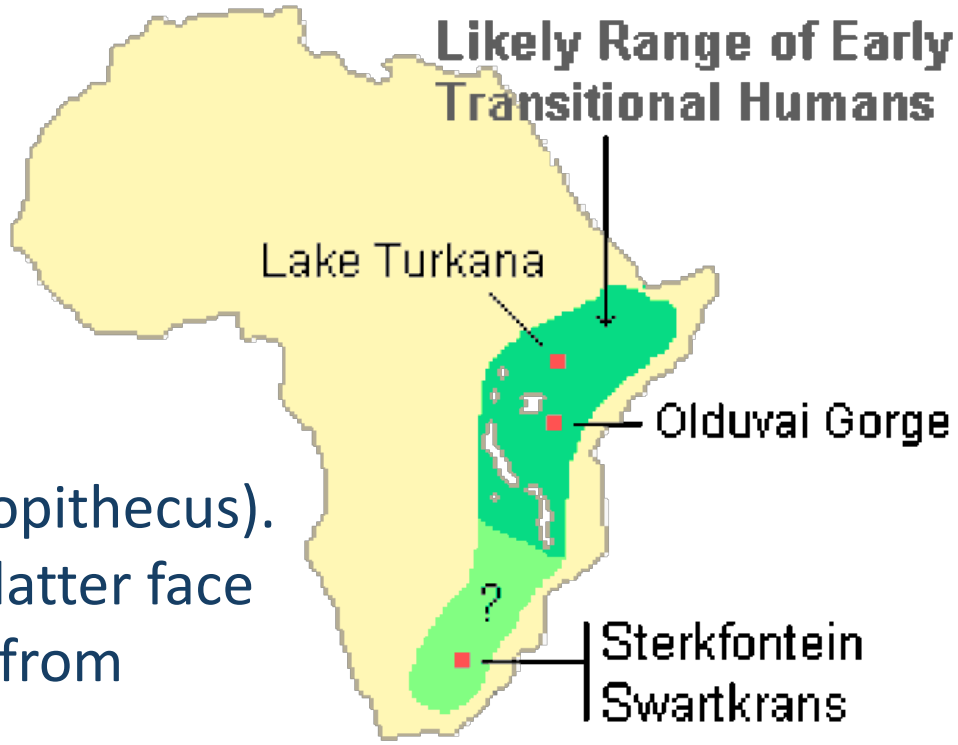
Australopithecus
The Bridge Between Apes & Humans



What species is this?

Homo Habilis

2.4 and 1.6 million years ago



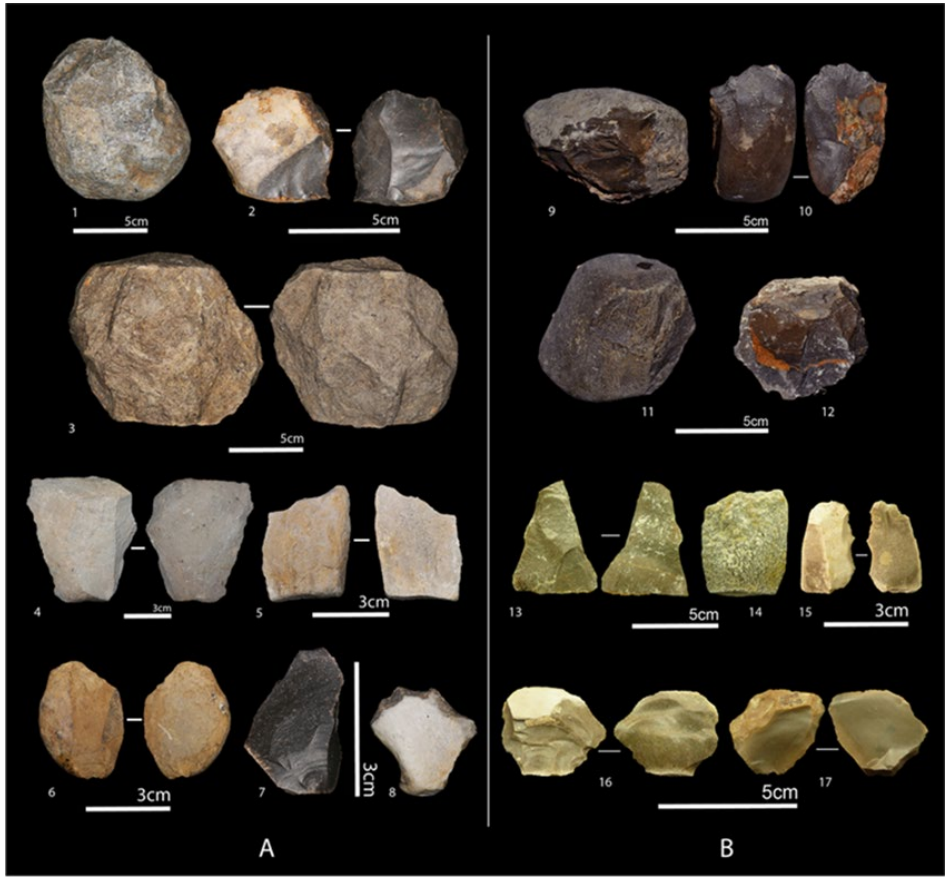
- **Location:** East and Southern Africa
- **Size:** 1–1.2 m tall, 20–37 kg.
- **Brain size:** 500–800 cc (about 40% larger than Australopithecus).
- **Teeth:** Smaller jaws and teeth than earlier hominins, flatter face
- **Diet:** Omnivorous – fruit, plants, and scavenged meat from carcasses.
- **Social life:** Lived in groups, may have shared food and resources
- **Tool use:** First clear maker of stone tools (Oldowan tools – choppers, scrapers)

What makes homo habilis special?

