CHAPTER 1

INTRODUCTION

AN UNSTOPPABLE SPECIES?

We are Earth's unstoppable species. Today humans live in a global diaspora within which we move about with ease. At just over 8 billion individuals, we outnumber all other primates combined. If some disaster depopulated an entire continent, enough humans would survive elsewhere to eventually repopulate that "lost continent." As long as the biosphere persists, so do we. Our global diaspora confers on us an "extinction immunity" without evolutionary precedent among creatures larger than microorganisms. Our extinction immunity contrasts starkly with that of other primates, past and present. The African apes (gorillas, chimpanzees, and bonobos), our nearest primate relatives, inhabit a narrow range of tropical habitats (Figure 1.1). Surrounded by skyrocketing human populations, extinction stalks apes as their own shadows do. Humans (*Homo sapiens*) are the opposite of endangered. For apes and countless other species, we are the danger.

Why us? Might trilobites, cephalopods, and other creatures whose remains crowd sediments from Earth's earliest ages have thought themselves unstoppable? We will never know. We, alone, among all life in Earth's history, can actually answer the challenge with which Carolus Linnaeus (1707–1778) defined *Homo sapiens*: "*Homo, nosce te ipsum*" (Latin for "Man, know yourself"). Why humans, rather than any other animal, became the unstoppable species is anthropology's ultimate and most consequential "big question," for how we choose to answer it and what we do with that answer will affect humanity's long-term survival.

What Is This Book About?

Asserting that our unstoppability results from our diaspora, this book explains how we achieved that diaspora. *The Unstoppable Human Species* describes *Homo sapiens*' origin and global dispersal after 300,000 years ago. It chronicles how

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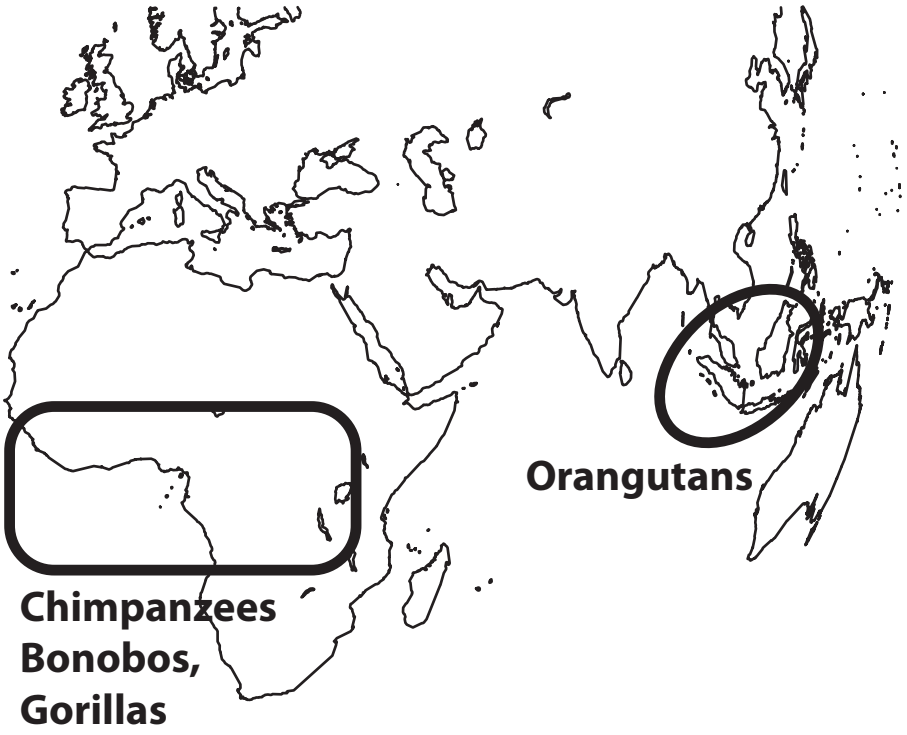

Figure 1.1 Where apes live. © John J. Shea.

mobile hunter-gatherers ("bows, boats, and beads" people) became sedentary food producers ("houses, herds, and hoes" people). Along the way, *The Unstoppable Human Species* overturns several long-standing conventions in archaeological research about prehistory.

First, this work challenges archaeology's use of migration as an explanation for past human population movements. For more than a century, archaeologists have sought and failed to find evidence for migrations in "deep-time prehistory" (before 10,000 years ago)(Clark 1994). Migration enjoys a recent renaissance, as archaeologists increasingly seek to correlate their findings with those from historical genetics and molecular anthropology (Lewis-Kraus 2019). One thinks this interdisciplinary flirtation misguided. Migrations require storable and transportable food surpluses of the sort that plant and animal husbandry (agriculture and pastoralism) or their functional equivalents create. Most if not all evidence for such "food production" dates to less than 10,000 years ago, long after humans settled most of the world except Antarctica and the most remote oceanic islands.

Second, *The Unstoppable Human Species* challenges archaeologists' long-standing obsession with questions about prehistoric humans' social identities – with who moved where and when and with who mated with whom.

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Molecular anthropologists reserve special enthusiasm for such questions because they can provide conclusive answers in ways that traditional archaeological approaches cannot (Higham 2021). This work views these so-called hypotheses about such identities linking genes to fossils and fossils to archaeological remains as the unfalsifiable arguments they really are. We cannot call them hypotheses, because we cannot prove them wrong using evidence. Much like Medieval theologians' debates about how many angels could stand on the head of pin, they distract us from actual hypotheses, arguments that evidence can prove wrong. This work focuses on questions about prehistoric human behavior, on what our ancestors did. We are not the unstoppable species because of who our ancestors were. We are the unstoppable species because they solved survival challenges differently from other hominins (bipedal primates) that are now extinct.

