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As I said before, humans are a hybrid species, straddling the worlds of biology and culture. So far, we have focused on human biology, because early human cultures, while vital, were so simple, and changed so slowly. But culture would not stay slow and simple forever. Culture has the potential to change very quickly, far more quickly than biology. In fact, cultural change has tended to accelerate during human history, and has long since outpaced biology as the main engine of human change and diversity. In this chapter then, we will zoom inward, to the scale of tens of thousands of years. At this scale, biological change has slowed almost to a constant. Cultural change is now the big story, and is the subject of the next few chapters.

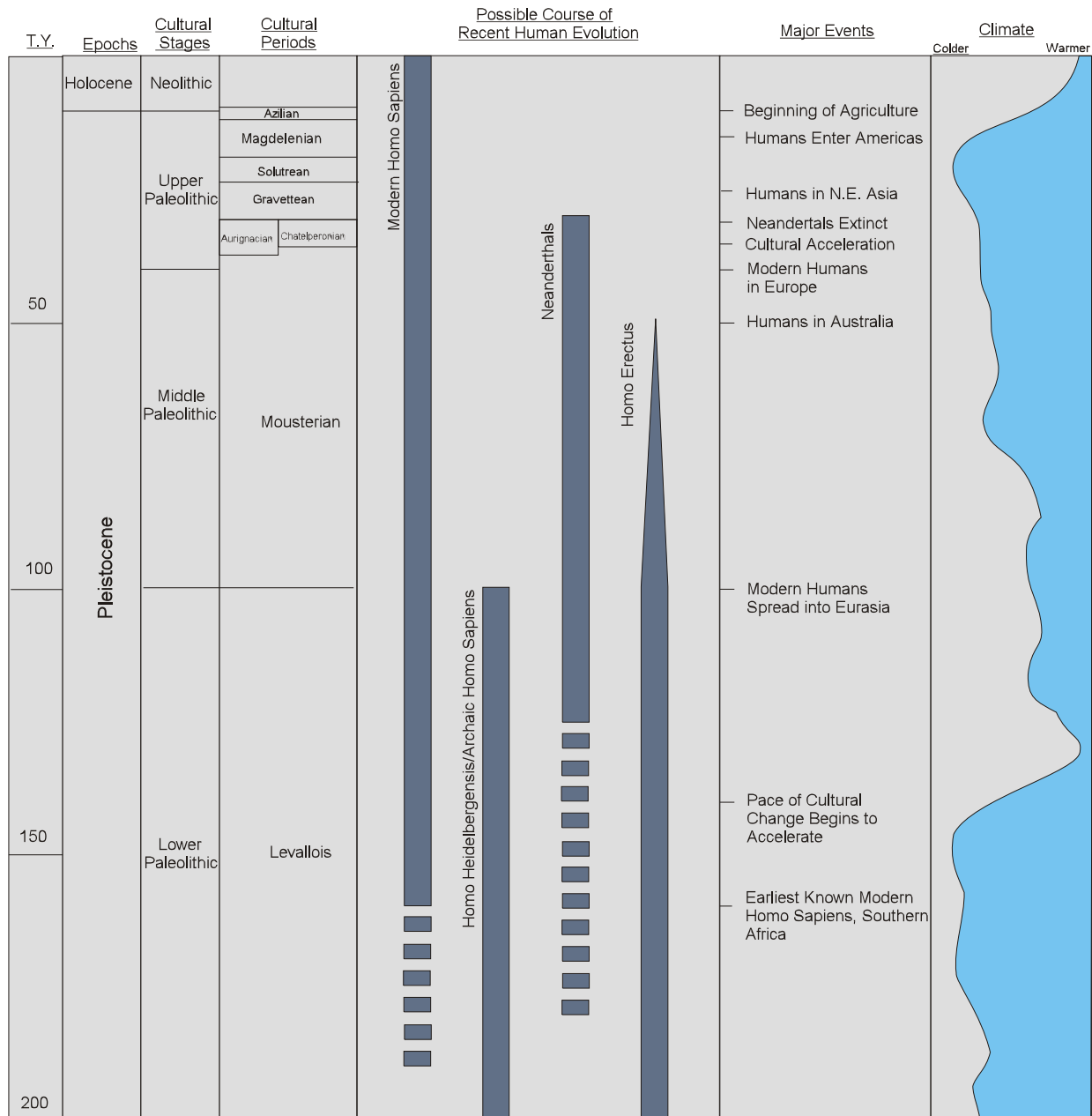
## **THE UPPER PALEOLITHIC**

Figure .1 gives a good look at how culture has accelerated over time. While the Oldowan and Acheulian cultures of the Lower Paleolithic each lasted for over a million years, the Middle Paleolithic Mousterian culture lasted just a little over 50 thousand years. By the beginning of the Upper Paleolithic, between 30 and 40 thousand years ago, cultural change seems to have taken off, with new cultures emerging every few thousand years, each more complex than the last. Whereas tools had been made almost entirely of stone before the upper Paleolithic, suddenly tools of bone, wood, and antler appear in the archaeological record. Art, which had been all but non-existent before, began to flourish. Cave paintings, sculpture, and beads became common.

