Chapter 12
The Origin and Dispersal of Modern Humans

Introduction
• The first modern *Homo sapiens* evolved in Africa close to 200 kya (by 195 kya).
  o Within 150,000 years, their descendants had spread across most of the Old World.
  o **All contemporary populations** are placed in the subspecies *Homo sapiens sapiens*.
  o Most paleoanthropologists agree that several fossil forms, dating back as far as 100 kya, should also be included in the same subspecies
• There remain a series of important questions when talking about modern humans. (Some of these questions are easier to answer than others.)
  o When did modern humans first appear?
  o Where did the transition take place? In one or several regions?
  o What was the pace of evolutionary change?
  o Outside of the place of origin, how did the dispersal look?
  o What does archaeological evidence tell us about important cultural characteristics of early modern people?
• This chapter also looks at archaeological data from the Upper Paleolithic (40-10 kya in western Europe). This period of time reflects hunter-gatherer groups with high levels of success and complexity.

Understanding Modern Human Origins 1
• Paleoanthropologists have created a number of theories concerning the origins of modern humans. We will review the top three;
• **The Regional Continuity Model (aka Multiregional Model)**
  o Milford Wolpoff is the primary advocate of this hypothesis.
  o Challenges the notion of replacement of premodern populations by AMHSS
  o Suggests that some local populations in Europe, Asia, and Africa continued indigenous evolutionary development from premodern Middle Pleistocene forms to anatomically modern forms (meaning evolution happened in multiple places).
  o This model is based on two assertions:
    • Denies that the earliest modern *H. sapiens* populations originated **exclusively** in Africa.
    • Asserts that some gene flow (migration) between premodern populations was extremely likely, which means that modern humans can’t be considered a separate species from premodern hominins.
  o Argument is that this gene mixing prevented speciation, but that the isolation did result in a very polytypic human species.
  o They argue also that *Homo heidelbergensis, Homo sapiens neanderthalensis*, and *Homo sapiens* are a single species that evolved from *Homo erectus*. Again, polytypic.
  o The latest genetic data does not support this model, so even the advocates of this model concede the genetic contributions of African populations was significant.

Understanding Modern Human Origins 2
• **Replacement Models**
  o Christopher Stringer and Peter Andrews were the first to champion these Replacement Models.
• It is based on the origin of modern humans in Africa and later replacement of populations in Europe and Asia.
• This theory proposes that anatomically modern populations arose in Africa within the last 200,000 years (speciation event) and then migrated from Africa, completely replacing populations in Europe and Asia.
• There is greater genetic diversity in Africa than elsewhere and so this supports an African origin of humanity
• Interbreeding?
  • Replacement Models were once called the Complete Replacement Model as it based on assumption that in Africa there was no interbreeding with premodern groups as they were separate species.
  • The renaming as “Replacement Models“ reflects the idea that interbreeding COULD have occurred, but that it was so rare as to be unimportant evolutionarily.
  • How these proponents will interpret the newest genetic findings (i.e.; Neanderthal genes in modern populations remains to be seen)

Understanding Modern Human Origins 2
• Partial Replacement Models
  • **Partial Replacement Model 1**: Both Günter Bräuer and John Relethford support the idea that very little interbreeding occurred and call this variant the Mostly Out of Africa Model.
  • **Partial Replacement Model 2**: Fred Smith believes there was more interbreeding in some areas than in others (now being called the Assimilation Model).
  • How much interbreeding, then?
  • The majority of the recent findings suggest that the Bräuer and Relethford view (Mostly Out of Africa Model) is likely in that 1-4% of genes in modern populations are Neanderthal.
    • A corollary of this view states that the interbreeding happened AFTER modern humans left Africa (probably 80-50 kya in the Middle East). Given that Neanderthals do not seem to have lived in Africa, this would make sense.
    • The latest data from the UW (indicating non-human DNA in 3 modern African populations) may bring this into question. There may have been interbreeding between yet to be identified groups!
• Summary:
  • The latest data most closely fits the Partial Replacement models.
  • The new questions are likely to be centered on whether the “Mostly Out of Africa” model is the best fit or whether more interbreeding occurred in some geographic regions.