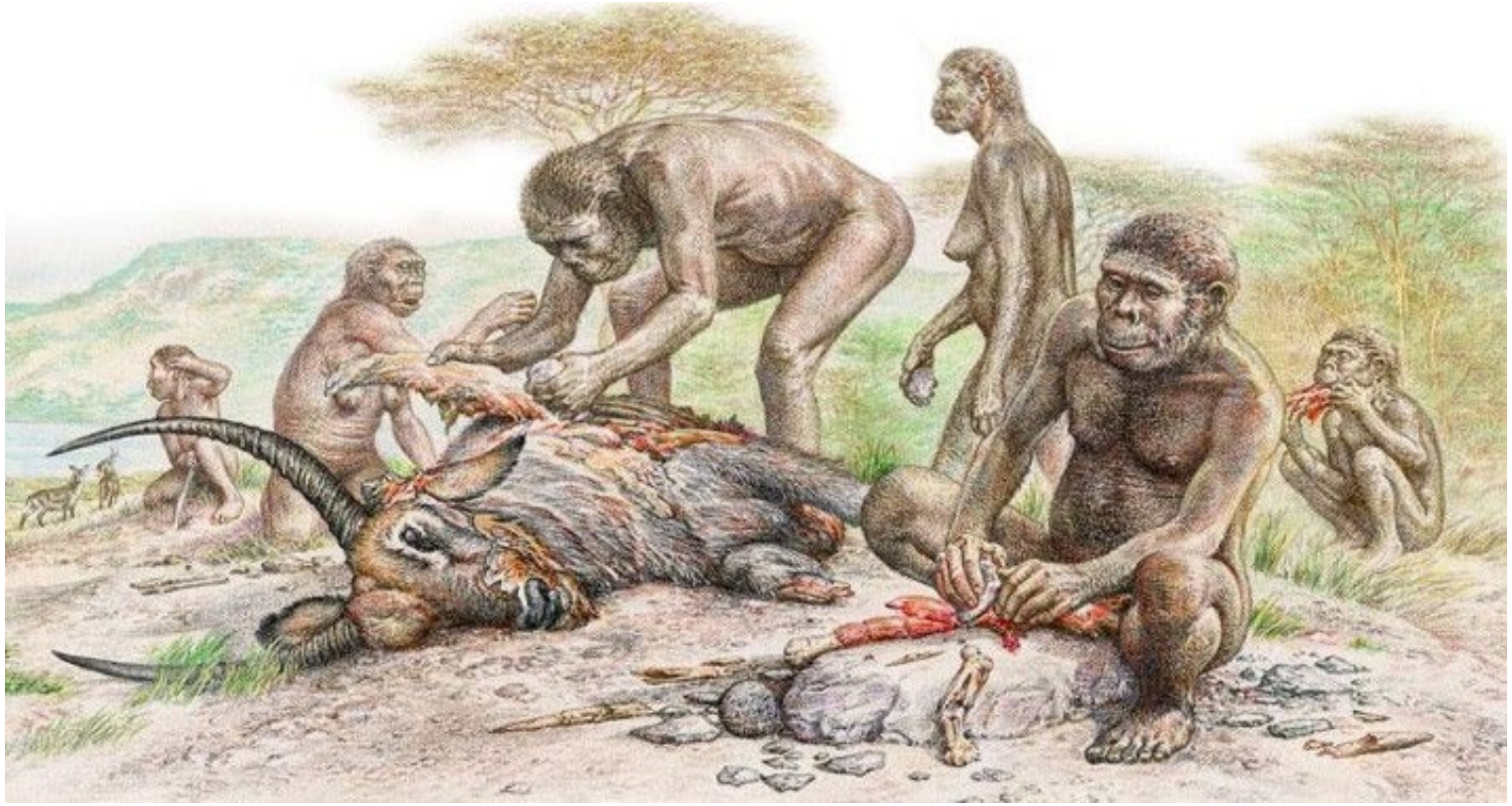
Homo Habilis - Toolmaking

- **Simple but effective –** sharp flakes struck from stones used for cutting.
- **Choppers –** large, sharp-edged stones for smashing bones and cracking nuts**.**
- **Scrapers** – used for cleaning hides and cutting meat.
- **Bone marrow** – tools gave access to rich energy sources inside bones.
- **Game-changer –** tools meant Homo habilis could exploit food sources no other animals could**.**
- **Learning and sharing** – skills likely passed on within groups, showing early culture.

Homo Habilis - Toolmaking



What impact did homo habilis tool use have?



