CHAPTER 1

The worlds of deep human history

Going up that river was like travelling back to the earliest beginnings of the world.

Joseph Conrad, *Heart of Darkness*, 1902

Humans Reunited

The prospect of gold had brought them into the mountains. They were pioneers in an unexplored land, and at the end of a day's steep climb, a large fertile valley lay before them. That night the well-armed party of seventeen men grew apprehensive as they saw fires in the far distance. The next day, they met many people who carried stone axes.

This story of encounter could have happened anytime and in many places during the last 600 years. The prospectors could have been Portuguese adventurers, Spanish soldiers, English sailors, Dutch spice-merchants, French trappers, Russian whalers, Danish fishermen, Argentine ranchers or Brazilian loggers. But this was 1930 in the Bismarck ranges of Papua New Guinea (Connolly and Anderson 1988).[1] The two Australian prospectors and their fifteen New Guinean carriers had an official permit to be there. Moreover, they expected to make contact with new people. To help their safe passage, they had brought supplies of trade axes and glass beads. What their leader, Mick Leahy, had not expected were the numbers of people living in the mountains of New Guinea. His small patrol had stumbled across more than a million Highlanders.

This first contact eighty years ago saw two histories moving over and under each other like continental plates: colonial expansion and tribal

[1] Subsequent patrols by Leahy and his brothers took cameras providing a full record of this human reunion.

management, fortunes in gold and wealth in shells, rifles and spears, steel and stone axes, cloth shorts and loincloths, sun hats and feather headdresses. But for all the outward differences in ideology and technology, as well as the skin contrast between northern white and tropical black, this was a reunion. Both sides of the encounter shared a common origin in a seed population of Africans that some 60,000 years ago (60ka) began the process of expansion which settled the whole world. Adaptations to local conditions followed as new habitats were encountered, while the tiny numbers, peripatetic lifestyles and frequent separation intensified a variety of micro-genetic changes. These small differences from a remote time contain an account of humanity's common foundation. The evidence is accessible through archaeological, genetic and palaeoanthropological[2] enquiry framed by environmental and climatic data from quaternary science. Together these approaches identify a deep history of geographical expansion that demands interpretation.[3]

Enter the Hominins

But there is still an older, deeper history which forms the context for both these historically documented first contacts and the earlier expansion of Africans. The starting point, however, is very different. The people involved were not humans but *hominins*, a grouping that includes ourselves (humans) and all our extinct ancestors such as the African australopithecines and Eurasian Neanderthals. Yet another taxonomic grouping, the *hominids*, sweeps up humans and hominins together with the African and Asian great apes. Then the *anthropoids* add in Old and New World monkeys such as baboons, vervets and capuchins and their fossil ancestors.

The hominins, like the hominids, inhabited only the Old World. To be more precise, they were restricted for more than three million years to particular parts of the continents of Africa, Asia and its European arm. In contrast to the African expansion starting 60ka, these hominins were bounded by a reluctance to cross water and climb mountains. They were also more sensitive to the effects of longitude, latitude, rainfall and

[2] Palaeoanthropology combines several fields but is used throughout this book as a synonym for human palaeontology, the study of hominin fossil remains.

[3] Throughout this book, I use deep history in preference to prehistory. I take the view that everything about the human past is history.

temperature on growing seasons and the abundance of food. When two species of hominins encountered each other, as is probable, they were distinguished less by what they carried – infants, spears and stone tools for the most part – and more by either the size of their brains or the complexity of their social lives. And during this long period of change and evolution, those brains and social lives were steadily increasing in size and scale. As archaeologist John Gowlett (2010: 357) puts it, there is an eternal triangle in human evolution, and its three points are diet change, detailed environmental knowledge and social collaboration. Some advances, such as fire or domestication, changed these relationships, amplifying them in unexpected ways, some of which assisted the expansion of range and dispersal into new lands.

