ANANTAM IAS · OPTIONAL NOTES

Anthropology Optional Fossil Hominids: Phylogenetic Status, Characteristics, Distribution

Paper 1 · Unit 3

The fossil record from Lucy to Cro-Magnon, read as a phylogeny rather than a list: who each hominid was, where and when it lived, its cranial capacity and diagnostic anatomy, its tools, and the live debates (robust australopithecine status, the Movius line, Neanderthal taxonomy, Out-of-Africa versus Multiregional) that separate a 60 answer from a 45.

anantamias.com

UPSC SYLLABUS

Phylogenetic status, characteristics and geographical distribution of the following: (a) Plio-Pleistocene hominids in South and East Africa - Australopithecines. (b) Homo erectus: Africa (Paranthropus), Europe (Homo erectus - heidelbergensis), Asia (Homo erectus javanicus, Homo erectus pekinensis). (c) Neanderthal Man - La-Chapelle-aux-Saints (Classical type), Mt. Carmel (Progressive type). (d) Rhodesian man. (e) Homo sapiens - Cromagnon, Grimaldi and Chancelade.

How to Read the Hominid Record: Phylogeny, Grades, and Why the Numbers Move

Before naming a single fossil, fix what the question is actually testing. 'Phylogenetic status' does not mean 'describe the skull'. It means: where does this form sit on the family tree, is it an ancestor or a side branch, and what is the evidence either way. Every high-scoring answer in this unit is an argument about ancestry supported by anatomy, not a physical description with a photograph in words.

- Distinguish a grade from a clade, because examiners reward it and most answers blur it. A grade is a level of organisation (small-brained bipeds; large-brained toolmakers); a clade is a branch of shared ancestry. Australopithecus is a grade that may contain several lineages, only some of which lead to us. Saying 'Australopithecus is our ancestor' is loose; the defensible claim is that some gracile australopithecine near A. afarensis or A. africanus lies at or near the base of the Homo clade, while the robust forms are a specialised dead end.
- The hominization trends that structure the whole unit, and the frame every characteristics answer should hang on: progressive bipedalism and the reorganisation of the pelvis, spine, foramen magnum and lower limb; expansion of the brain (encephalisation), especially the neocortex; reduction of the jaws, teeth and chewing muscles; loss of the simian shelf and development of a chin only in modern humans; the shift from a projecting to a flat face and vertical forehead; and the steady deepening of dependence on culture and tools.
- Bipedalism came first, the big brain came late. This is the single most important sequencing fact in the unit. Australopithecus was a habitual biped with an ape-sized brain more than a million years before brain expansion began in earnest with Homo. Any narrative that enlarges the brain before freeing the hands is wrong.
- Dates and cranial capacities in this unit are estimates from small, damaged samples, and they are revised as new fossils and better dating (potassium-argon, argon-argon, palaeomagnetism, ESR, uranium series) appear. Treat every number as a central value with a real range around it: for example, Homo erectus cranial capacity is usually given as roughly 750 to 1250 cc, and modern human capacity averages about 1350 cc but ranges widely. Where sources disagree, say so; do not pretend to a precision the fossils cannot bear.
- Read the syllabus wording literally and know its quirks, because UPSC frames questions from it. Note that the official syllabus lists 'Africa (Paranthropus)' under Homo erectus, which is taxonomically odd, since Paranthropus is a robust australopithecine, not Homo erectus. This is a known peculiarity of the UPSC list, not a scientific claim; treat Paranthropus with the australopithecines and mention the placement only if directly asked.
- Plio-Pleistocene locates the australopithecines in time: the Pliocene (about 5.3 to 2.6 million years ago) into the early Pleistocene. The genus Homo emerges around the Pliocene-Pleistocene boundary. Fixing the epoch is worth easy marks and prevents anachronism.

Master sequence of fossil hominids (cranial capacities and dates are central estimates; ranges vary between sources)

Fossil / taxon	Approx. age	Region / key sites	Diagnostic features
Australopithecus afarensis ('Lucy')	~3.9 to 2.9 Mya	East Africa: Hadar (Ethiopia), Laetoli (Tanzania)	Habitual biped, cranial capacity ~380 to 430 cc, ape-like face and small brain, Laetoli footprints ~3.6 Mya
Australopithecus africanus	~3.3 to 2.1 Mya	South Africa: Taung, Sterkfontein, Makapansgat	Gracile, cranial capacity ~400 to 500 cc, more rounded cranium, Taung child (Dart, 1924)
Paranthropus robustus	~2.0 to 1.2 Mya	South Africa: Kromdraai, Swartkrans	Robust, sagittal crest, massive molars, cranial capacity ~530 cc, dish-shaped face
Paranthropus boisei	~2.3 to 1.2 Mya	East Africa: Olduvai (OH 5), Koobi Fora	Hyper-robust 'Nutcracker Man', huge post-canine teeth, capacity ~500 to 550 cc
Homo habilis	~2.4 to 1.4 Mya	East Africa: Olduvai Gorge, Koobi Fora	First toolmaker (Oldowan), capacity ~500 to 680 cc, reduced face, 'handy man'
Homo erectus (Java)	~1.8 Mya to ~0.1 Mya	Asia: Trinil, Sangiran (Java); Zhoukoudian (China)	Capacity ~750 to 1250 cc, thick skull, sagittal keel, large brow ridge, no chin
Homo heidelbergensis	~700 to 300 kya	Africa, Europe: Mauer, Bodo, Kabwe	Archaic, large brained (~1200 to 1300 cc), bridge between erectus and later humans
Rhodesian man (H. rhodesiensis)	~300 kya (redated)	Africa: Broken Hill / Kabwe (Zambia)	African archaic, capacity ~1280 cc, massive brow, heavy dental caries
Neanderthal man	~230 to 40 kya	Europe, West and Central Asia: La Chapelle, Mt Carmel, Shanidar	Large brain (~1450 to 1500 cc, exceeds modern average), midfacial projection, barrel chest, Mousterian tools
Homo sapiens (Cro-Magnon)	~40 to 10 kya	Europe: Les Eyzies, Grimaldi, Chancelade	Anatomically modern, high vault, chin, capacity ~1350 to 1600 cc, Upper Palaeolithic art