Third, this work focuses on *Homo sapiens* and to a lesser degree on our immediate ancestor, *Homo heidelbergensis*, and on the Neanderthals (*Homo neanderthalensis*) with whom early humans were rough contemporaries. While there are certainly merits to placing *Homo sapiens*' origins and diaspora in the larger narrative of primate and hominin evolution (Stringer 2012; Gamble 2013; Hoffecker 2017), doing so requires one to sacrifice details about post-Pleistocene human migrations, migrations that shaped our world today, as well as to curtail discussions about extinction threats and what prehistory can tell us about humanity's future – the very things students and others so often ask paleoanthropologists about! Why else study the remote past than in search of lessons for our remote future?

Finally, *The Unstoppable Human Species* challenges archaeologists' conviction that we owe our evolutionary success to some specific quality that evolved since *Homo sapiens* fossils first appear in the fossil record around 200,000–300,000 years ago. Many recent works on this subject emphasize evolutionary changes in cognition, overlooking the difficulties in measuring cognitive differences among living humans, much less among extinct ones. Others attribute our success to "modernity," a metaphor pulling together a wide range of activities only tangentially connected to one another. *The Unstoppable Human Species* argues that we owe our evolved unstoppability to an integrated suite of "ancestral survival skills." These skills include powerful precision grasping, endurance bipedalism, predictive hallucination, spoken language, and hyper-prosociality. Other hominins possessed these ancestral survival skills, too, but our ancestors used them differently and better than other hominins did.

Why Is This Subject Important?

The Earth is by no means full, but we can no longer move away from our problems, as ancestral humans did. Nowadays, when rising waters flood coastal

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communities and drown towns located on floodplains, when fires burn rural communities to ashes, and when wars and earthquakes reduce cities to rubble, people rebuild in the same places. Strategies for a sustainable future? One thinks not. Calling *Homo sapiens* "unstoppable" expresses not a fact but a "hopepothesis" (a hypothesis one hopes is true but one cannot prove wrong). Future environmental and planetary catastrophes will put us in their crosshairs, too. The overwhelming majority of climate science suggests our current global heating trend will continue into the near future, afflicting us with increasingly severe storms, droughts, wildfires, crop failures, mass extinctions, epidemics, and pandemics (Bostrum and Cirkovic 2011). How will we overcome such challenges? Learning how early humans overcame past difficulties will enlighten, inspire, and guide us and our descendants about how to anticipate and overcome whatever difficulties the future throws at us, for difficulties it will assuredly throw. Like those ancestors, we must never, ever quit. As Antarctic explorer Sir Ernest Shackleton (1874–1922), put it, "Difficulties are just things to overcome, after all."

For Whom Is This Book Intended?

I wrote *The Unstoppable Human Species* mainly for college students and others interested in human evolution. This work seeks a larger audience and brings to the table different perspectives on prehistory than one finds in recent works professional anthropologists have written for other professional anthropologists (e.g., Bellwood 2013; Gamble 2013; Hoffecker 2017). I hope my colleagues and graduate students will enjoy *The Unstoppable Human Species* and find it thought-provoking. To aid nonprofessional readers, the book reviews basic terms and concepts in paleoanthropology (scientific research about human origins and evolution) and includes a Glossary at the back of the book. Professional paleoanthropologists may find these reviews unnecessary, even tedious, but one would rather inflict tedium on them than leave the greater number of other readers behind.

One also hopes colleagues in molecular anthropology will read this book. All too often, hypotheses about human evolution based on genetics simply use the archaeological record as "window dressing." That is, they assert evolutionary relationships among extinct humans and then rummage about for archaeological evidence that supports their claims about those relationships. Confirmation bias is a powerful thing: it encourages one to accept facts that agree with one's previously held beliefs and to ignore facts that do not. Archaeologists' views about prehistoric human population relationships vary so widely that, properly motivated, any molecular anthropologist can find an archaeologist or paleontologist whose previously published views on any issue support theirs.

How Does This Book Differ from Others?

One rarely sees the words "practical" and "archaeology" in the same sentence, but this is a work of practical archaeology. Other recent works about prehistoric human population movements concern themselves with prehistory, with who moved where and when. This work tacks differently. It focuses on how our ancestors survived long enough to become our ancestors. To do this, it delves into sources of hypotheses that other works largely neglect, namely the literature of bushcraft and wilderness survival. These two sources intersect in complex ways, but they share a core concern: how to not die before one's time in the great outdoors. We know little for certain about what early humans and other hominins did, but we can be confident that those who became our ancestors did not do the things bushcraft and wilderness survival works warn against doing.

POPULATION MOVEMENTS

Historically, humans cope with rapid climate change or other adverse circumstances either by intensification (working harder to remain in place) or by residential movement ("voting with your feet"). Political debates about modern-day population movements, as well as many scholarly works, often conflate migration, transhumance, and dispersal (Bellwood 2013; Shah 2020). Migrations, transhumance, and dispersals differ from one another (Figure 1.2 and Table 1.1).

Dispersal

In a dispersal, individuals or small numbers of people move over short distances. Small numbers allow them to feed as they go and to assimilate as they wish to or as necessary in their destinations. As a result, dispersing humans can rapidly change their culture, their social relations, and their archaeological "footprint" at their destinations. For example, the author's father's ancestors relocated from Ireland to Massachusetts, individually, decades apart, and from different parts of Ireland. On arrival, and as swiftly as they could, all became American citizens. They were dispersing. None of their descendants speaks Gaelic or self-identifies as Irish American, much less as Irish.