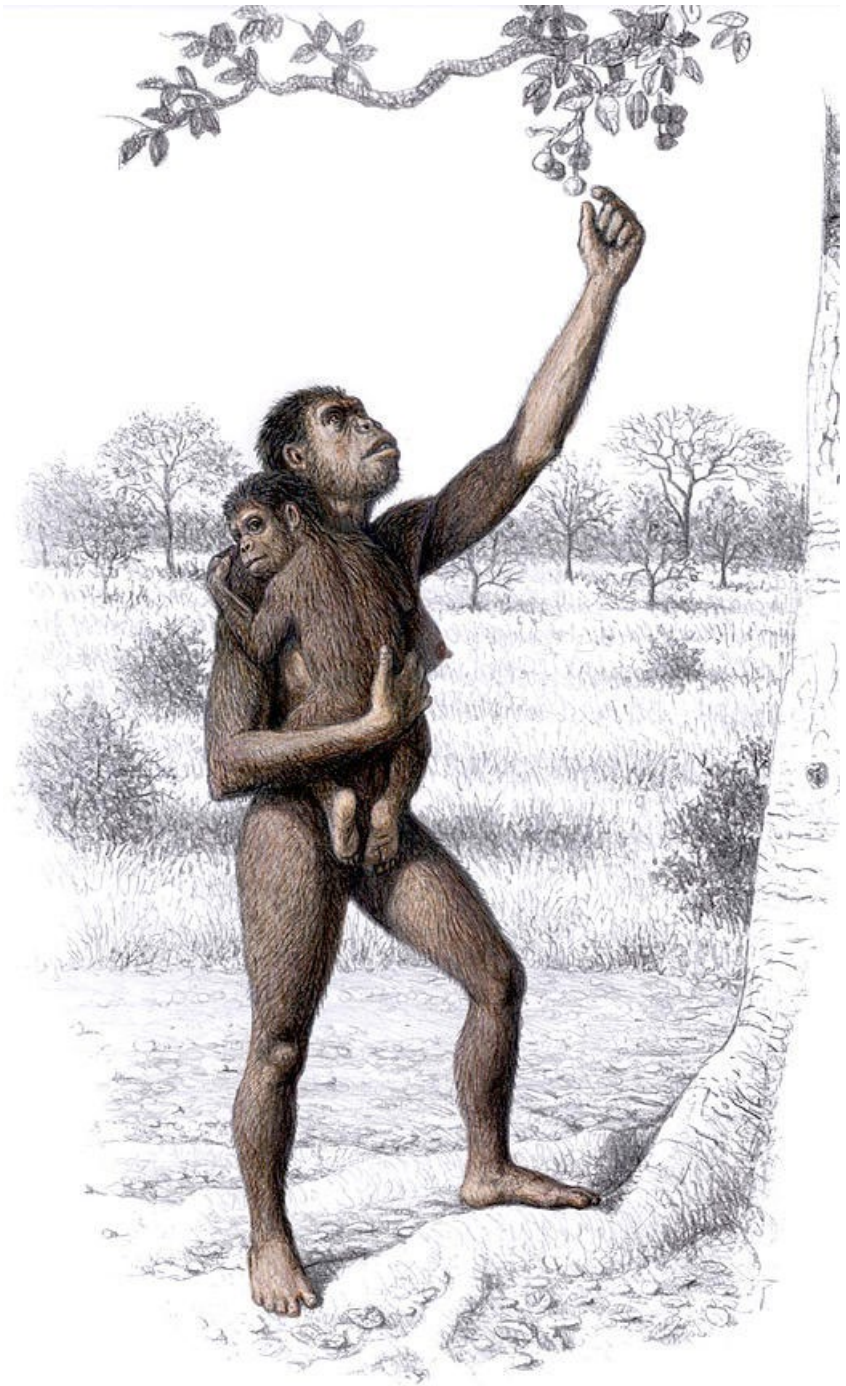
Homo Habilis
Toolmaking Impact

- **Access to new food sources –** Tools let them crack bones for marrow, cut meat, and scrape hides, giving them energy-rich diets that supported brain growth.
- **Survival advantage –** They no longer had to rely only on plants or scavenged scraps; tools gave them access to resources other animals couldn't reach.
- **Cultural learning** – Tool-making required skill and teaching, encouraging social learning, cooperation, and the beginnings of shared culture.
- **Freeing from environment limits** – Tools made them less dependent on raw physical strength, opening the path to innovation as a survival strategy**.**
- **Foundation for future advances** – This step laid the groundwork for more advanced tool industries (Acheulean hand axes, fire use, clothing), each pushing human evolution forward.