PREVIOUS YEAR QUESTIONS

- Discuss the hominization process and describe the major trends in human evolution with suitable examples and illustrations. [2023]

Gracile Australopithecines: afarensis ('Lucy') and africanus

Start here because this grade establishes the defining fact of the family: bipedalism with a chimpanzee-sized brain. The gracile australopithecines are the most credible candidates for the base of the human line, and 'Lucy' and the Taung child are the two specimens every answer should be able to reconstruct from memory.

- Australopithecus afarensis, roughly 3.9 to 2.9 million years old, is known mainly from Hadar in Ethiopia and Laetoli in Tanzania. The famous partial skeleton AL 288-1, 'Lucy', was found by Donald Johanson and colleagues at Hadar in 1974, is about 3.2 million years old, and preserves around 40 percent of a small female skeleton, which is why it settled the bipedalism question.
- The evidence for habitual bipedalism in afarensis is skeletal and independent of the skull: a valgus (angled inward) knee, a broad short pelvis with laterally flaring iliac blades, an anteriorly placed foramen magnum, and a lumbar curve. The clinching evidence is external to any one bone: the Laetoli footprint trail, about 3.6

million years old, preserved in volcanic ash by Mary Leakey's team in 1978, shows a striding bipedal gait with an adducted big toe and a heel-strike, not a knuckle-walker's tracks.

- afarensis retained many arboreal and ape-like traits, which is why it is best read as a biped that still climbed: curved finger and toe bones, long arms relative to legs, a funnel-shaped thorax, and a small brain of roughly 380 to 430 cc, barely above chimpanzee size. The face is prognathous (projecting), the canines are reduced from ape size but the dental arcade is intermediate.
- Marked sexual dimorphism is a signature of afarensis: the 'First Family' assemblage (AL 333) and specimens such as the large male 'Kadanuumuu' indicate males considerably larger than females, which is used to infer social organisation, though the inference is contested.
- Australopithecus africanus, roughly 3.3 to 2.1 million years old, is the South African gracile form, known from Taung, Sterkfontein and Makapansgat. Raymond Dart described the Taung child skull in 1925 and named Australopithecus africanus, 'southern ape of Africa'; it was long rejected because Piltdown had primed scientists to expect a big brain first. Robert Broom's later adult finds at Sterkfontein, including 'Mrs Ples' (Sts 5), vindicated Dart.
- africanus is slightly more derived toward Homo than afarensis in some features: a more rounded cranium, a somewhat larger brain (roughly 400 to 500 cc), a less projecting face and smaller anterior teeth, though its hands and post-crania still show climbing adaptations. The endocast of the Taung child showed a humanlike sulcal pattern, part of Dart's original argument.
- Phylogenetic status is the crux and should be argued, not asserted. The mainstream reading is that a gracile australopithecine at or near afarensis lies close to the ancestry of Homo, with africanus either on or near that line or on a southern side branch. What you must avoid is treating either as a direct, uncontested ancestor: the tree near the origin of Homo is genuinely bushy, and Australopithecus garhi, Kenyanthropus and Australopithecus sediba have all been proposed as alternatives, so honest hedging scores better than false certainty.
- Distinguish australopithecines from apes crisply, since UPSC asks it directly (2009). Like apes: small brain, projecting face, no chin, large brow. Unlike apes and toward humans: habitual bipedalism and the whole pelvic-limb complex, reduced non-honing canines with no diastema in later forms, parabolic rather than U-shaped dental arcade tendency, and a forward foramen magnum. The decisive difference is locomotor, not cerebral.

KEY TERMS

Bipedalism (habitual) — Upright two-legged walking as the normal mode of locomotion, evidenced by the pelvis, valgus knee, foramen magnum position and foot; the founding hominid adaptation.

Prognathism — Forward projection of the jaws and face, pronounced in australopithecines and reduced through the evolution of Homo toward a flat, orthognathous face.

Gracile — Lightly built australopithecines (afarensis, africanus) with smaller teeth and chewing muscles, contrasted with the heavily built robust forms.