Migration

In a migration, large numbers of people (hundreds or more) move together over long distances (hundreds of kilometers). Because they carry food stored in bulk with them, they need not assimilate into other groups through whose

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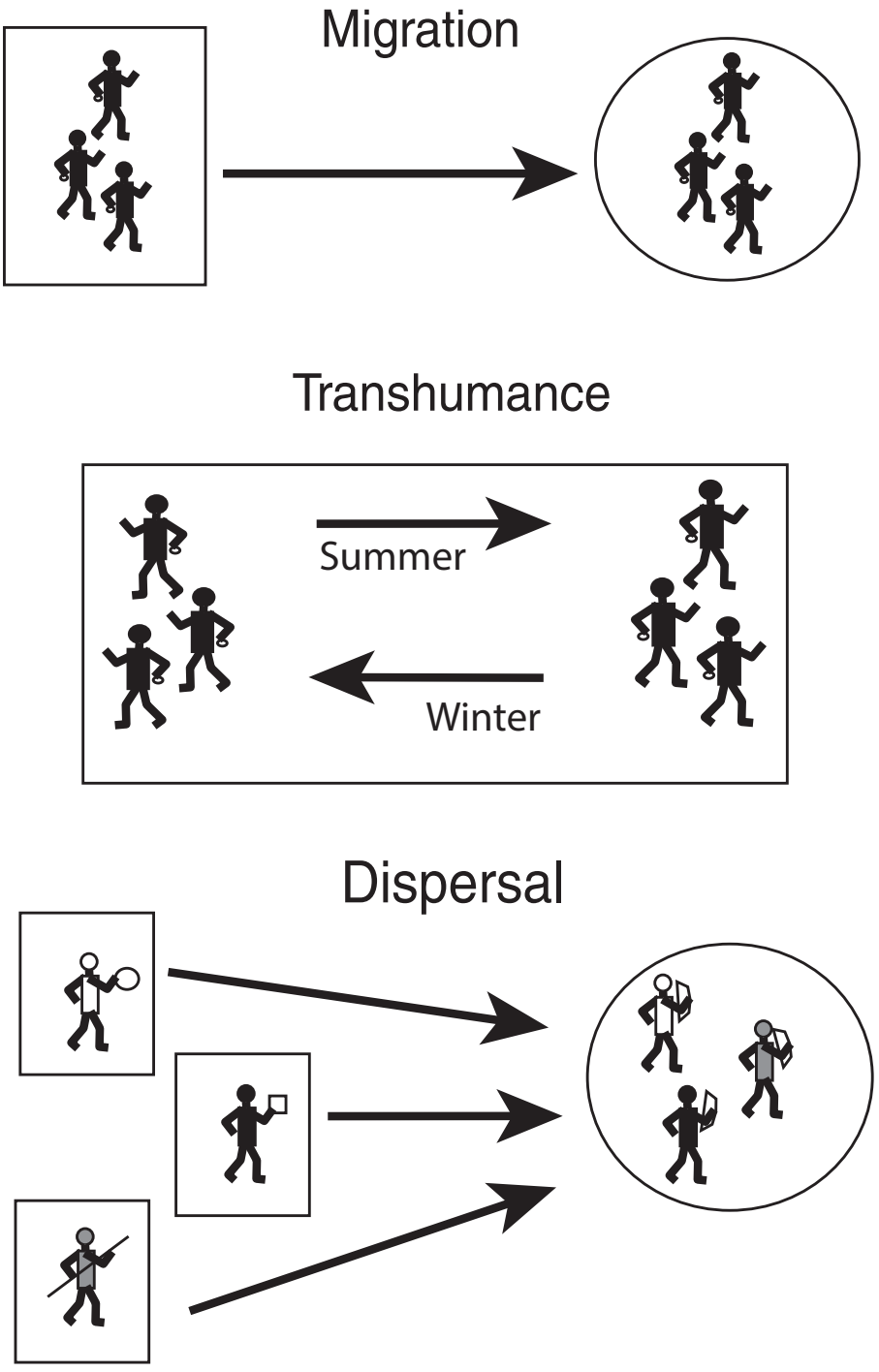

Figure 1.2 Human population movements: Migration, transhumance, dispersal. © John J. Shea.

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TABLE 1.1 *Dispersals, migrations, and transhumance*

	Dispersals	Migrations	Transhumance
Who moves?	Individuals or small groups (low dozens or fewer)	Large groups (hundreds or more)	Variable
How far?	Tens of kilometers	Hundreds of kilometers	Tens of kilometers
Food sources?	Feed as you go	Stored in bulk and transported	Gathered in bulk at source and destination
Social relations?	Reconfigured in destinations	Remain intact	Remain intact
Archaeological signature?	Difficult to recognize due to rapid changes over time and distance	Recognizably the same or similar for long periods and over great distances	Varies depending on activities

territories they pass. For a time, migrating groups retain their culture and social relations at their destinations. Migrations leave a detectable archaeological "signature," of artifacts, food waste, and other things that remain recognizably the same or at least similar over vast distances and long time periods. For example, during the 17th century the author's maternal ancestors moved en masse from Brittany in northwestern France, to what is now Nova Scotia in Canada. They migrated. To this day, their descendants in northernmost Maine still speak French and self-identify as "Acadian" to distinguish themselves from their French-speaking Québécois neighbors in Canada and English-speaking American neighbors.

Migrations conjure up drama and conflict far more so than dispersal. Calling something a migration versus an invasion, after all, is a matter of perspective. European Americans' migrations were for Native Americans an invasion. Unsurprisingly, migrations command more popular attention than dispersals. Migrations figure more prominently in works written about prehistory for similar reasons (drama), but using them in prehistory has led to an imbalance in the sorts of questions paleoanthropologists ask about deep-time prehistory.

Transhumance

Transhumance describes cyclical and temporary shifts of habitation sites within a larger geographic range, such as between winter and summer camps or highland or lowland residences. Either the entire community moves or some specific subset of that larger group does. Pastoralists often practice transhumance so that their livestock can take advantage of plant foods that become available in different places at different times. Ethnographic and historic

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hunter-gatherers often did this to take advantage of migrating fish, such as salmon, or large mammals, such as reindeer. If the activities carried out at seasonal sites differed widely, then archaeologists could have trouble telling whether they were seeing the remains of the same group or different groups (Thomson 1939).

Mixed Dispersals and Migrations

Dispersals and migrations are not mutually exclusive of one another, but rather end points on a continuum. Both can occur simultaneously. The 17th-century English Pilgrims who settled Plymouth, Massachusetts (formerly Wampanoag Patuxet), included both members of a dissident Protestant religious sect as well as individual nonmembers ("strangers") traveling to the New World to seek their fortunes there (Bradford and Morrison 1651 (1952)). Therefore, in thinking about prehistoric human population movements, this work does not argue whether a particular prehistoric or historic population movement was either wholly a dispersal or a migration (a categorical distinction). Instead, it evaluates whether the evidence for the movements in question more closely matches our expectations about migrations versus dispersals.