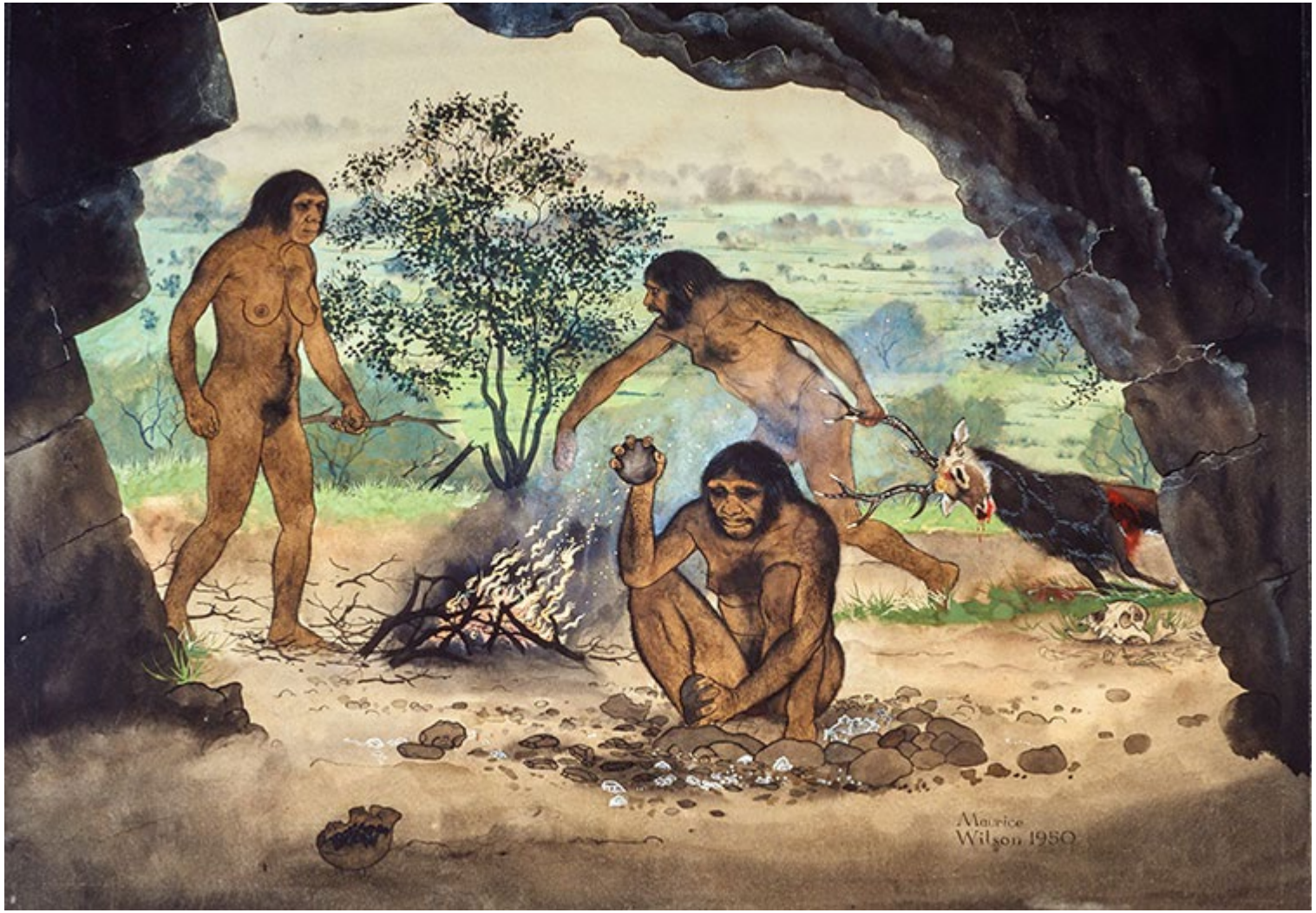
What other leaps forward did we see from Homo habilis

Homo Habilis
Other Leaps Forward

- **Bigger brain** – 500–800 cc, more advanced than Australopithecus.
- **Right-handedness** – Early signs of brain specialisation.
- **Group living** – Shared food, worked together for survival.
- **Adaptable** – Climbed trees for safety, walked on ground for foraging.
- **First "Homo"** – Marked the step from ape-like ancestors to true humans.



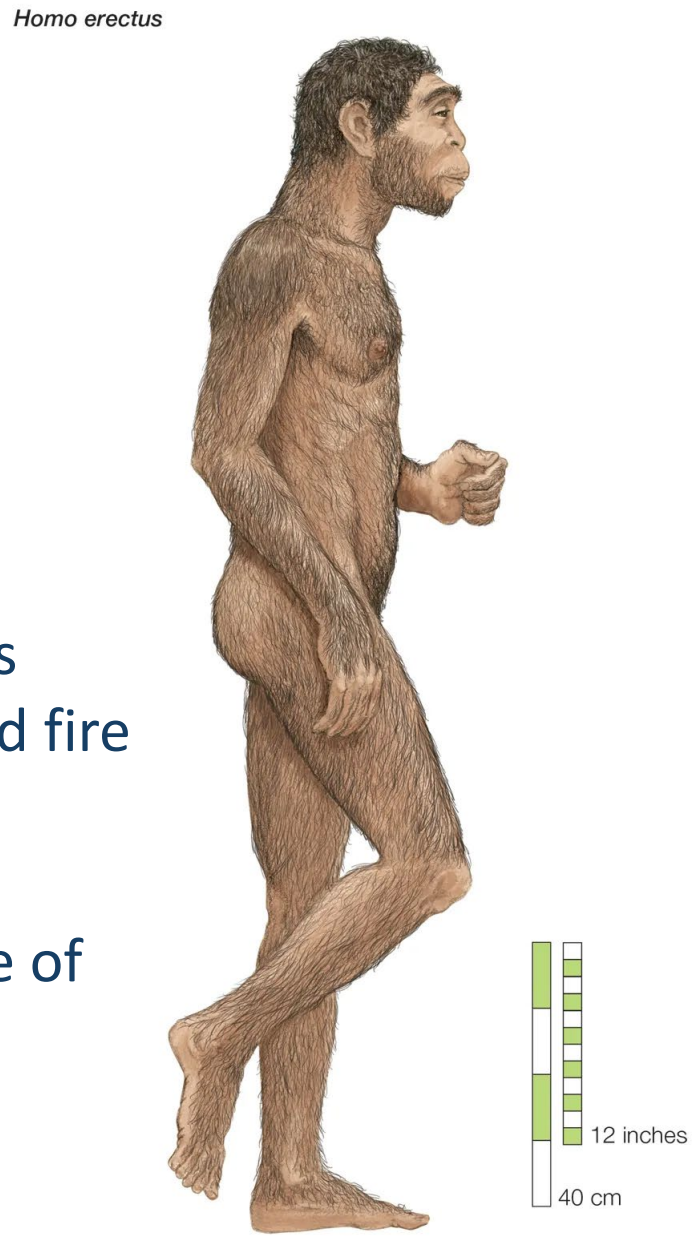
What species is this?