PREVIOUS YEAR QUESTIONS

- Distinguish between major categories of Australopithecines. How are Australopithecines different from Apes? [2009]
- Comment briefly on the phylogenetic position of Australopithecines. [2012]
- Discuss the spatial distribution, physical features, cultural status and origin of Australopithecines. [1987]

Robust Australopithecines (Paranthropus): robustus and boisei, the Chewing Specialists

The robust forms are the classic side branch: a masterclass in adaptive specialisation that led nowhere. Keeping them separate from the graciles, and reading their anatomy as a single functional story about heavy chewing, is exactly what a phylogenetic-status question rewards.

- The robust australopithecines are commonly placed in their own genus Paranthropus (meaning 'beside man'), though some authors keep them in Australopithecus; flag this taxonomic split rather than picking a side silently. Three species are recognised: P. aethiopicus (the earliest, about 2.7 to 2.3 Mya, the 'Black Skull' KNM-WT 17000), P. boisei in East Africa, and P. robustus in South Africa.
- Every robust feature is a chewing adaptation and should be presented as one integrated complex: a sagittal crest along the top of the skull for anchoring enlarged temporalis muscles, flaring zygomatic arches for the masseter, a broad dish-shaped face, huge flat post-canine teeth (molars and premolars, hence 'megadont') with thick enamel, and reduced front teeth. The dietary reading is a diet of hard or tough, low-quality plant foods requiring heavy grinding, though isotopic work suggests boisei ate large amounts of C4 plants such as grasses or sedges.
- Paranthropus boisei, about 2.3 to 1.2 million years old in East Africa, is the hyper-robust extreme. The type specimen is OH 5 from Olduvai Gorge, found by Mary Leakey in 1959, originally named Zinjanthropus boisei and nicknamed 'Nutcracker Man' for its enormous molars. Cranial capacity is roughly 500 to 550 cc, no larger than the graciles despite the massive skull, because the size is in the chewing apparatus, not the brain.
- Paranthropus robustus, about 2.0 to 1.2 million years old, is the South African robust form from Kromdraai and Swartkrans, first described by Robert Broom in 1938. It is robust but less extreme than boisei, with a cranial capacity around 530 cc.
- Phylogenetic status is settled enough to state firmly: the robust australopithecines are a specialised, extinct side branch, not human ancestors. They coexisted with early Homo for hundreds of thousands of years (Homo and boisei both occur at Olduvai), which itself disproves a simple single-file ladder and demonstrates that hominid evolution was branching, not linear.
- Do not attribute stone tools to the robusts by default. The Oldowan tools at sites where boisei occurs are now generally credited to contemporaneous early Homo; the initial association of OH 5 with tools at Olduvai was later reassigned once Homo habilis was recognised at the same site. Bone tools at Swartkrans have been argued to be robust-made for digging, but this is debated.

KEY TERMS

Sagittal crest — A bony ridge along the midline of the skull vault that anchors enlarged temporalis (chewing) muscles; a hallmark of robust australopithecines, and of gorillas, reflecting heavy mastication, not large brains.

Megadontia — Greatly enlarged cheek teeth (molars and premolars) with thick enamel, the dental signature of the robust australopithecine grinding diet.

Adaptive dead end — A lineage that becomes highly specialised for a narrow niche and then goes extinct without issue, as the robust forms did; a caution against reading specialisation as progress.

PREVIOUS YEAR QUESTIONS

- Distinguish between major categories of Australopithecines. How are Australopithecines different from Apes? [2009]
- Write a note on Australopithecus. [2005]

Homo habilis: the First Toolmaker at Olduvai

Homo habilis is the threshold of our genus and the point where the brain finally starts to expand and culture becomes archaeologically visible. Its status is contested precisely because it sits on the Australopithecus-Homo boundary, so treat it as a transitional grade and argue the case rather than filing it neatly.

- Homo habilis, roughly 2.4 to 1.4 million years old, was named in 1964 by Louis Leakey, Phillip Tobias and John Napier from material at Olduvai Gorge in Tanzania (the type specimen OH 7). The name means 'handy man' or 'skilful man', chosen because the fossils were associated with the earliest stone tool culture, the Oldowan.
- The claim to Homo rested on three things, and naming them shows you understand why the boundary is drawn where it is: a cranial capacity larger than the australopithecines (roughly 500 to 680 cc, often given around 610 to 640 cc as a mean, though the sample is small and variable), reduced tooth and jaw size relative to the robusts, and the association with deliberately manufactured tools.
- The Oldowan industry (Lower Palaeolithic, Mode 1) is the defining culture: simple flakes struck from pebbles and cores, chopper and chopping tools, used for cutting meat and hide and cracking bone for marrow. Cut-marked animal bones at Olduvai indicate access to meat, whether by hunting or scavenging, and mark the beginning of a technologically mediated diet.
- Endocasts of habilis are argued to show expansion of Broca's area, associated in modern humans with speech production, which has fed speculation about rudimentary language; treat this as suggestive, not proven.
- The status of habilis is genuinely disputed, and saying so is the mark of a strong answer. The sample is variable enough that some workers split it, assigning larger-brained, flatter-faced specimens such as KNM-ER 1470 to a separate species, Homo rudolfensis (capacity around 750 cc). Others argue habilis retains australopithecine body proportions (long arms, small body) and should sit closer to Australopithecus. The safe position: habilis is a transitional form at the base of Homo, probably ancestral to or closely related to the ancestor of Homo erectus, but the picture near the origin of the genus is bushy.
- Chronological overlap matters for phylogeny: Homo habilis and early Homo erectus overlap in time in East Africa, which means one did not simply transform smoothly into the other in a straight line, reinforcing the branching, not ladder-like, character of the record.