QUESTIONS ABOUT HUMAN EVOLUTION: WHO, HOW, AND WHY

As innovations in 16th- to 18th-century maritime technology brought European explorers to ever more distant lands, different groups of people gazed at one another across beaches and rivers asking, "Who are these people, and how did they get here?" Anthropology developed out of European explorers' and scholars' efforts to find scientific answers to this question (Wolf 1982; Kuper 1988). But the question actually asks two very different things. "Who questions" ask about prehistoric humans' identities, their relationships to one another and to us. "How questions" ask about prehistoric humans' activities and how they solved problems.

"Who Questions"

Scientists recognized "prehistory," the time before written records, during the late 18th to early 19th centuries (Daniel and Renfrew 1988). Seeking scientific answers to historical linguists' and historians' questions about the origins of living human groups, 19th- and early 20th-century paleoanthropologists thought and wrote about prehistoric human population movements as migrations, and as a result, they devoted vastly more effort to answering "who questions" than "how questions." From the mid-19th century onward, archaeologists and other scholars populated deep-time prehistory with

"cultures," "races," and stone tool "industries" and more recent prehistoric periods with groups defined in terms of variation among ceramic artifacts. Twentieth-century prehistorians treated these cultures, races, and industries as the equivalents of ethnographic (living human) cultures and races, and they wrote many journal papers and books speculating about their origins, migrations, mutual influences, and historical relations to living humans (Sackett 1991). Historians of archaeology call this approach to prehistory "culture history." Some archaeologists recognized such "prehistory" was not quite history, as historians understood their field, nor quite science as scientists understood theirs, but these remained minority positions (Taylor 1948; Binford 1962).

Signs of trouble with this culture-history approach appeared during the 1960s. By that point, race was on its way out as a serious research focus in evolutionary biology (Wolpoff and Caspari 1997). Radiocarbon and other geophysical dating methods demonstrated that many archaeological industries and cultures lasted far longer and exhibited far less variation than any historical human culture. A "culture" that lasts 100,000 years or more essentially unchanged is the *opposite* of culture as anthropologists define the term (Kroeber and Kluckholn 1952). Second, archaeologists found traces of the same cultures spread out over entire continents (Bordes 1968), far more widely than any preindustrial ethnographic culture (Clark and Riel-Salvatore 2006). Finally, 20th-century cultural anthropologists showed that living humans maintain complex and multilayered social identities that we easily change as the need to do so arises (Boas 1940). Archaeologists' use of the culture concept denied these complex social identities to prehistoric *Homo sapiens* and to other hominins.

Today, the notion that one can meaningfully divide prehistoric human societies into anything like actual human cultures seems no more plausible than dividing living humans into named, meaningfully different groups based on the kinds of pens and pencils in their trash cans (Shea 2014). Culture-historical approaches to "who questions" equated trivial differences among stone tools and other evidence with evolutionarily important differences among prehistoric people.

Archaeologists' efforts to solve these problems with culture-history largely break up archaeological cultures into component parts. One currently popular approach focuses on reconstructing "operational chains,"[1] different strategies for making pottery, houses, or stone tools (or for doing anything, really), and archaeologists' reconstructions of those strategies. Patterned variation in the occurrences of different operational chains in the archaeological record then guide archaeologists in identifying prehistoric "communities of practice," conjectural groups of prehistoric people who did things the same way. The

[1] From the French *chaînes opératoires*.

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procedures for recognizing communities of practice differ from those earlier archaeologists used for identifying prehistoric cultures, but the results are fundamentally the same: named groups of prehistoric humans defined in terms of the artifacts. Old wine in new bottles.

Contemporary "genetic history" perspectives on prehistory people the past with named "haplogroups" (DNA samples with similar and distinctive combinations of genes). Some such works treat haplogroups as specific human populations (Sykes 2001; Oppenheimer 2004; Wells 2009). And yet analyses of ancient DNA provide no support whatsoever for the notion that genetically "pure" haplogroups ever existed (Reich 2018). There were no "Haplogroup M people," merely human populations among whom some had Haplogroup M's distinctive genetic signature.

(The recent advent of "personal genetics" offers up a brand-new horror show of answers to "who questions." These tests promise to identify the percentage of different named "ethnicities" that make up one's genetic heritage. The ethnicities in question range from entire regions (sub-Saharan Africa), nations no more than a few centuries old (Germany), religious groups (Ashkenazi Jews), and so on. All these tests actually do is identify where in the world people live whose DNA most resembles yours. DNA-based claims of membership in one or another named human ethnic or national group are not the same things as 19th-century ethnology's "pure races," but they don't differ from them all that much either.[2])

A second sort of error occurs when "molecular" answers to "who questions" equate the inferred dates of divergences among haplogroups with momentous events in human evolution. Whatever events led to the Haplogroup L-M split 70,000 years ago could have been something that ancestral humans discussed around their campfires for centuries afterward. Alternatively, one person or family might have moved across a river because somebody else snored too loudly or failed to share food adequately. When paleoanthropologists equate haplogroup/gene histories with population histories, they make precisely the same mistake culture-historical archaeologists made, namely, equating potentially trivial differences among their observations with evolutionarily important differences among prehistoric people. Scientists

[2] Colleagues and students have encouraged me to take a "personal genetics" test to learn what if any percentage of Neanderthal DNA lurks in my genome. I have not done so and never will. After all, finding such Neanderthal DNA would not (and should not) change what I think about myself or (I hope) what my colleagues think about me. A DNA test would almost certainly trace "genetic heritage" back to the early humans who lived in Africa. Would that make me African? Suppose such a test revealed a trace of Native American ancestry. Should I start wearing "leathers and feathers" to work at the university? Some might do so, but I would not. No federally recognized Native American tribe or nation accepts DNA tests as evidence of membership. More importantly, I value the respect that my actual Native American students and colleagues have for me. Tellingly, no personal genetics test could reveal my actual American ethnicity.

call this error "assuming the consequent," or accepting hypotheses they ought to be trying to prove wrong.