Any enquiry into the deep history of humans is driven by two themes: on the one hand, brain growth, *encephalisation*,[4] and, on the other, an increase in *global settlement*. The former led to brains three times as large as might be expected for a primate of our size – an encephalisation that occurred long before the global expansion initiated by Africans took place. From our perspective, the latter happened surprisingly late in hominin evolution. Before 50ka, about a quarter of the planet was settled by hominins. The remaining three quarters, when judged against the four million years of hominin evolution, was first occupied in about one per cent of that time. The purpose of this book is to examine these two measures of growth and change in deep human history and to ask how they are linked.

The Evolution of Human Imagination

My theme is an archaeological geography of our deep human history that weaves together time, place and change. Archaeology and geography draw on our ability to imagine other worlds and people them accordingly. And it is this most distinctive human capacity – imagination – that I will explore using material and cognitive evidence set in a global framework. Without imagination, there would be no past, no memories beyond the instant reminders of smell, touch, taste, vision and hearing – the triggers of feeling.

[4] Encephalisation is calculated as a measure of brain to body size, expressed as the encephalisation quotient (EQ). Whales have the largest brains for mammals but they have even larger bodies and so a modest EQ. Compared to the body size of chimpanzees, we have an EQ three times the expected size.

While the human imagination relies heavily on the experience of the senses, it has moved beyond the purely experiential to the relational. It has achieved this by making complex connections through symbols and metaphors. The former substitutes signs for meaning, while the latter expresses how we experience one thing in terms of another. This is how a stone hand axe comes to represent an unseen fossil ancestor and, as Joseph Conrad describes in *Heart of Darkness*, how a journey up a remote river retraces our history to its source.

Several imaginative developments occurred in our deep time history. In no particular order, our imagination began to relate to people when they were not present and to behave as if they were. Then, at some point, we came to treat objects in ways similar to people. Such relations created a two-way agency between the animate and inanimate that amazes us so much, we take it for granted. And finally, an evolving human imagination created geographies of other times and spaces: the Garden of Eden, Swift's Lilliput, Coleridge's Xanadu, Alice's Wonderland, Edward Said's Orientalism, James Cameron's Pandora and a shared Palaeolithic past.

These developments provide the springboard to consider the evolution of human imagination, and three closely connected elements form the core of my archaeological geography:

- the timing of global dispersal and expansion, where archaeology and the genetics that underpin a phylogeography of movement provide the insights;
- the growth in brain size, where cognitive science, evolutionary psychology and palaeoanthropology combine to account for encephalisation;
- the changing environments which frame the process of cultural and biological evolution, the preserve of quaternary science and palaeoecology.

The environments are reviewed in Chapters 2 and 3 alongside evolutionary and cognitive models, while the archaeological, genetic and fossil evidence is presented in Chapters 4–8. The evidence available is set out in Box 1.1, and in Chapter 3, I draw attention to the veneers, the data and assumptions derived from the recent past that cover and colour deep history.

The remainder of this introduction is given over to the cartography of hominin settlement and a route map for extended and expanded minds.

Box 1.1. The sources of evidence for deep and shallow human history

There have been four game-changing moments when the archives available for writing deep history raise new possibilities. These archives are found in artefacts, symbols, genes and digital data. They are applicable to different Terrae (Table Box 1.1).

The first, or artefact archive, contains the evidence for the oldest technologies. It begins with simple implements, often stone which then become more complicated so that we find tools which cannot occur in nature: composite implements such as stone projectile points bound to a wooden haft. We also find during the later stages of Terra 2 and throughout the later Terrae further technological innovation based on the concept of containing things and with which we are very familiar because we live in houses, wrap up warmly on a cold day and drive our cars. One aspect of these changing technologies is to give material form to emotions and bodily sensations through the imaginative device of metaphorical substitution. They are social technologies because they rely on making connections, bringing things and people into association, in order to have both a practical effect and an aesthetic affect.

The second change is a symbolic archive marked by the patchy appearance of literacy beginning in Terra 4. For long the preserve of the very few, basic literacy only became widespread in the last 100 years. Today youth and adult literacy – defined as the ability to read, write and understand simple statements about everyday life – varies greatly between countries and by gender. However, the global estimates are that today eighty-two per cent of adults and eighty-eight per cent of those aged between 15 and 24 years can be classed as literate (Dorling, Newman and Barford 2008: maps 229–232). Traditionally, literacy involves symbols to transfer the sense of spoken language to clay, parchment and textile media. The surviving texts are accorded great significance as a means to record history, amplified at different moments by innovations such as paper, printing presses and keyboards.