KEY TERMS

Oldowan — The earliest recognised stone tool industry (Mode 1), simple cores and sharp flakes, named after Olduvai Gorge and associated with Homo habilis and early Homo.

Olduvai Gorge — A ravine in northern Tanzania, worked by the Leakeys, that yielded Zinjanthropus (OH 5), Homo habilis (OH 7) and Oldowan tools; a key East African site.

Homo rudolfensis — A proposed separate species (type KNM-ER 1470) for larger-brained, broader-faced early Homo specimens sometimes lumped into H. habilis; evidence that early Homo was diverse.

PREVIOUS YEAR QUESTIONS

- Write a note on Homo habilis. [2009]
- Write a note in 150 words on Olduvai Gorge. [2019]

Homo erectus: Java Man, Peking Man, the First Human Grade to Leave Africa

Homo erectus is the workhorse of the paper: the first hominid with essentially human body proportions, the first to spread out of Africa across Asia and Europe, and the maker of the Acheulian handaxe and, arguably, the first controller of fire. Organise the answer by geography, since the syllabus itself does (Java, China, and the African and European forms).

- Homo erectus spans roughly 1.9 million to about 100,000 years ago (some Javanese populations at Ngandong may be as recent as about 117,000 to 108,000 years, though the dating is debated), making it the longest-lived human species. Cranial capacity ranges widely from roughly 750 to 1250 cc, averaging around 900 to 1000 cc, a clear advance on habilis but still below the modern mean.
- The diagnostic cranial features form one recognisable package: long, low, thick-walled skull; a sharp angle at the back (occipital torus); a strong continuous brow ridge (supraorbital torus); a sagittal keel along the midline; a receding forehead; a broad-based skull (pentagonal in rear view); large jaws with no chin; and post-cranially, a body of modern human stature and limb proportions, shown by the Nariokotome / Turkana Boy skeleton (KNM-WT 15000) from Kenya, about 1.6 million years old.
- Java Man is the historically decisive find. Eugene Dubois discovered a skullcap and femur at Trinil on the Solo River in Java in 1891 to 1892 and named it Pithecanthropus erectus, 'erect ape-man'. Later, richer material came from Sangiran. Java Man showed a low skull with a heavy brow and a modern-looking femur, evidence of upright walking with a small brain, and is now classed as Homo erectus (the syllabus term 'Homo erectus javanicus').
- Peking Man is the great Chinese sample. Excavations at Zhoukoudian (Choukoutien) near Beijing in the 1920s and 1930s, under Davidson Black and later Franz Weidenreich, yielded remains of dozens of individuals originally named Sinanthropus pekinensis, cranial capacity averaging around 1000 to 1050 cc. The original fossils were lost during the Second World War in 1941; Weidenreich's casts and monographs preserve the evidence. Zhoukoudian is central to the fire and cannibalism debates.
- Tools: the syllabus link to Acheulian must be stated with the Movius line qualification, which is a classic discriminating point. In Africa and western Eurasia, Homo erectus and Homo ergaster made Acheulian bifaces (Mode 2 handaxes and cleavers). In East Asia, including the Java and Zhoukoudian populations, the industries are chopper and chopping-tool or flake based (Mode 1), east of Hallam Movius's proposed 'Movius line'. So 'erectus made Acheulian tools' is true for the western populations, not straightforwardly for the Asian ones the syllabus names.
- Fire is the other cultural claim and should be handled carefully. Burnt bone and ash at Zhoukoudian were long cited as proof of controlled fire by Peking Man, but re-analysis in the 1990s questioned whether the deposits were in situ hearths. Firmer early evidence of fire use comes from sites such as Wonderwerk Cave (South Africa) and Gesher Benot Ya'aqov (Israel). The exam-safe statement: Homo erectus is the strongest early candidate for the habitual use of fire, but the Zhoukoudian evidence specifically is contested.
- Phylogenetic status is comparatively secure and worth stating plainly: Homo erectus (with African Homo ergaster) is broadly ancestral to later humans, including Homo heidelbergensis and thence Neanderthals and Homo sapiens. The Asian erectus populations are largely a terminal side branch that persisted late in Java. The old UPSC-style provocation 'Homo erectus was too specialised to be our ancestor' should be answered by separating the ancestral African/western forms from the specialised, long-surviving Asian ones.
- Homo heidelbergensis (the syllabus's 'Homo erectus - heidelbergensis' for Europe) bridges erectus and later humans: the Mauer mandible (1907, Germany, about 600,000 years old) is the type, and African and

European specimens (Bodo, Kabwe, Arago, Petralona) show larger brains around 1200 to 1300 cc with still-archaic features. It is widely seen as the last common ancestor of Neanderthals and modern humans.