If one thinks about it, proving paleoanthropologists' answers to "who questions" wrong would require interviewing and observing extinct humans. A device of the sort H. G. Wells envisioned in his 1888 novel, *The Time Machine*, would solve this problem (and put most archaeologists out of work), but our current understanding of physics holds such backward-and-forward time travel impossible. Prehistoric humans' social identities might have been less complex, less variable, and more tightly tethered to variation in their artifact designs than recent humans' social identities are, but neither anthropological nor evolutionary theory supports this assumption to the exclusion of competing hypotheses (i.e., that they were not). That none of the world's 8 billion humans lives in a society with innate (biologically based) "cultural conservatism" suggests such "cultures" are evolutionary non sequiturs. They do not exist either because they are structurally impossible or because past peoples whose cultures lacked such innate cultural conservatism replaced them.

None of the foregoing should be read as either condemning or disparaging research on "who questions." "Who questions" are important ones, and they deserve scientifically valid answers. However, answering "who questions" turns out to be a lot more complicated and difficult than the scientists engaged in this research and the general public who pays for it appreciate.

"How Questions"

Early archaeologists tried to answer "how questions," but they worked with limited resources. Like their counterparts today, most early archaeologists lived in urban centers of industrial states far away from where nonindustrialized peoples still hunted, gathered, fished, and made stone tools in ways that were plausibly analogous to how prehistoric humans did. A few early anthropologists conducted experiments making and using stone tools and other "primitive" (ancestral) technology, and a tradition of "experimental archaeology" persists (Leakey 1954; Schick and Toth 1993; Eren et al. 2016). Still, even today, few prehistoric archaeologists hunt, much less hunt and gather. Other early archaeologists relied on cultural anthropologists' and others' notes about preindustrial activities in remote parts of Africa, Asia, Australia, and the Americas. At the time anthropologists observed them, however, many of these preindustrial societies were becoming increasingly assimilated into global industrial economies.[3]

[3] Also, at the time, cultural anthropologists were more interested in ethnographic humans' kinship systems, social customs, and supernatural beliefs, things they thought guided "primitive" humans' behavior, than they were about their economic activities and material culture (artifacts).

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Accounts of ethnographic humans' ecology, technology, subsistence, and settlement patterns often lacked the sorts of details archaeologists needed to develop hypotheses about prehistoric human activities. Recognizing these gaps in the ethnographic record, from the 1970s onward, archaeologists developed "ethnoarchaeology," research documenting how living humans create an archaeological record.

There is certainly nothing wrong with using observations of recent human activities as sources of hypotheses about the past. Basing one's theories about the past on observations of present-day phenomena is uniformitarianism (Lyell 1830–1833), the common theoretical touchstone of all natural history. Nevertheless, when archaeologists pose answers to "how questions" about prehistory, they face a problem. Projecting recent preindustrial human activities unaltered back into prehistory, especially "deep-time" prehistory, contradicts fundamental evolutionary principles. It conflates analogy and homology. Prehistoric human activities might have resembled recent human activities (analogy), but they were not identical (homology), because evolution never, ever stops.

Consider dogs. Nearly all recent hunter-gatherers keep and use dogs as hunting aids, as do many farmers, herders, and city-dwellers. Dogs allow hunters to pursue prey animals they might otherwise bypass, such as small and nocturnally active creatures and waterfowl. Anthropologists base theories about how prehistoric humans hunted on ethnographic observations of dog-using hunter-gatherers. And yet domesticated dogs appear in the fossil record less than 12,000–30,000 years ago (Shipman 2021), hundreds of thousands of years after humans do. "How did early humans hunt without dogs?" is an anthropologically important question with significant implications for what we think happened in human prehistory. "Who first domesticated dogs?" is far less consequential.[4]

Differences between Who and How Questions

"Who questions" and "how questions" differ from each other. Answers to "who questions" narrow. Much as family genealogies do, they connect a living person or people to a specific dead person or extinct groups of people to serve the living's social game: to assert authority about some matter, to claim exemptions, or to justify privileges (Jasanoff 2022). In the same sort of way

[4] Even assuming that one can identify a specific region or time period in the "big picture" of human evolution, it simply does not matter whether dogs first appeared in the Czech Republic, Israel, China, or elsewhere. After all, it is not as though modern-day residents of these countries can claim credit for their predecessors' having domesticated wolves without suffering the ridicule such a claim deserves.

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that everyone cares deeply about their genealogy but nobody else does,[5] answers to "who questions" about one part of the world decline with distance and with time. That is, answers to questions about who made which sort of Middle Bronze Age pottery in central Europe might interest prehistorians working on the central European Early and Later Bronze age, or the Bronze Age in adjacent parts of Europe. They would probably not interest colleagues working further afield and in different time periods, such as the Bronze Age in China or the Iron Age in Africa. These problems with "who questions" are not exactly secrets.

Answers to "how questions" widen. They enlarge the range of people connected to one another. So, why are paleoanthropologists so less engaged with "how questions" than with "who questions"? "How questions" are tough questions. They require one to ask questions to which much current scholarship answers, "Nobody knows." On the other hand, learning how earlier humans solved a problem provides insights into the lives of *all* humans, past and present. For example, during the early 20th century in California, one Native American man, Ishi (Yahi, 1861–1916), "the last of his tribe," demonstrated to interested anthropologists how he and his people made stone tools (Nelson 1916). Today, thousands of craft/hobby "flintknappers" shape stone tools using the same or similar techniques to those Ishi used. They and others have learned what Ishi taught, and these insights have been deployed in archaeological research on the earliest prehistory onward (Whittaker 2004; Shea 2017b). Answers to "how questions" evoke the common heritage of all humanity.