Lightening Does Strike Twice!
• Remember in a previous chapter we discussed Lee Berger finding of *Australopithecus sediba*?
  • This was a once-in-a-lifetime event. Except it wasn’t.
    • He found a **second species in 2013**: *Homo naledi* at Rising Star Cave, South Africa.
      • The entry into the cave was so narrow, they advertised for **petite spelunkers**.
      • In total (to date) **15 partial skeletons** were found.
    • In 2017, the date range was assigned: 236-335 kya.
  • Differences in anatomy:
• Most striking is the smaller brain size (~500 cm$^3$), at the same time humans co-existed with large brains.
• Pelvis and shoulders are primitive.
• The hands were human-like, but the fingers are more curved (tree climbing adaptation).
  o Similarities in anatomy:
    ▪ Feet are adapted to bipedalism.
    ▪ Teeth are smaller.
    ▪ The shape of the skull is human-like.

Earlier Than Earliest Fossils
• June 2017: The oldest human was found at 300,000+ ya.
  o Not in South Africa, or Ethiopia, or Tanzania, nope.
  o At Jebel Irhoud, Morocco.
    ▪ This site was originally excavated in the 1960s and dated to 40,000.
    ▪ Digging restarted in 2004, finding both human remains and other artifacts.
      • Among these artifacts were burned stone blades.
      • Because these stones were heated, thermoluminescence could be used to date them
  o One interpretation:
    ▪ We evolved in multiple locations in Africa.
    ▪ There is no single Cradle of Humanity.
• Anatomy:
  o Facial features were like modern humans prognathism and more gracile brow ridges).
  o Tooth morphology is robust but similar to some other early modern humans (EMH).
  o The organization of the brain differs.
    ▪ The overall shape of the skull is more primitive and elongated.
    ▪ Cranial capacity not yet published (that I can find).

Earliest Discoveries of Modern Humans 1
• Africa fossil finds
  o Omo Kibish, southern Ethiopia
    ▪ Represents the oldest finds in Africa to date (195 kya for Omo 1)
    ▪ Two individuals are found here (called Omo 1 and Omo 2); in 2008 a few post-cranial bones also discovered
    ▪ Omo 2 is more archaic and robust, even though Omo 1 is older
  o Herto, Ethiopia
    ▪ Announced in 2003 for site in Ethiopia; they are well-preserved and well-dated and helped fill in some of the gaps. Includes fossils of Ardipithecus, Australopithecus and Homo erectus.
    ▪ New modern finds were discovered that date to 160-154 kya. These finds support an African origin for humanity
    ▪ A near complete adult cranium, a child’s cranium and another incomplete adult cranium were found.
      ▪ The morphology and level of preservation makes them definitively modern
    ▪ Modern range for cranial capacity (best preserved specimen is 1450 cm$^3$), but is more heavily built. Still does not project like Neanderthals
Tim White and others call them ‘near-modern’ and label as *Homo sapiens idaltu* (for elder).

- **Klasies River Mouth, and Border Cave (South Africa)**
  - Both sites date to around 120-80 kya; suggestion is that modern humans evolved in east Africa and then migrated to south Africa about 100 kya.
  - Appear to be stopover sites, no permanent residences and used ocean resources as well as land resources.

### Location and Timing of Human Diaspora

- When modern humans left Africa is complex.
  - One question is where humans first leave Africa for the rest of the Old World.
  - A second question is the timing.

#### First wave of migrations

- The estimate is that the first migrations out of Africa were at about 120-125 kya.
- There appears to have been two routes:
  1. The first was a movement from Ethiopia, across the Rea Sea to the Arabian Peninsula (125 kya). May have then migrated to Oman, and on to India?
     - There are no human remains associated with this migration.
     - There is **extensive evidence of stone tools** at Jebel Faya, UAE. The tool traditions are similar to those in Africa and in India (75 kya).
  2. The second was through Nile Valley in Egypt into the Middle East at about 120 kya and includes fossil remains as well as artifacts (see upcoming slide).
    - Appears these early migrants were unsuccessful as a drought probably killed them off. But might have made it to China (controversial and myriad of dates)!

#### Second wave of migrations

- Genetic evidence suggests a second wave of migration – the surviving ancestors – occurred around 70 kya. Pre-Toba or post-Toba?
- Route? Many proposed: 1) Red Sea, Gibraltar, Egypt, and so on.
- Number of migrations? Debated, but many support a single migration via the Rea Sea.