The third archive is contained within us. Comparative studies of humans, apes and monkeys have been used for more than 200 years and very successfully by nineteenth-century scientists such as Thomas Huxley and his groundbreaking *Man's Place in Nature* (Huxley 1863). The comparative method has always relied on chains of inference, some of them quite long, to argue for common ancestry and shared capacities. By contrast, the genetic archives, a breakthrough of the last forty years, allow us to go directly to the source to establish lineages and historical

(continued)

Box 1.1 *(continued)*

connections. We can study the DNA of living people and learn about the past movements of the populations to which they belong. Also, we can now obtain ancient DNA data from the teeth and bones of fossil ancestors. Those same bones also provide isotopic data on what food they ate and the geology where they were raised. These direct methods shorten the chains of inference about diet and movement that previously depended on analysing animal bones and raw materials.

The fourth and current game-changing archive is digital, its global impact both astonishing and recent through its manifestation as the World Wide Web. Its significance as an historical archive lies in creating new connections rather than merely storing data. In a sense, the web is the projectile point of the twenty-first century. The addition of sound and moving images is a novelty, and no doubt the other senses of taste, touch and smell will shortly be added. Since 1991, when HTML was written by Tim Berners-Lee in a lab in Cerne, Switzerland, new historically based pathways have become not only possible but virtual. On a personal note, this book has been shaped by these digital archives, and the possibilities they afford, in ways that its predecessor, *Timewalkers* (Gamble 1993), could not begin to imagine.

TABLE BOX 1.1. *The historical archives available for the study of global settlement and encephalisation*

Digital	Terra 5	Shallow history
Text, numeracy and writing	Terrae 4–5	
Personal molecular codes	Terrae 3–5	Deep history
Artefacts and materials	Terrae 1–5	
Skeletal and ancient DNA	Terrae 0–5	
Comparative primate studies	Terrae 0–5	

The point about the three new archives – symbolic, genetic and digital – of Terrae 3–5 is that treated incautiously, they cover the remote past with a veneer, disrupting what should be a continuous record of deep history. These veneers are imposed between us and the older worlds we are investigating. They encourage the unhelpful division between a deep history and a shallow history, according a "greater-truth" to the latter because of what is recorded in the symbolic, genetic and digital archives. But as I have argued elsewhere (Gamble 2007), the commonly made distinction between written history and material prehistory is as false as those Neolithic revolutionaries, such as the archaeologist Gordon Childe, who trumpet the historical importance of agricultural societies against all those that went before.