Chronologically, "who" and "how questions" also look in different directions. Answers to "who questions" look backward. Learning that the indigenous inhabitants of Vanuatu (a group of Pacific Islands) came from the Philippines rather than New Guinea might be interesting, but this information does not affect Vanuatans' present or their future (Lewis-Kraus 2019). Neither the Philippines nor New Guinea can credibly claim these islands based on hypotheses about prehistoric migrations. Answers to "how questions" look forward. Learning how prehistoric Vanuatans overcame such survival challenges as rapidly rising sea levels, wildfires, food insecurity, and pandemic diseases suggest ways they can overcome similar challenges or, even better, avoid them entirely. For living Vanuatans and scientists (and those who are both), "who questions" are not irrelevant, but are vastly less interesting than "why questions," such as why their ancestors came to Vanuatu in the first place.

[5] Unless, of course, one cites such genealogy as conferring authority to speak on a matter of consequence or to receive benefits (e.g., reparations, preferences in hiring or college admissions) not available to others, or some other advantage in one's "social game," in which case, everybody cares.

"Why Questions"

Both "who" and "how questions" have something to offer in helping us answer questions about causes – or "why questions," such as why we rather than some other primate became the unstoppable species. Knowing "who" can help one identify chronologically and geographically unique combinations of natural selection pressures. Knowing "how" can winnow down hypotheses about mechanisms to a plausible core of multiple working hypotheses. The problem paleoanthropologists face in explaining the past is that assertions about "how" are falsifiable (capable of being proven wrong using evidence) in ways that assertions about "who" are not. This makes explanations of the past focusing on "who they were" vulnerable, indeed fragile, in the face of new evidence in ways that explanations focusing on "how they did it" are not.

EXPLAINING THE PAST

Why are we, rather than some other creature, Earth's unstoppable species? Scholars of human evolution have used both narrative and comparative approaches to answer this question. Narrative approaches are as old as the oldest written records, and probably much, much older. Comparative approaches are almost certainly deeply ancestral, too, but they play a smaller and more recent role in prehistoric research.

Narrative Approaches

Historically, paleoanthropologists have framed theories about the origins of human uniqueness using a narrative approach to explanations. These explanations share two important characteristics. First, they arrange observations into linear sequences of causes and effects. Second, they invoke single causes for major changes.

The focus on single causes is both an artifact of history and a result of academic specialization. Early evolutionists, including paleoanthropologists, expressed theories about human prehistory in "anthropogenic narratives," recruiting conventions from traditional folktales, most notably, the "hero's journey" (Landau 1991). Table 1.2 shows the anthropogenic narrative's basic elements by comparing a conjectural evolutionary narrative with the plot of a *Popeye the Sailor* cartoon[6].

Modern-day paleoanthropologists continue to use anthropogenic narratives, probably unconsciously and sometimes invoking more than one donor acting in sequence (as do some hero's journey folktales). Anthropogenic

[6] Originally an American comic strip, *Popeye the Sailor* cartoons debuted in 1933 and endure to this day in syndication on television and in a variety of other popular media.

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TABLE 1.2 *Anthropogenic narratives and hero's journey narratives*

Stage in anthropogenic narrative	Evolutionary narrative	*Popeye the Sailor*
1. Initial situation: Things are stable, unchanging.	Miocene to Pliocene	A boat is at sea.
2. The hero is introduced.	Ape-like ancestors	Popeye appears.
3. Change.	Increasing aridity	Popeye sights land.
4. Departure: The hero's journey begins.	Ancestors leave woodlands for savannas.	On shore leave, Popeye sees Olive Oyl and falls in love.
5. Failed challenge: The hero survives but fails to overcome a challenge.	Carnivores prey on ancestors.	Olive's suitor, Bluto, beats up Popeye.
6. Donor: Something new appears that can change the hero.	Ancestors develop fire, tools, large-scale cooperation, or some other thing.	Popeye eats a can of spinach.
7. Transformation: The hero changes in some important way.	Ancestors become hominins.	Popeye becomes stronger.
8. Challenge again: The same or worse challenge emerges.	Carnivores try to prey on hominins.	Popeye defeats Bluto.
9. Triumph: The hero overcomes the second challenge.	Hominins defeat carnivores.	Popeye and Olive are united in a happy ending.
10. Apocalyptic coda: Something the hero does creates problems.	Hominins turn their antipredator defenses on one another.	Popeye returns to the sea, but Bluto survives.

narrative explanations offer satisfying explanations, but they share the same fragility. New observations can shatter linear chains of causes and effects. Inasmuch as we have the least evidence about the earliest phases of hominin and human evolution, in which anthropogenic narratives root themselves, narrative explanations of events on evolutionary timescales are intrinsically likely to be wrong.[7]

Comparative Approach

This book employs a different, comparative approach. A comparative approach involves the following five steps:

[7] Surprising discoveries overturning all previous knowledge sometimes happen in human origins research, as in science in general, but these are exceptions, among which few live up to the hype initially attached to them. The most useful scientific discoveries arise from prior theory – from patient efforts to test predictions scientists make based on previous knowledge. "Look what I found!" is not prior theory.

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1. Arranging evidence into contrasting pairs of samples, such as evidence from different time periods, different regions, or some combination of time and geography:
2. Identifying the differences between those samples
3. Developing the minimum number of hypotheses necessary to explain those differences
4. Falsifying as many of those hypotheses as one can using available evidence
5. Accepting hypotheses that survive attempts to prove them wrong pending the discovery of new evidence.

Comparative approaches to human evolution are not immune to revision or refutation, but, because they do not propose simple and easily overturned cause-and-effect relationships over time, but rather claims about differences, they are less volatile than narrative explanations. In short, they endure.

The comparative approach this work uses shows that we owe neither our diaspora nor our uniquely evolved unstoppability to any one thing, but instead to how our ancestors employed a suite of survival skills they inherited from earlier hominin ancestors. They had the same skills; they just used them better.