### Possible Routes Showing Ancient Sea Levels

### Earliest Discoveries of Modern Humans 2

- **Near East fossil finds**
  - In Israel researchers found early modern humans, with at least 10 individuals at *Skhul* Cave at Mt. Carmel (130-100 kya).
  - Also found at least 20 persons at Qafzeh Cave (120-92 kya)
    - This site is very near the Tabun site of Neanderthals (nearly dating to 120 kya)
    - The features of these fossils is a bit more like Neanderthals, others more pre-modern
    - These fossils challenge the Multiregional model?
      - A recalibration at Tabun to 120,000 suggests a slightly earlier date for Neanderthals than moderns.
      - Even so, there was considerable overlap in habitation for these groups in the Near East.
- **Asian fossil finds**
  - There are 7 early humans in China. The most significant are *Zhoukoudian*, Tianyuan (near Zhoukoudian) and at Ordos, Mongolia. All are fully modern, so African origins,
but, may also be some inbreeding with premodern species.

- Zhoukoudian (27 kya) consists of 3 skulls and cultural remains
- Tianyuan (40 kya) mostly modern features, but a few archaic ones
- Ordos skull has a date that is still debated (suggested 50-35 kya)
  - Niah Cave (Borneo) (maybe to 45-40 kya) is a partial skull recently redated; oldest modern human find from Asia

**Earliest Discoveries of Modern Humans 3**

**Australia fossil finds**

- The Sahul was the landmass between Australia and New Guinea that was seen during a glacial at 50,000 years ago. Rafting may have been possible between islands.
- Australian habitation dates remain debated, but recent DNA verifies that all modern Australians are from the same migration at 50 kya
  - Lake Mungo is the earliest of the sites in Australia and is in the Southeast.
    - At 55 kya we see archaeological sites in Australia at Lake Mungo
    - The hominin remains from Lake Mungo date to 30-25 kya and all are modern humans
  - **Exciting Update** (May, 2017): A 50 kya site was found in Northwest Australia.
  - Another find (July, 2017) dates to 65 kya site at Madjedbebe (N. Australia)
  - Kow Swamp is more recent (14-9 kya) but facial features more archaic (receding foreheads, heavy supraorbital tori and thick cranial bones)

**Earliest Discoveries of Modern Humans 4**

**Central Europe fossil finds**

- Central Europe represents the locale for many of the earliest modern humans in Europe
  - Oase Cave, Romania (35 kya) is where these 3 early moderns are found. They are a bit more robust, but clearly older.
  - Mladeč Czech Republic (31 kya) is site of several moderns, although some variation in morphology
- By 28 kya modern humans are found across central and western Europe

**Western Europe fossil finds**

- This region has received a lot of attention so lots of data available.
- Anatomically modern humans are found as far back as 35,000 years ago and are commonly called Cro-Magnon (after a site in southern France).
  - Remains of eight individuals were discovered in 1868 inside a rock shelter in the village of Les Eyzies, in southern France (they date to 28 kya)
    - These are the earliest of France’s anatomically modern fossils
    - Cro-Magnon 1 (“Old Man”), one of the 8 individuals was seen as model of this population. But he was not typical.
    - Cro-Magnon is associated with the Aurignacian tool assemblage (Upper Paleolithic stone tool industry in Europe beginning at about 40,000 years ago)
- How much interbreeding remains a debate
  - Portugal Boy, a 4 year old child’s skeleton, found in Lagar Velho, Portugal is one of the best evidences of hybridization between humans and Neanderthals.
  - The skeleton is a blend of Neanderthal and human physical traits, but dated to 24.5 kya, (5,000 years later than the last clearly Neanderthal find).

**Something New and Different**
• By 25,000 humans had dispersed all over the Old World and seemed to have it to themselves.
• Then, out of no-where it seemed, finds from Liang Bua Cave, Flores, Indonesia challenged the common wisdom. Watch this video clip
  o In late 2004, reports of an incomplete female (LB1) and pieces of 13 other persons were reported.
  o Nicknamed ‘hobbits’, but the formal name is Homo floresiensis
  o In 2010, report on tools suggests a long occupation as they date to 1 mya and as recently as 13 kya.
  o The incomplete skeleton of a female (LB1), along with fragments of 13 other individuals was found
    • LB1 was estimated to 3 feet, with a cranial capacity of only 417 cm$^3$!
    • She has since been nicknamed the “Little Lady of Flores” and as “Flo”. Size may be the result of insular dwarfing
• Where did they originate?
  o Suggestion 1: Early Homo migrated out of Africa and that this ancestral migration may have been earlier than even Homo erectus
  o Suggestion 2: Physically they resemble Dmanisi Homo erectus, but there are some derived traits that set them apart (including the wrist bones).