Homo Erectus

2 million – 100,000 years ago

- **Location:** Originated in Africa, spread to Asia and Europe
- **Time period:** 2 million – 100,000 years ago
- **Size:** 145–185 cm tall, 40–68 kg in weight
- **Brain size:** 546–1,250 cc (much larger than Homo habilis)
- **Teeth/face:** Smaller teeth, flatter face, pronounced brow ridges
- **Diet:** Omnivorous – hunted large animals, gathered plants, used fire
- **Social life**: Lived in groups, cared for sick and elderly, possible division of labour
- **Tool use:** Acheulean hand axes, advanced stone tools, evidence of fire use



What makes homo erectus special?

Homo Erectus - Out of Africa

- **Adaptability**

– Survived in many environments: savannas, forests, colder climates.

- **Innovation**

– New challenges encouraged advances in tools, fire, and survival skills.

- **Wider range**

– Became the most widespread early human, reaching Asia and Europe.

- **Foundation**
- – Opened the path for later humans (Neanderthals in Europe, Homo sapiens worldwide).

Leaving Africa proved humans could adapt anywhere, setting the stage for global domination.

What was other game-changing homo erectus innovations?

Hunting and Fire

- **Big-game hunters**

– worked in groups to hunt elephants, rhinos, and other large animals.

- **Fire for cooking**

– made meat easier to chew and digest, unlocking more energy.

- **Safety & survival**
- – fire scared predators away and kept groups warm at night.
- **Social life**

– campfires became a place for sharing food and cooperation.

- **Brain boost**
- – more calories from cooked meat supported further brain growth.

And another homo erectus evolutionary advancement?

Homo erectus
Care for Others – A Human Touch

- **Evidence:**

Fossils show individuals with tooth loss or injuries who lived long after, meaning they were supported.

- **Group survival:**

Helping the weak strengthened group bonds and cooperation.

- **Early compassion:**

Suggests empathy, not just survival instinct.

- **Cultural step:**

Caring for others laid the groundwork for human social values.

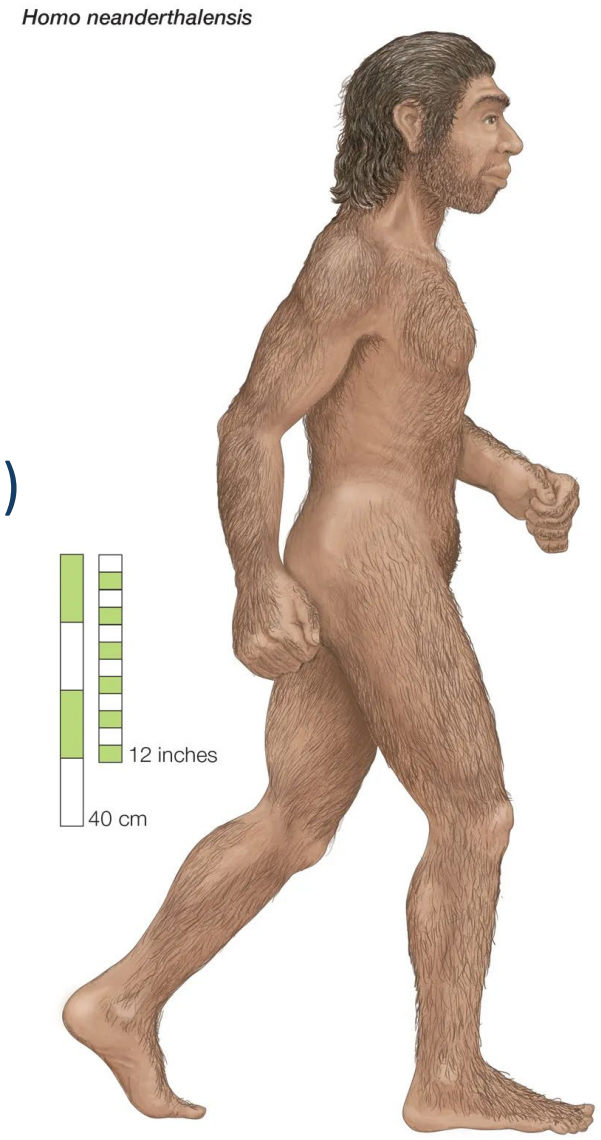
Homo erectus show the first signs of human-like compassion and community care.

What species is this?

Neanderthals

400,000 – 40,000 years ago

- **Location:** Europe and Western Asia (as far east as Siberia)
- **Size:** Men ~165 cm, Women ~152 cm; stocky, muscular build
- **Brain size:** 1200–1750 cc (on average larger than modern humans)
- **Face/Body:** Big brow ridges, wide nose, no chin, adapted to cold climates
- **Diet:** Large game (mammoths, bison, deer), plus plants, nuts, and seafood
- **Social life:** Lived in groups, cared for sick and injured, may have buried their dead
- **Tools:** Advanced stone tools (Levallois technique), hafted spears, clothing from hides, skilled fire use



Neanderthals – Geographical Spread

What is the challenge of living in Europe?