HOW THIS BOOK IS ORGANIZED

If it achieves its best-hoped-for purpose, *The Unstoppable Human Species* will spur its readers to ask different sorts of questions and to think differently about human evolution and prehistory.

Chapter 2 introduces this "hard evidence" for prehistoric movements, dates, fossils, artifacts, and genes. It also discusses the limits of what paleoanthropologists can infer from such evidence. (One thinks of this chapter as an inoculation against the "press-release science" that so afflicts paleoanthropology.)

Chapter 3 reviews *Homo sapiens*' place in primate evolution, the differences between us and other animals, and the nature of differences among living humans. (Spoiler alert: most human-vs.-human differences are evolutionarily trivial.)

Chapter 4 introduces "survival archaeology," a new approach to investigating the "how questions" about prehistoric human population movements (Shea 2020b). It also identifies the suite of ancestral survival skills earlier humans used, illustrating them with examples from contemporary times.

Chapter 5 reviews evidence for behavioral differences between Ancient Africans (*Homo sapiens*) and their immediate evolutionary precursor, *Homo heidelbergensis*. The crucial behavioral innovations that accompany our species beyond Africa include watercraft, complex projectile weapons, and symbolic artifacts ("boats, bows, and beads").

Humans first appear outside Africa in Southwest Asia before 80,000 years ago. Settling the East Mediterranean Levant, the Arabian Peninsula, and the Indian subcontinent appears to have required few major changes to human survival strategies. Indeed, parts of South and Southwest Asia might have been part of the larger Afro-Asiatic region in which early *Homo sapiens* originated.

Chapter 7 focuses on human settlement in Sunda (a peninsula formed when low sea levels conjoined mainland Southeast Asia to the islands that make up the Indo-Malaysian archipelago) and Sahul (New Guinea, Australia, and Tasmania, also joined by low sea levels). The chapter considers what effect, if any, the eruption of the Mount Toba (Indonesia) supervolcano around 75,000 years ago had on humans living in these regions. The answer, it turns out, is surprisingly little.

Beginning around 45,000 years ago, humans moved northward over the Alpine and Himalayan mountain ranges into Northern Eurasia. This region's cold "Mammoth Steppe" habitats posed novel survival challenges. So that we can better understand how these "Early Eurasian" humans dealt with these cold habitats (Chapter 9), the preceding Chapter 8 reviews the earlier Neanderthal adaptations to them.

Chapter 10 examines the evidence for the peopling of the Americas. During the peak of the last glaciation around 20,000 years ago (or possibly slightly earlier), humans crossed into the Americas, moving southward and eastward with breathtaking speed. This chapter also considers the "mass extinctions" that swept the Americas around this time and their possible link to a distinctive set of stoneworking traditions, the Clovis phenomenon, for which evidence appears over much of North America.

With Chapter 11, *The Unstoppable Human Species* turns from recent prehistory to migrations. Archaeological evidence for population movements older than 10,000 years ago is consistent with dispersals, but after 10,000 years ago one finds increasingly convincing evidence for migrations. Chapter 11 explains this shift as the result of food production (plant and animal husbandry) and of correlated human population growth. These two changes provided both the incentive for migrations and the means by which to accomplish them. One thinks of those involved in these migrations as "houses, herds, and hoes" people.

Many prehistoric migrations after 10,000 years ago merely rearranged humans on those continents we already occupied. Chapter 12 discusses the migrations to far oceanic islands that were the final step in humanity's global diaspora. It considers evidence for Pleistocene seafaring, but it focuses especially on the peopling of the Pacific Ocean. Beginning around 20,000 years ago, humanity's greatest explorers extended our diaspora to fully one-third of the Earth's surface.

Are we truly unstoppable? An appropriately numbered Chapter 13 considers what could stop us. These include unlikely extinction threats that commonly appear in popular media as well as ones, chillingly real, that do not receive as much attention as they should and, ultimately, must.

A concluding Chapter 14 looks both backward at "how we did it" and forward to what we must do to remain the unstoppable species.

Readers already familiar with the broad outlines of human deep-time prehistory will note that this work uses neither traditional archaeological age-stages (e.g., Lower, Middle, Upper Paleolithic) nor named stone tool industries, other than in passing reference to the history of research. This is not an accidental omission. These terms and concepts add a superfluous level of description to archeologists' observations.[8] They create more problems than they solve, and as this work will show, human origins research is better off without them (see Shea 2017b). Nevertheless, archaeological age-stages are familiar touchstones. Appendix A reviews them very briefly so that readers unfamiliar with these terms will know what they mean if and when they encounter them in the references this work cites.

For readers unfamiliar with the bushcraft/wilderness survival literature survival archaeology uses as a source of hypotheses, Appendix B presents a select list of published introductory works.

Appendix C, "Further Reading," lists selected popular-science books, as well as a few technical works that present up-to-date syntheses of the archaeological and paleontological evidence that individual chapters discuss.

Box 1.1: *Human Morphological and Behavioral Modernity: Their Discontents*

Since the 1980s debates about human distinctiveness have focused on differences between "modern" versus "archaic" humans and "modern" versus "archaic" human behavior. Professional colleagues reading this work may note that, other than in this box, the book does not even mention these terms. This is not an accidental omission. Categorical distinctions such as "archaic" and "modern" needlessly clutter up human origins research. We are better off without them.

Paleontologists involved in "modern human origins" research disagree over just which individual fossils belong to "modern" versus "archaic" humans. Such disagreement is entirely expected. Paleontologists describe hominin fossils using discrete categories ("species" or taxa), but evolution varies continuously. That an unambiguously "archaic" human mother gave birth to an equally unambiguously "modern" human child sometime around 200,000–300,000 years ago seems a scientifically improbable scenario for our species' beginning. Most paleontologists recognize this, and so the controversy about which specific fossil or fossils are "modern" or not really involves little more than "moving the goalposts to improve the

[8] One thinks of archaeologists' complex systematics (frameworks for describing their evidence) as the "archaeology tax," the cost of including them in books for popular audiences or in classes for any but doctoral students.