KEY TERMS

Supraorbital torus — The heavy continuous ridge of bone above the eye sockets, prominent in Homo erectus and archaic humans, reduced to separate arches in modern people.

Acheulian (Mode 2) — The Lower Palaeolithic biface industry of handaxes and cleavers made by Homo erectus / ergaster and heidelbergensis, dominant in Africa and western Eurasia, largely absent east of the Movius line.

Movius line — Hallam Movius's proposed boundary separating the Acheulian handaxe zone of the west from the chopper and flake tool traditions of East and Southeast Asia, where Java and Peking Man lived.

PREVIOUS YEAR QUESTIONS

- What are the physical and cultural characteristics of Homo erectus? Discuss its phylogenetic status. [2021]
- Describe the salient characteristics and geographical distribution of Homo erectus. [2015]
- Describe the culture related to Homo erectus. [2018]
- Describe major skeletal similarities and differences between Homo erectus and Homo sapiens. [2011]

Neanderthal Man: Classic versus Progressive, and the Status Debate

Neanderthals are the most examined single hominid in this unit, because they carry a live taxonomic controversy (subspecies or separate species) and a rich cultural record. The syllabus names the two poles directly, La Chapelle-aux-Saints (Classic) and Mt Carmel (Progressive), so structure the answer around that contrast and then argue the status question.

- Neanderthals lived roughly 230,000 to 40,000 years ago (with an earlier 'pre-Neanderthal' phase deeper still) across Europe, the Near East and western and central Asia. The first recognised specimen came from the Neander Valley near Dusseldorf in 1856, three years before Darwin's Origin. Cranial capacity averages around 1450 to 1500 cc, which is larger than the modern human average, a fact worth stating because it demolishes the lazy equation of brain size with intelligence.
- The Neanderthal anatomical package is cold-adapted and robust: a long, low skull with a rounded rear (occipital bun), a large midfacial projection with a big nose, swept-back cheekbones, a strong double-arched brow, no chin, taurodont molars and a retromolar gap; post-cranially a barrel chest, short distal limb segments (a Bergmann-Allen cold adaptation), and very robust, heavily muscled bones. The face is best read as engineered around a large, projecting nasal aperture.
- Classic Neanderthals are the specialised Western European cold-stage form. The type example is the 'Old Man' of La Chapelle-aux-Saints (France, 1908), whose arthritic, toothless skeleton was wrongly reconstructed by Marcellin Boule as stooped and brutish, cementing the false 'shambling caveman' image for decades. La Ferrassie is the other classic French site. These show the extreme brow, occipital bun and robusticity.
- Progressive (or generalised) Neanderthals are the more gracile, less extreme forms of the Near East, the syllabus's 'Mt Carmel' specimens from the caves of Tabun and Skhul in Israel, along with Shanidar in Iraq. Some Mt Carmel material is intermediate or shows modern-looking traits, which historically fed arguments about a transition to, or contact with, modern humans; note that Skhul is now often classed as early Homo sapiens rather than Neanderthal, so use 'Mt Carmel' carefully.

- Culture is a major mark-earner and should be specific. Neanderthals made the Mousterian industry (Middle Palaeolithic, Mode 3), using the prepared-core Levallois technique to strike standardised flakes into scrapers and points. They controlled fire, hunted large game, cared for the injured and aged (the Shanidar 1 individual survived severe disabilities), and buried their dead (La Chapelle, La Ferrassie, Shanidar). The 'flower burial' at Shanidar and claims of symbolic behaviour, pigment use and possibly cave art are debated but increasingly supported.
- The status debate is the heart of any Neanderthal question and must be argued from evidence, not asserted. Two positions: (1) subspecies of us, Homo sapiens neanderthalensis, a regional variant within a single evolving species; (2) a separate species, Homo neanderthalensis, a distinct European lineage. Anatomy and long separation favour separate species; the decisive new evidence is genetic.
- Ancient DNA reframed the debate and is the up-to-date point examiners now expect. Sequencing of the Neanderthal genome (Svante Paabo's group; draft published 2010) showed that Neanderthals and modern humans interbred: present-day non-African populations carry roughly 1 to 4 percent Neanderthal DNA. This means Neanderthals were not a wholly separate biological world; they contributed to our genome even if they are usually kept as a distinct species. Some Neanderthal-derived alleles affect immunity, skin and disease risk today.
- Why Neanderthals disappeared, around 40,000 years ago, is a standard sub-question: competition with incoming modern humans, absorption through interbreeding, small and fragmented populations, and climatic instability are the leading, non-exclusive explanations. 'Less capable than Homo sapiens' (an old UPSC framing) is too simple: Neanderthals were highly capable and cognitively sophisticated, and their end was probably demographic and ecological as much as a matter of ability.

KEY TERMS

Mousterian — The Middle Palaeolithic (Mode 3) flake-tool industry of the Neanderthals, characterised by scrapers and points made on Levallois prepared cores.