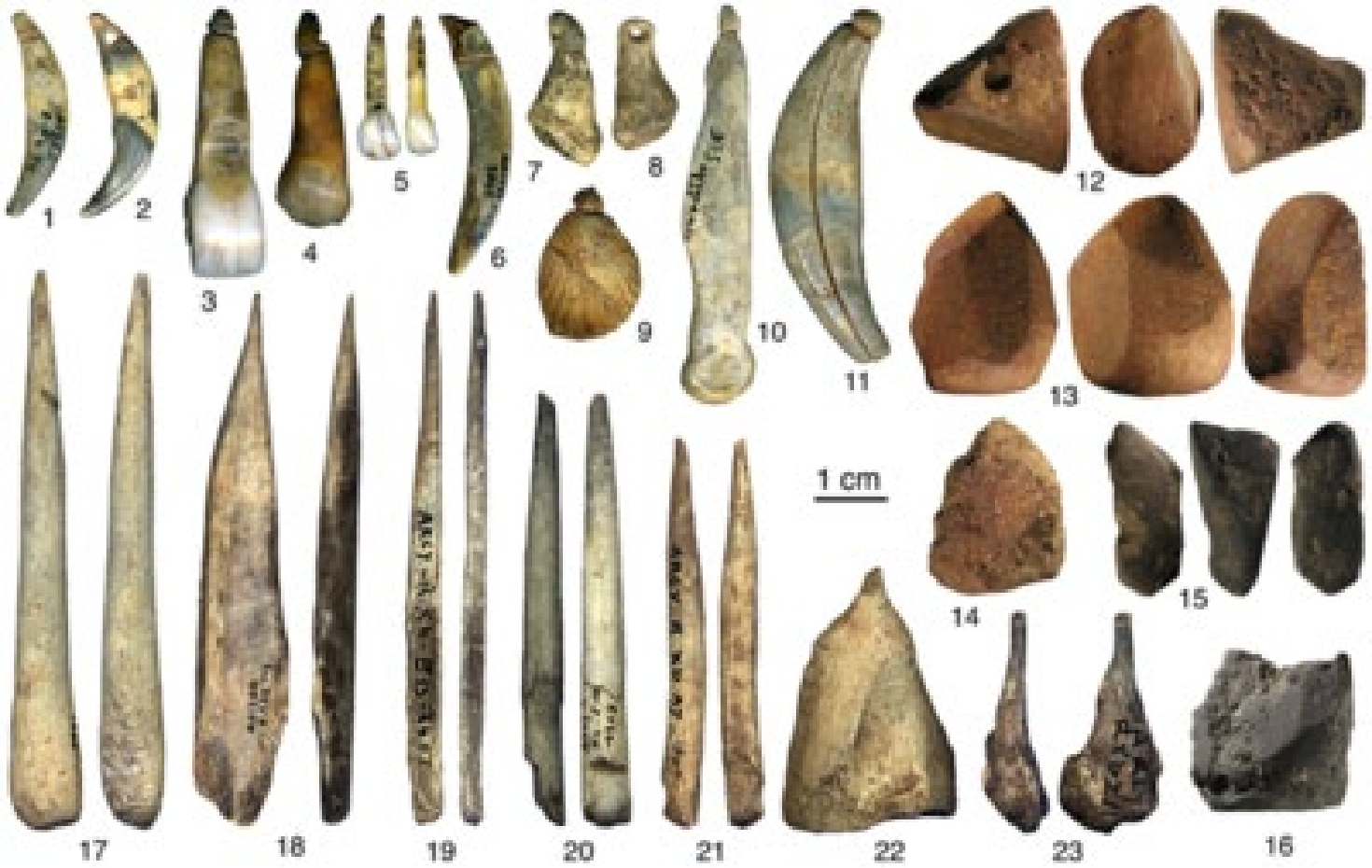
Neanderthals - Cold Climate Adaptation

- **Stocky bodies** – shorter, muscular builds conserved heat.
- **Wide noses** – warmed and moistened cold, dry air.
- **Strong bones & muscles** – ideal for hunting large Ice Age animals.
- **Clothing** – worked animal hides into garments; may have stitched or tied them for a better fit.
- **Shelters** – caves and simple hide structures gave protection from the cold.
- **Meat-rich diet** – relied heavily on large game for calories in harsh climates.

Neanderthals became masters of the Ice Age.

How else did Neandertals advance ?

Neanderthals – Advanced tool maker



•Laid the foundation for many techniques later used by *Homo sapiens*.

Neanderthals – Advanced tool maker

- **Levallois technique** – carefully prepared stone cores produced sharp, predictable flakes.
- **Hafted spears** – stone tips attached to wooden shafts, improving hunting efficiency.
- **Adhesives** – used birch tar, pine resin, and beeswax to fix tools (early chemistry!).
- **Variety** – scrapers, blades, awls, and points for hide-working, cutting, and woodworking.
- **Fire skills** – skilled at starting and maintaining fires for cooking, light, and warmth.

Neanderthal tools were more advanced than those of earlier humans, showing planning, skill, and innovation.

Laid the foundation for many techniques later used by Homo sapiens..

Neanderthals vs. Homo sapiens Physical Characteristics

- **Body build:**

Neanderthals shorter, stockier, more muscular; sapiens taller and slimmer.