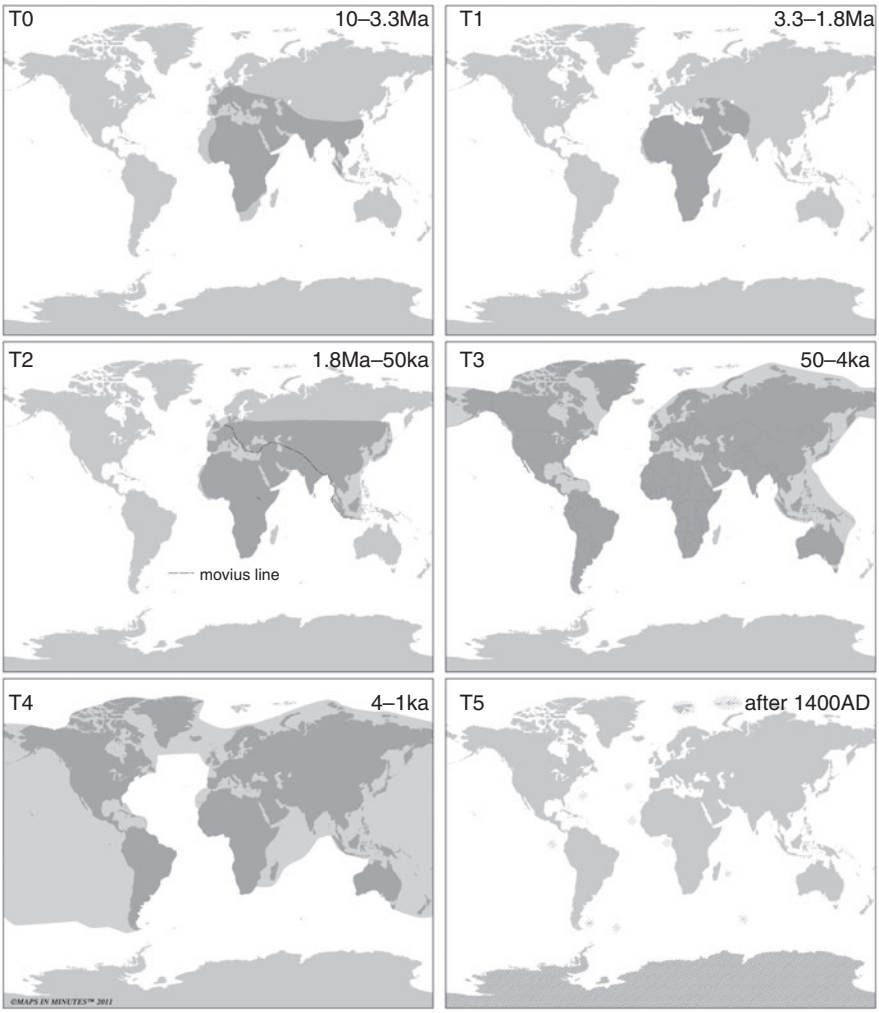

FIGURE 1.1. The six Terrae of hominin global settlement.

The Six Terrae of Deep History

When applied to deep history and the themes of encephalisation and global settlement, our imagination needs boundaries to avoid free fall. Here, I use the changing distribution of archaeological evidence in time and space to distinguish six hominin worlds which collectively I call *Terrae*. Consequently, the boundaries of these six Terrae (Figure 1.1) are drawn by the ages of what has been found, and initially ignore the type of tools their

TABLE 1.1. *The five hominin Terrae*

	Size of Terra compared to present-day land mass 148,647,000 km² (%)	Time from T1–T5 3.3 million years	Duration from T1–T5 (%)
Terra 1	24	1.5Ma	45
Terra 2	44	1.75Ma	53
Terra 3	94	46ka	1.4
Terra 4	95	3ka	0.09
Terra 5	100	600yr	0.02

The current land area of the Earth, whether inhabitable or not, is 150 million km². At times of low sea level, a further 22 million km² became available on the exposed continental shelves. These gains have to be balanced against the continental and mountain glaciations, particularly in the Northern hemisphere. Even at the most equable moments, Terrae would not have been continuously occupied. Rather, their settlement histories express hominin tolerances and preferences to climatic conditions such as temperature and its seasonal fluctuations.

inhabitants made or the shape and size of their skulls. These Terrae are, of course, a snapshot of the current state of research; their boundaries in time and space subject to alteration as new evidence accrues (Tables 1.1 and 1.2). Their purpose is to structure the deep history of a primate that travelled and changed.

Terra 0 10Ma–3.3Ma (Chapter 4 Walking down the evolutionary spine)

This is the world of the Miocene apes, such as the dryopithecines, and the diverse hominids and hominins of the Pliocene that include the australopithecines,[5] the southern apes. The Miocene (23Ma–5.3Ma) began as a period of warmer global temperature with expanded tropical forest habitats across much of the temperate Old World. Fossil apes well adapted to these forest conditions are known from many parts of Africa, southern Asia and Europe. However, after 11Ma, the trend to global cooling sees the reduction of these habitats and the expansion of grasslands.

The key issue in Terra 0 is not encephalisation but bipedalism. The evolution of upright walking marks a significant shift for hominins in habitat

[5] *Dryopithecus* is the Greek for tree ape. *Australopithecus* translates as southern (austral) ape (pithecus) following Raymond Dart's discovery of a fossil child cranium (*Australopithecus africanus*) in the Taung quarry, South Africa, in 1924.