Occipital bun — A rounded, projecting bulge at the back of the Neanderthal skull, part of the long, low cranial shape that contrasts with the globular modern skull.

Introgression — The incorporation of genes from one population or species into another through interbreeding; Neanderthal introgression left about 1 to 4 percent Neanderthal DNA in non-African modern humans.

PREVIOUS YEAR QUESTIONS

- Compare the fossil remains of 'Progressive' and 'Classic' Neanderthal men for anatomical characteristics and spatial distribution. Examine their phylogenetic position in human evolution. [1993]
- 'Europeans are closer to Neanderthals.' Critically discuss in view of the African origin of humankind. [2019]
- Write a note in 150 words on Neanderthal Man. [2011]

Rhodesian Man and the African Archaics

Rhodesian man is a short-answer favourite that is best understood not in isolation but as Africa's contribution to the archaic-human grade contemporary with the Neanderthals of Europe. Place it correctly on the tree and the small facts fall into line.

- Rhodesian man was discovered at Broken Hill (now Kabwe, Zambia) in 1921 by Tom Zwigelaar during mining, and originally named Homo rhodesiensis. The find is a nearly complete, massive cranium (the 'Broken Hill skull' or 'Kabwe 1') plus some post-cranial bones.

- Its features are archaic and robust: an enormous, shelf-like supraorbital torus, a low receding forehead, a large face, and a cranial capacity of about 1280 to 1300 cc, within the modern range in size but primitive in shape. The teeth famously show extensive caries and abscesses, among the earliest clear evidence of dental disease in the fossil record.
- Dating was long uncertain, and this is a point to flag as revised: Kabwe was once thought quite recent, but uranium-series and other dating published in 2020 places it at around 300,000 years old, older than previously assumed, which fits it neatly among Middle Pleistocene archaic Africans rather than as a late survivor.
- Phylogenetic status: Rhodesian man is best classified as an African representative of Homo heidelbergensis (hence sometimes 'Homo rhodesiensis' is treated as African heidelbergensis), part of the archaic grade from which anatomically modern Homo sapiens emerged in Africa. It is broadly the African contemporary and counterpart of the European Neanderthal lineage, both descending from a heidelbergensis-grade ancestor.
- Use Rhodesian man to make a comparative point that scores: while Europe was evolving the specialised, cold-adapted Neanderthals, Africa around the same period held large-brained archaics like Kabwe and Bodo, and it was in Africa, not Europe, that the transition to modern humans occurred. Rhodesian man is a signpost on the African road to Homo sapiens.

KEY TERMS

Archaic Homo sapiens — A loose grouping of Middle Pleistocene large-brained humans (heidelbergensis, Rhodesian man, Neanderthals) intermediate between Homo erectus and anatomically modern humans.

Homo heidelbergensis — The Middle Pleistocene archaic species, with African (Kabwe, Bodo) and European (Mauer, Petralona) members, widely regarded as the common ancestor of Neanderthals and modern humans.

PREVIOUS YEAR QUESTIONS

- Write a note in 150 words on Rhodesian Man. [2016]
- Write a note on Rhodesian Man. [2006]

Homo sapiens: Cro-Magnon, Modern Anatomy, and Out-of-Africa versus Multiregional

The unit closes on our own species and its central controversy. Two things must be delivered: the anatomical definition of a modern human, with Cro-Magnon as the type European specimen the syllabus names, and a clear, evidence-based verdict on the origins debate, which is the single most examined argument in the whole of physical anthropology.

- Anatomically modern Homo sapiens is defined by a consistent package: a high, rounded (globular) braincase with a vertical forehead; a small or absent brow ridge; a flat, tucked-in (orthognathous) face; a projecting bony chin (unique to us); reduced teeth and jaws; and a lightly built (gracile) skeleton. Cranial capacity averages about 1350 cc, ranging widely; it is the shape of the modern skull, not its size, that distinguishes us from Neanderthals.
- The African origin of modern anatomy is now well dated and should be stated with the key fossils: Jebel Irhoud in Morocco, about 315,000 years old (Hublin and colleagues, 2017), pushes the emergence of the sapiens lineage back further than the older textbook figure; Omo Kibish (Ethiopia) at about 195,000 to 233,000 years and Herto (Ethiopia) at about 160,000 years are the classic early modern fossils. Modern

humans then dispersed out of Africa, reaching the Near East and, by roughly 45,000 to 40,000 years ago, Europe.