Upper Paleolithic Technology & Art 1
• Southwest Asia and Europe Technology and Art
  o In Eurasia, cultural changes viewed as part of the Upper Paleolithic period spread rapidly, with early sites in southwest Asia (Israel/Lebanon). By 41 kya we see sites as far as southeastern Russia and in southern France
  o There were major climate changes in this time in that during the last glacial period (about 30,000 years ago) a warming trend started
    • It lasted several thousands of years
    • This resulted in much of Europe being covered with tundra and steppes
      • All this feed large herds of herbivores such as mammoths, bison, horses and well as smaller animals and fish and fowl.
      • It was a time of relative abundance, and ultimately Upper Paleolithic people spread out over Europe, living in caves and open-air camps.
      • Hunting appeared to be focused on seasonal availability, but we know little about plant use and other gathered materials during the Upper Paleolithic
    • Sites were used longer and were often larger in population than Middle Paleolithic
      • Burials appear to be different than Middle Paleolithic in the sometimes contains ornaments, tools, and other artifacts that may indicate possible status differences.
      • We see this in the grave goods
    • This also suggests there may have been a shift in perceptions of the afterlife

Upper Paleolithic Technology & Art 2
• Southwest Asia and Europe Technology and Art (continued)
• The Upper Paleolithic is a time of significant technological changes. In hunting, we see the advent of the atlatl (spear straightener) and later the bow and arrow means they could hunt by positioning less close to the game.
• The Upper Paleolithic cultures are usually divided into 5 different blade tool industries: Chatelperronian, Aurignacian, Gravettian, Solutrean, and Magdalenian
The use of blades is an innovation. A blade is defined as a tool that is at least 2X as long as it is wide.

In order to make blades a new technique was invented: **Punch blade technique** (the method of driving off blades and flakes from a prepared core using a bone or antler punch to press off a thin flake using a punch technique)

A second new technique, pressure flaking, is performed by taking small bits off a tool by pushing them off the edge.

New tools were found:
- Burins: Small, chisel-like tools with a pointed end; thought to have been used to engrave bone, antler, ivory, or wood.
- Use of hafting of microliths was noted (microliths are small stone tools)

**Upper Paleolithic Technology & Art 3**
- **Southwest Asia and Europe Technology and Art (continued)**
  - The period between 35-10 kya was an artistic explosion. During the Upper Paleolithic.
  - There was much development of "art" in the form of both portable art and in cave art.
    - Most famous sculptures are the **“Venus figurines”** that probable served many symbolic functions, not just as fertility figures. Found during the Aurignacian or Gravettian periods
    - The cave art of [Lascaux](#), [Altamira](#), and [Grotte Chauvet](#) in Europe
    - At both Dolní Věstonice and Předmosti (27-26 kya) small clay figurines were found.
    - Engraving tools were used to decorate spear straighteners as well as other objects. Here is my favorite example, [Swimming reindeer](#) (13 kya)

**Upper Paleolithic Technology & Art 4**
- **Africa Technology and Art**
  - Much of the research on prehistory in Africa has been conducted only in last few decades so preliminary.
  - There are some finds we can discuss:
    - At Pinnacle Point, South Africa, dating to 164-75 kya we see a blast of new behaviors indicating a “complex cognition” which includes the use of microliths, red ochre, use of shellfish as food. Projectile weaponry dates to 100-50 kya.
    - At Sibudu Cave, South Africa the bow and arrow by 64 kya.
    - At Katanda, DRC (Congo) (90-79 kya) we see use of bone and antler to make barbs (harpoons)
    - At [Blombos Cave, South Africa](#), we see bone tools, beads and decorated ocher fragments (100-75 kya)
    - Diepkloof Rock Shelter, South Africa, 270 fragments of ostrich shell containers date to 66 kya
    - Apollo 11 Cave, Namibia we see cave art at 28-26 kya
  - Why the earlier dates are particularly important is that they challenge the concept of a “Great Leap Forward” dating to only 50 kya.
    - This is the idea that our brains rewired at this late date based on explosion of technology and art
    - But these earlier dates so the cognitive changes were earlier.
  - Breaking news: Oldest pottery [cooking vessel from China](#) at 20 kya.