TABLE 1.2. *Geological timescale and hominin Terrae*

Era	Period	Epoch	Division	Age (Ma)	
					T5 <1ka
		Holocene			T4 4ka
				0.01	
			Late		T3 50ka
Cenozoic				0.13	
	Quaternary	Pleistocene	Middle		
				0.78	
			Early		T2 1.8Ma
				2.558	
			Late		T1 3.3Ma
		Pliocene		3.6	
			Early		
	Neogene			**5.3**	
			Late		T0 10Ma
				11.6	
		Miocene	Middle		
				15.9	
			Early		
				23	

and ecology, and had major ramifications for the structure of social groupings. There are hints that this novel, at least for the hominids, form of locomotion takes place towards the end of the Miocene (6Ma), as indicated by the shape of a femur belonging to *Orrorin tugenensis*. In the succeeding Pliocene (5Ma–2.5Ma), the fossil record improves, and 4.4Ma-year-old *Ardipithecus ramidus* from Ethiopia was most certainly bipedal but still retained an arboreal adaptation. Bipedalism in the form of a preserved footprint trail and similar-aged fossil limb bones is known for *Australopithecus afarensis* from Laetoli, Tanzania, from 3.7Ma. Interest also focuses on the transition from an ape diet of fruits and leaves to a hominin diet which includes higher-quality foods such as meat. This shift has ramifications for the size of home ranges from which food is gathered.

To date, all these bipedally competent fossils are exclusively African. However, the evidence is scant, and future discoveries throughout Terra 0 are probable for what seems to have been a highly varied phase of hominid evolution. Finally, close to the boundary with Terra 1 is the australopithecine child from Dikika in Ethiopia. The fossil remains come from the same

sediments as cut-marked bone which may be the oldest evidence at 3.3Ma for stone tools, although the artefacts remain to be discovered.

Terra 1: 3.3Ma–1.8Ma (Chapter 4 Running down the tectonic trail)

Terra 1 is smaller than Terra 0 (Figure 1.1). Its extent is not confined to Africa alone but includes an extension through the northern Rift Valley into Southwest Asia. This link between tectonic activity and hominin distributions is not fortuitous (G. N. Bailey and King 2011). For hominins, these areas presented advantageous broken topography, while the eroding sediments allow palaeoanthropologists to search systematically for artefacts and fossils.

In the geological chronology, Terra 1 sees the transition from the Pliocene to the Pleistocene, a boundary of some precision now fixed by international convention at 2.558Ma. The significance of this change in geological epochs, and a move from the Neogene to the Quaternary period (Table 1.2), is the continuing cooling and drying trend in global climate. The first small polar ice caps appear at this time.

Terra 1 has stone artefacts. The oldest are those from Gona in Ethiopia dated to 2.5Ma (Semaw, Renne, Harris et al. 1997). However, this baseline will probably move back in time, and may already have done so at Dikika. Hominin brain volumes are now above 400 cm^3, a significant threshold, since none of the living great apes, apart from the large-bodied gorilla, exceed this and neither did the Terra 0 hominids.

At least three hominin genera make the grade with attention focussing on the small-brained, less than 900 cm^3, *Homo* who co-exists with the australopithecines. The distribution of their fossil remains and stone tools sets the northern limits of Terra 1.

The body size of these earliest *Homo* is large, leading to an increase in the home ranges for food. This combination of large brains and bodies requires a higher-quality diet with some meat.

Terra 2: 1.8Ma–50ka (Chapter 5 Three strides across a bio-tidal world)

The Old World frames the extent of Terra 2 settlement which lasted for almost 2Ma and is crossed in three great temporal strides: 1.8–0.8Ma, 0.8–0.2Ma and 200–50ka. Terra 2 hominins are predominantly from the genus *Homo*, accompanied up to 1.2Ma by the last of the australopithecines. Early in Terra 2, the next significant threshold in encephalisation is exceeded