- Cro-Magnon is the syllabus's European modern type. The original specimens came from the Cro-Magnon rock shelter at Les Eyzies in the Dordogne, France, in 1868, and are about 30,000 to 40,000 years old. Cro-Magnons were tall, robustly built but fully modern in skull form, with high vaults and prominent chins and cranial capacities often around 1600 cc; they are Europe's Upper Palaeolithic population.
- Their culture is the Upper Palaeolithic (Mode 4 and later), a clear advance: blade tools, burins, and tools of bone, antler and ivory; the spear-thrower and eventually the bow; personal ornaments; and above all symbolic art, the cave paintings of Lascaux and Chauvet and the 'Venus' figurines. This florescence of symbolic behaviour is used to argue for fully modern cognition and language.
- Grimaldi and Chancelade, both named in the syllabus, are two further European Upper Palaeolithic finds. The Grimaldi remains from the caves on the Italian-French Riviera were historically, and controversially, described as showing 'Negroid' affinities, a claim now rejected as reflecting the racial preoccupations and unreliable typology of early twentieth-century anthropology rather than sound evidence. The Chancelade skeleton (France) was similarly, and equally dubiously, likened to modern Eskimos (Inuit). Present these as historically important specimens whose old racial interpretations are discredited, since parroting the racial labels uncritically is a factual and ethical error.
- The origins debate is the compulsory argument, and both models must be stated fairly. The Recent African Origin or 'Out-of-Africa' model (Chris Stringer and others) holds that modern humans evolved in Africa within roughly the last 300,000 years and spread to replace archaic populations elsewhere. The Multiregional model (Franz Weidenreich's older continuity idea, developed by Milford Wolpoff and Alan Thorne) holds that Homo erectus populations across the Old World evolved in parallel into modern regional populations, linked by gene flow.
- The genetic evidence is what decides the balance and should anchor the verdict. Mitochondrial DNA analysis (Cann, Stoneking and Wilson, 1987) pointed to a recent common maternal ancestor in Africa, 'Mitochondrial Eve', around 150,000 to 200,000 years ago, and Africans show the greatest genetic diversity, both signatures of an African origin. This strongly supports Out-of-Africa.
- The mature, current position is a synthesis, and giving it shows you are up to date: a predominantly recent African origin with limited interbreeding (admixture) with local archaic humans as moderns spread, namely Neanderthals in Eurasia (1 to 4 percent Neanderthal DNA in non-Africans) and Denisovans in Asia and Oceania. So the strict 'total replacement' version is softened, and the strict multiregional version is rejected, in what is sometimes called 'assimilation' or 'leaky replacement'. Africa is the origin; the rest of the world received a small archaic genetic contribution on the way.
- Write the verdict, since the questions demand a stance: the weight of fossil and, decisively, genetic evidence favours a recent African origin over multiregionalism, qualified by real but minor archaic admixture. Answers that sit on the fence without weighing the mtDNA and ancient-genome evidence underperform.

KEY TERMS

Anatomically modern human (AMH) — Homo sapiens with the full modern package: globular braincase, vertical forehead, small brow, flat face and a projecting chin; defined by cranial shape rather than size.

Recent African Origin (Out-of-Africa) — The model that modern humans arose in Africa within roughly the last 300,000 years and dispersed to replace, with limited admixture, archaic humans elsewhere; strongly supported by mtDNA and genomic data.

Multiregional model — Weidenreich, Wolpoff and Thorne's model of parallel regional evolution from Homo erectus across the Old World, connected by gene flow; largely rejected in its strong form by genetic evidence.

Mitochondrial Eve — The most recent common matrilineal ancestor of all living humans, inferred from mtDNA to have lived in Africa around 150,000 to 200,000 years ago; evidence for a recent African origin.

PREVIOUS YEAR QUESTIONS

- Critically evaluate the contesting theories of the emergence and dispersal of modern Homo sapiens. [2020]
- Discuss the question of single sources vs. multiple sources of the origin of Homo sapiens. Which one of the two hypotheses do you think is more tenable? Give reasons in support of your answer. [1995]
- Describe major skeletal similarities and differences between Homo erectus and Homo sapiens. [2011]