- **Face:**

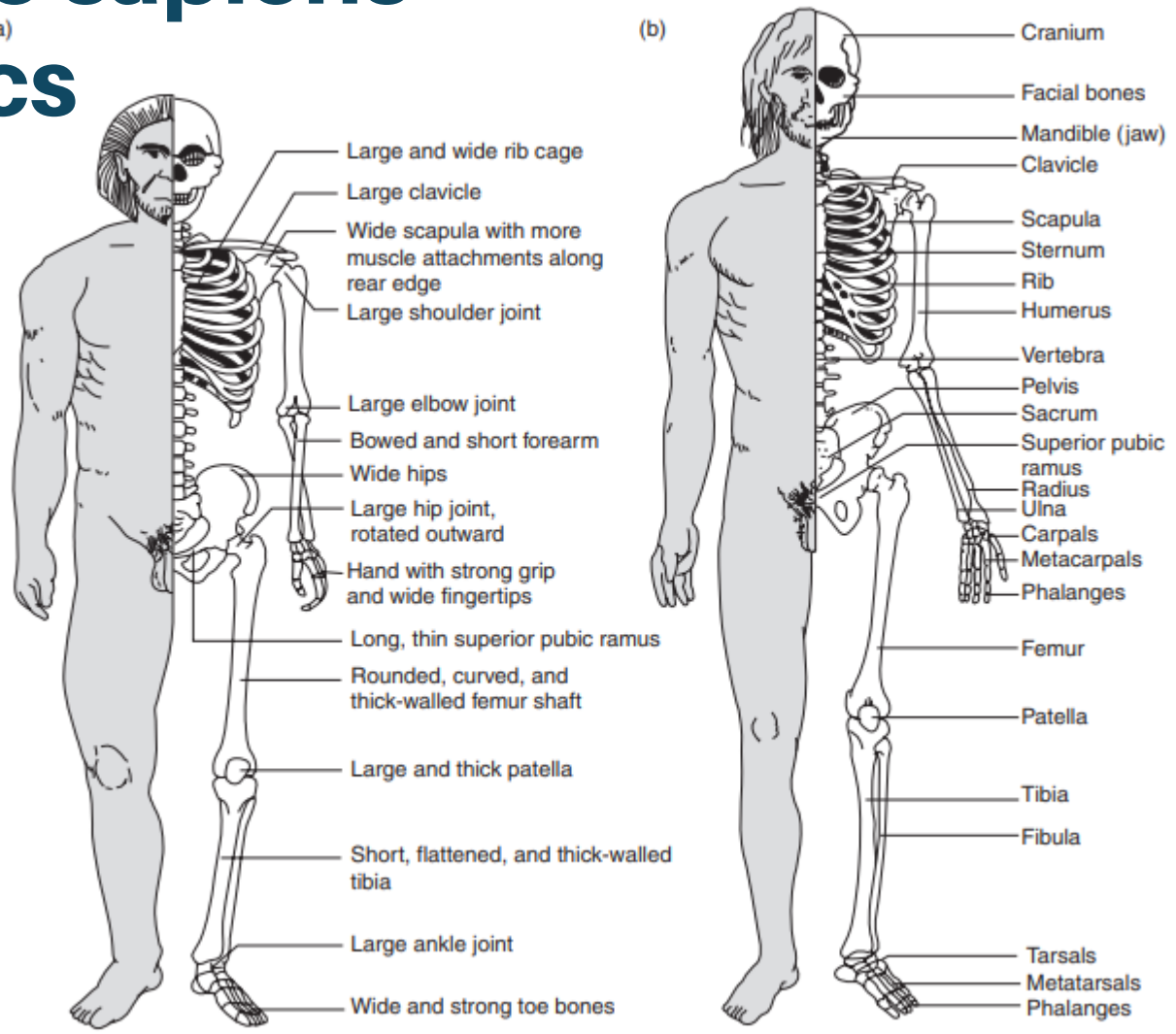
Neanderthals had heavy brow ridges, wide noses, no chin; sapiens have smaller brows, narrower nose, and a chin.

- **Brain:**

Neanderthals had slightly larger brains (average 1450 cc vs ~1350 cc) but shaped differently — more for vision and movement, less for symbolic thought.

- **Adaptation:**

Neanderthals built for Ice Age cold, sapiens for endurance and adaptability in many climates.



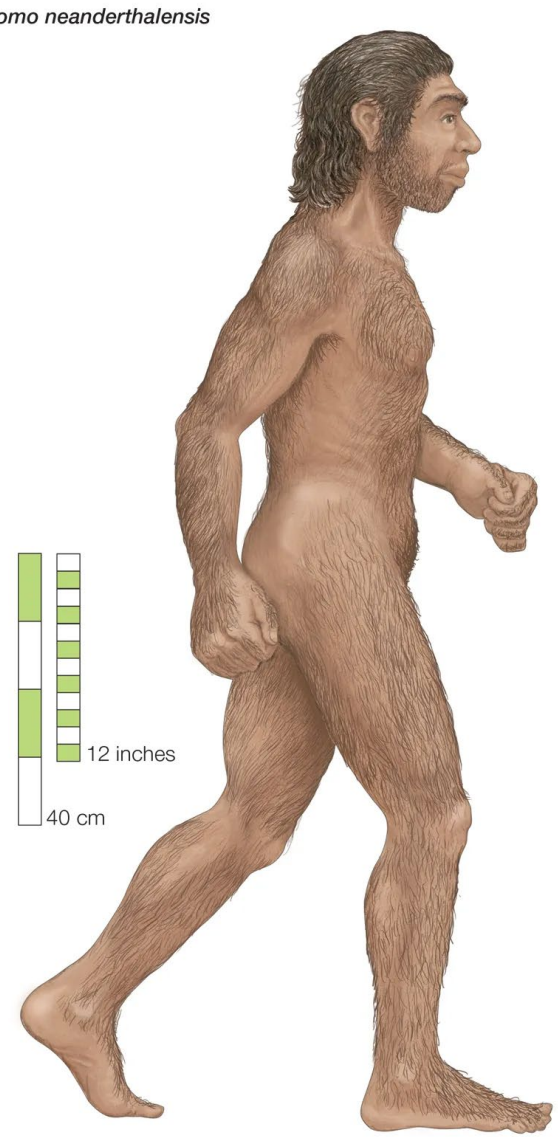
Modern non-African humans carry 1–2% Neanderthal DNA.