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Box 1.1: *(cont.)*

score." That is, paleontologists push the limits of what the field considers *Homo sapiens* in order to move said fossil or fossils into prominence as the "oldest modern human." This might seem a cynical view, but one finds it telling that few such "oldest modern human" claims bother to explain why one would expect a new hominin species to arise near wherever the fossil in question was found, and only in that place to the exclusion of others. A tough challenge? Not really. As the astronomer Carl Sagan (1936–1996) put it, "Extraordinary claims require extraordinary evidence." As this work will argue, the difficulty of pinpointing our species' metaphorical "Garden of Eden" may actually provide clues about the more complex processes underlying our evolutionary origins.

Archaeologists' misadventures with "behavioral modernity" are a bit more complicated. Paleoanthropology began in Europe. Most of the behaviors to which behavioral modernity refers are things that distinguish the European archaeological record associated with European humans after 45,000 years ago from that subcontinent's earlier prehistory (Mellars 1989a; Bar-Yosef 2002; Nowell 2010). Lists of "modern human behavior" based on that evidence usually include the following:

- Long-distance (>100 km) movements of stone and other materials
- Labor-intensive stone and bone tool production (prismatic blades, microlithic tools, carved bone implements)
- Specialized big-game hunting
- Complex projectile weapon use (bow and arrow, spear-thrower and dart)
- Systematic use of marine and aquatic resources
- Constructing freestanding architecture
- Use of fire as an engineering tool (ceramics, mastics [glues])
- Symbolic artifact use (mineral pigments, beads, and other personal adornments).

This list includes some clearly problematical behaviors. Using marine resources, for example, presumes the nearby presence of an ocean. Specialized big-game hunting is far more likely to occur in regions with large migrating herds of steppe-dwelling mammals than in, say, an equatorial rain forest. Of the behaviors on these behavioral modernity checklists, many paleoanthropologists agree that symbolic artifact use is the most important (Mellars 1996b; Henshilwood and Marean 2003).

Archaeologists began using this "modernity" metaphor in earnest during the 1980s as fossil discoveries in Africa and Asia increasingly showed first appearance dates for *H. sapiens* much earlier than 45,000 years ago. As an

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Box 1.1: *(cont.)*

analytical construct, behavioral modernity turned out to be very useful. It allowed European paleoanthropologists – the overwhelming majority of whom focused their careers on the European evidence – to retain a central place in human origins research even though it grew increasingly clear that for much of the Pleistocene, Europe was a peripheral backwater. Paleoanthropologists working in Asia and Africa cited evidence of "behavioral modernity" outside Europe to attract attention to their findings abroad (McBrearty and Brooks 2000; Mellars 2007; Stern 2009; Zilhao 2011; Bae et al. 2017).

Current archaeological views about these issues converge on the following four arguments.

1. The suite of behaviors that made humans distinctively "modern" appeared late in human evolution and only among *Homo sapiens*. Historically the older position, it reflects the strong influence early research in Europe had on thought about human evolution more generally (Mellars 1989b; Klein 1992). In Europe, *H. sapiens* fossils appear around 45,000 years ago together with evidence for complex tools, artworks, and activities for which conclusive evidence rarely occurs together with fossils of other hominins. Specifically, it argues that the evidence for human evolution in Europe results from universal patterns in human evolution.
2. The suite of behaviors that made humans distinctively "modern" evolved at or around the time *H. sapiens* fossils first appeared in Africa (McBrearty and Brooks 2000; Willoughby 2007).[9] This position developed around the turn of the 20th to 21st century and reflected growing evidence from Africa and Asia. Those supporting this argument have no problem with "modernity" per se; they simply argue that Africans became "modern" earlier than humans elsewhere.
3. Some among the suite of "modern human behaviors" are more important than others. Specific claims focus on symbolic artifact use (Henshilwood and Marean 2003), complex projectile technology (Shea and Sisk 2010), or a division of labor in subsistence (Stiner 1993; Kuhn and Stiner 2006). Perhaps unsurprisingly, those making these claims emphasize behaviors on which their own research focuses.
4. Because it oversimplifies complex patterns in prehistoric human behavioral variability, the "modern humans/modern human behavior" concept lacks scientific value (Habgood and Franklin 2008; Shea

[9] This first appearance date has been migrating steadily earlier in time over the last decades. It currently hovers around 200,000–300,000 years ago.

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Box 1.1: *(cont.)*

2011a, 2011b; Bae et al. 2017). Currently a minority position in paleoanthropology, this "a plague on all your houses" perspective is gaining traction in the scientific literature.

A simple thought experiment with "alternative history" shows how definitions of behavioral modernity reflect paleoanthropology's European origins. What if prehistoric archaeology arose among 19th-century Polynesians rather than among 19th-century Europeans? Our Polynesian paleoanthropologists' criteria for modern human behavior would almost certainly have included their civilizational high points, such as making ocean-going watercraft; celestial navigation; monumental architecture; domesticating root crops, chicken, and pigs; making feather cloaks; and creating complex tattoos. They might also, understandably, regard prismatic blades, finger-painted cave walls, and specialized big-game harassment as Afro-Eurasian eccentricities of no great evolutionary consequence.

Rather than arguing about who "modern humans" were and what made them modern, this work focuses instead on the behaviors responsible for our living in our global diaspora, the root cause of our evolved unstoppability. It argues that those behaviors arose from our ancestral survival skills.[10] As the name implies, these skills are evolutionarily primitive (ancestral) among hominins in the genus *Homo*. Other now-extinct hominins had these ancestral survival skills, too, but our ancestors used them differently than other hominins did. In evolution, only differences matter.

For thought and discussion: Using the checklist by which European archaeologists identify "modern human behavior," are you a modern human? Are they? Can you devise a list of such behaviors that include all living humans and that exclude evidence associated with all fossils other than those paleontologists assign to *H. sapiens*?

[10] And, no, we shall not be using an acronym for ancestral survival skills.

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