Last-mile revision

- Bipedalism came first, big brains came late. Australopithecus walked upright with a chimp-sized brain over a million years before brain expansion began with Homo. Never enlarge the brain before freeing the hands.
- Grade versus clade: Australopithecus is a grade, not a single ancestor. A gracile form near afarensis/africanus sits at the base of Homo; the robust forms (Paranthropus) are a specialised dead end.
- afarensis ('Lucy', AL 288-1, Johanson 1974, ~3.2 Mya, Hadar) plus Laetoli footprints (~3.6 Mya) prove habitual bipedalism; capacity ~380 to 430 cc. africanus (Taung child, Dart 1925; Sterkfontein 'Mrs Ples', Broom) is the South African gracile form, ~400 to 500 cc.
- Robust australopithecines (Paranthropus): sagittal crest, dish face, megadont molars = heavy-chewing specialists. boisei (OH 5 'Nutcracker Man', Zinjanthropus, Mary Leakey 1959, ~500 to 550 cc); robustus (Swartkrans, Kromdraai, Broom 1938, ~530 cc). Side branch, not ancestors; coexisted with early Homo.
- Homo habilis ('handy man', Leakey/Tobias/Napier 1964, Olduvai): first toolmaker (Oldowan Mode 1), capacity ~500 to 680 cc. Transitional at base of Homo; larger-brained KNM-ER 1470 sometimes split off as H. rudolfensis (~750 cc).
- Homo erectus: ~1.9 Mya to ~0.1 Mya, capacity ~750 to 1250 cc. Java Man (Dubois 1891, Trinil, Pithecanthropus erectus); Peking Man (Zhoukoudian, Sinanthropus, Black/Weidenreich, originals lost 1941). Long low skull, sagittal keel, big brow, no chin; body of modern proportions (Turkana Boy).
- Movius line qualification: Acheulian (Mode 2) handaxes are the western erectus/ergaster industry; the Asian populations (Java, Zhoukoudian) used chopper/flake tools. Fire: erectus is the best early candidate, but the Zhoukoudian 'hearths' evidence is contested.
- Homo heidelbergensis (Mauer jaw 1907, ~600 kya; Kabwe, Bodo, Petralona) is the archaic bridge and likely common ancestor of Neanderthals and modern humans, ~1200 to 1300 cc.
- Neanderthals: ~230 to 40 kya, Europe/Near East/Central Asia; capacity ~1450 to 1500 cc, LARGER than modern average. Cold-adapted, robust, midfacial projection, occipital bun, no chin. Mousterian (Mode 3, Levallois). Buried dead, cared for the sick.
- Classic Neanderthals = specialised West European (La Chapelle-aux-Saints, Boule's wrong stooped reconstruction; La Ferrassie). Progressive = Near Eastern, more gracile (Mt Carmel: Tabun, Skhul; Shanidar). Skhul now often read as early H. sapiens.
- Neanderthal status: subspecies (H. sapiens neanderthalensis) vs species (H. neanderthalensis). Ancient DNA (Paabo, genome 2010) shows interbreeding: non-Africans carry ~1 to 4 percent Neanderthal DNA. Usually kept as a distinct species that admixed with us.
- Rhodesian man (Broken Hill/Kabwe, Zambia, 1921; capacity ~1280 to 1300 cc; heavy caries; redated to ~300 kya in 2020) = African Homo heidelbergensis, the archaic counterpart of the European Neanderthal line. Africa, not Europe, is where moderns arose.
- Anatomically modern humans are defined by SKULL SHAPE not size: globular vault, vertical forehead, small brow, flat face, projecting chin. Origin in Africa: Jebel Irhoud ~315 kya, Omo Kibish ~195 kya, Herto ~160 kya.
- Cro-Magnon (Les Eyzies, France, 1868; ~40 to 30 kya; ~1600 cc) is Europe's Upper Palaeolithic modern population: blade tools, bone/antler technology, cave art (Lascaux, Chauvet). Grimaldi and Chancelade are further Upper Palaeolithic finds whose old racial labels ('Negroid', 'Eskimo') are discredited.

- Origins verdict: Recent African Origin (Stringer) beats Multiregional (Weidenreich/Wolpoff/Thorne). Decisive evidence: mtDNA 'Mitochondrial Eve' (Cann, Stoneking, Wilson 1987, ~150 to 200 kya, Africa) plus greatest African diversity. Mature model = mostly African origin with limited Neanderthal and Denisovan admixture ('assimilation').

Common errors to avoid

- Treating any single fossil as 'the ancestor'. The tree near the origin of Homo is bushy: multiple species coexisted (habilis with boisei, habilis with early erectus). Argue phylogenetic status; do not draw a single-file ladder from ape to man.
- Equating large brains with intelligence, then being unable to explain why Neanderthals, with brains larger than the modern average, are gone. Brain size is not the whole story; organisation and culture matter.
- Saying 'Homo erectus made Acheulian tools' without the Movius line qualification. The Asian erectus populations the syllabus names (Java, Peking) used chopper and flake tools, not Acheulian handaxes; the Acheulian belongs mainly to the western/African forms.
- Confusing the gracile and robust australopithecines, or attributing tools to Paranthropus. The Oldowan tools at sites with boisei are credited to contemporaneous early Homo; the robusts are chewing specialists and an evolutionary dead end.
- Repeating that Peking Man's Zhoukoudian ash proves controlled fire, or repeating Boule's stooped 'brutish' Neanderthal. Both are outdated: the Zhoukoudian hearth evidence is contested, and the La Chapelle skeleton was arthritic and wrongly reconstructed.
- Reciting the discredited racial descriptions of the Grimaldi ('Negroid') and Chancelade ('Eskimo') fossils as if they were valid findings. They reflect early-twentieth-century racial typology, not evidence, and should be flagged as rejected.
- Sitting on the fence in the Out-of-Africa versus Multiregional question. The genetic evidence (mtDNA, African diversity, ancient genomes) tips clearly toward a recent African origin with minor admixture; a verdict is expected, and 'both have merits' without weighing the DNA underperforms.
- Giving cranial capacities and dates as exact single figures. They are estimates from small samples with real ranges, and several (Kabwe's age, late Javanese erectus, Jebel Irhoud) have been revised; state central values and flag that estimates vary.
- Forgetting that Homo sapiens is defined by the SHAPE of the modern skull (globular vault, chin, flat face), not merely by brain size, which overlaps heavily with Neanderthals and archaics.
- Mislabelling Skhul/Mt Carmel material as straightforwardly Neanderthal. The 'Progressive' Mt Carmel sample is mixed, and Skhul is now widely classed as early Homo sapiens, which is exactly why it mattered historically for the transition debate.