What's the final species?

Homo Sapiens

300,000 – today

- **Location:** Originated in Africa, spread worldwide
- **Size:** Average height 160–180 cm, weight 55–80 kg
- **Brain size:** ~1,350 cc (large, complexly organised)
- **Face/body:** High forehead, rounded skull, smaller brow ridges, chin present
- **Diet: Highly adaptable –** hunted, fished, gathered plants, later farmed
- **Social life:** Large cooperative groups, division of labour, complex language
- **Tools & culture:** Advanced stone, bone, and later metal tools; art, ornaments, shelters, sewing needles



Homo Sapiens – Going Global

- **Out of Africa:**

First major migrations between 70,000–50,000 years ago.

- **To Asia & Australia:**

Reached South Asia by ~65,000 years ago and Australia by ~40,000.

- **Into Europe:**

Arrived ~45,000 years ago, coexisted with Neanderthals.

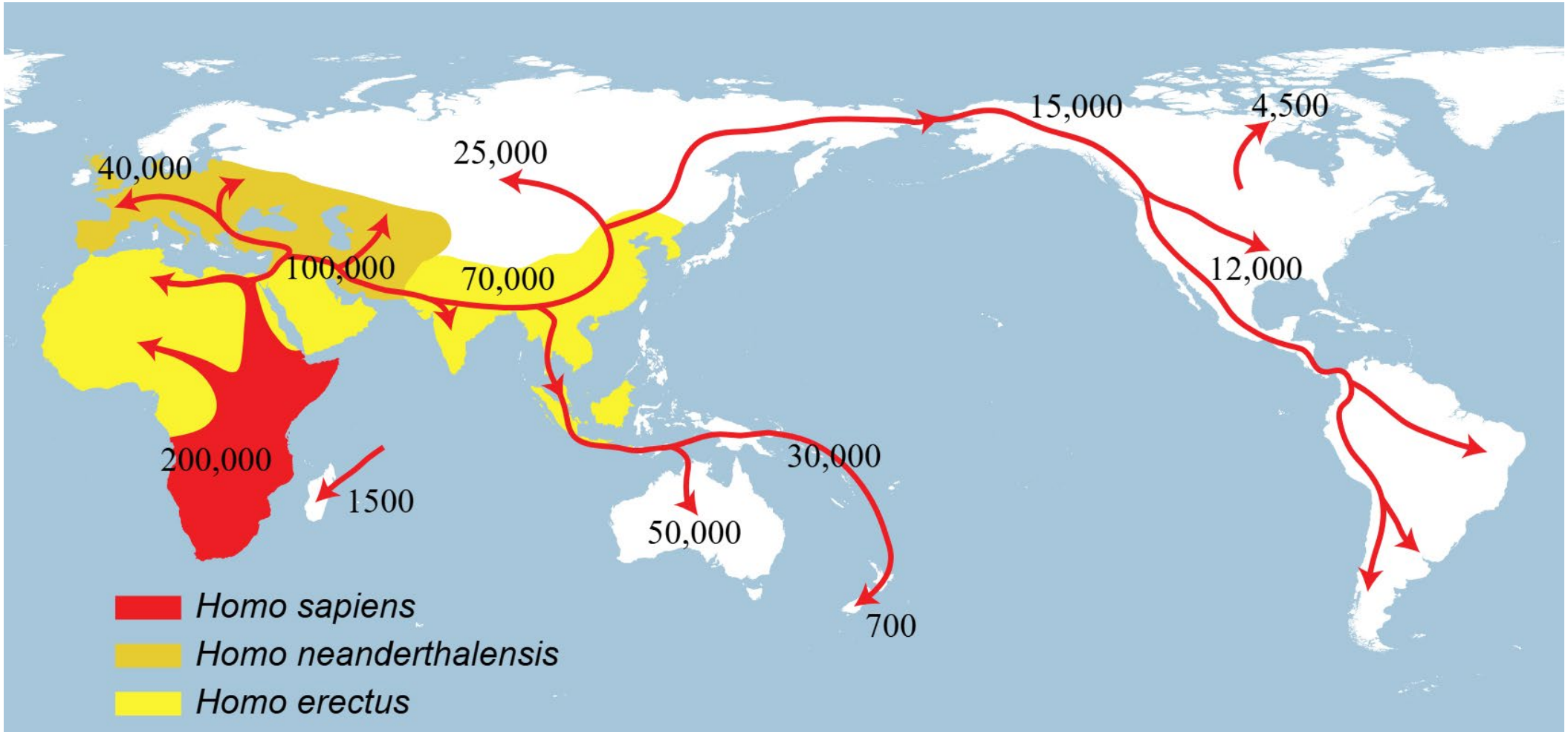
- **To the Americas:**

Crossed the Bering Strait into North America ~16,000 years ago, reaching South America soon after.

- **Global reach:**

By 12,000 years ago, humans lived on every continent except Antarctica.

Homo Sapiens – Going Global



Why did Homo sapiens win?

Homo Sapiens Evolutionary Winners

- **Adaptability**

survived in deserts, jungles, tundra, and coasts.

- **Imagination**

created art, symbols, and stories, strengthening identity.

- **Language**

complex speech allowed planning, teaching, and cooperation.

- **Innovation**

developed new tools, clothing, shelters, and later farming.

- **Cooperation**

lived in large groups with division of labour.

- **Resilience**

able to adjust to changing climates and environments.

Homo sapiens thrived because they relied on brains, culture, and cooperation, not just physical strength.