## **THE EUROPEAN SHOWCASE**

This transition seems to have occurred around the world at roughly the same time, but it is most striking in Europe. This is partly because Europe is the best studied region, with the best known archaeological record. It is worth looking at the Upper Paleolithic period in Europe, to see how the culture of modern humans first began to ignite. Modern humans entered Europe a little less than 40,000 years ago, during a warmer-than-average period in the last glacial cycle. Europe was still a bitterly cold place by current standards, however, and would grow colder until the height of the ice age, roughly 18,000 years ago. The area south of the ice sheets was mostly tundra in the west, giving way to more arid steppes to the east. For the next ten thousand years

Figure .1 Later Human Biological and Cultural Evolution



or so, the Neanderthals and their Mousterian tools would give way to modern humans and their more sophisticated tools.

These Upper Paleolithic tools are often referred to generically as “blade tools”. Like earlier tools, they were based on pieces struck from a larger stone, but by the Upper Paleolithic, these pieces had evolved into long, thin objects resembling knife blades. These “blanks” could be

further worked into various specialized tools, including scrapers, borers, and stone knives with one sharp edge. These specialized stone tools were used to create wood and antler tools, such as barbed spear points, spear throwers, and needles. Needles, in turn, were used to sew fitted leather clothing; vital in this frigid environment. These new cultural forms grew more complex as the Upper Paleolithic progressed, with older cultures giving way to new ones. For the first time, clear regional differences in style begin to appear. The overall impression is of very sophisticated peoples and cultures adapting to different environments in increasingly diverse ways.

The best archeological record from this time comes from caves in southern France and northern Spain. With a moderated maritime climate, this area was one of the most temperate in Europe, and supported the largest populations and the most complex cultures. The people lived mostly on reindeer, though they also hunted everything from small birds and mammals to woolly mammoths and rhinoceroses. In the drier, harsher regions to the east, sparser populations of people moved around more, living in shelters constructed of wood, hide, and in some cases, mammoth bones. Archeological sites from 23 to 25 thousand BCE, in what is now the Czech Republic, have yielded the world's oldest known fired clay figurines, as well as the earliest evidence of woven baskets and textiles.

## **THE FLOWERING OF ART**

One of the main features of the Upper Paleolithic is the emergence of art and adornment, which began to appear around 25,000 BCE from Africa to Australia, and became common around 18,000 BCE. People began to adorn themselves with bone, beads, and probably body paint. They created a wide range of art—from cliff and cave paintings, to figurines and bas-relief sculpture, to ornamental tools. Musical instruments, such as bone flutes, make their first appearance around this time. Here again, Europe has the most complete and spectacular record of Upper Paleolithic art, which appeared around 30,000 years ago and peaked with the Magdalenian culture around 12,000 BCE, at the close of the last glacial cycle. The famous cave paintings of France and Spain feature beautiful images of Pleistocene mammals, including cave bears, lions, woolly rhinoceroses, mammoths, horses, bison, and aurochs (the ancestors of domestic cattle). These caves also feature handprints, careful arrangements of cave bear skulls,

and drawings resembling female genitalia.

A common image in cave paintings, as well as sculpture, is a half-human, half-animal figure Figure .2 (**awaiting permission for image**), for example, shows a mammoth-ivory figurine of a lion-headed man. Dating from 30,000 BCE, this is one of the oldest pieces of artwork in the world. The hybrid human-animal motif suggests that cave art was produced for shamanistic rituals, intended to connect with or gain strength from the animals being represented. Such rituals have certainly been central in the lives of more recent hunting peoples. Another religious movement may be represented by the “Venus” figurines (Figure .3 **Awaiting permission for image**), which appeared briefly across Europe around 23,000 BCE.

## A CULTURAL EXPLOSION?

Obviously, the upper Paleolithic was a major transition period in human history, not just in Europe, but around the world. The change is so striking, in fact, that it has often been called a “cultural explosion”. It seems to have been a sort of Cambrian Explosion of human culture, inaugurating a new world of complexity and rapid change, just as the Cambrian Explosion had done for the biological world so many years ago. But, like the Cambrian Explosion, the cultural explosion may appear more radical than it really was. The Cambrian Explosion was partly a result of the appearance of hard shells and skeletons, which left far more fossils than earlier, soft-bodied creatures had. Similarly, more recent archaeological artifacts, such as those of the Upper Paleolithic, have had less time to be destroyed by natural processes than older ones, so their record is far more complete. This can’t account completely for the cultural explosion, however, because the artifacts show a change in quality and style, not just quantity. Another thing that might make the cultural explosion look more dramatic is that older, transitional forms have not yet been found. However, more are found all the time. In fact, the more archaeologists investigate, the more they find that the cultural explosion has deep roots in earlier times, and was not quite as revolutionary as was once thought.

Nonetheless, while the Cambrian and cultural explosions may have been less dramatic than they first appeared, both were real, both represented major transitions in the history of the world, and both had mysterious origins. As is the case with the Cambrian Explosion, we don’t quite

know why the cultural explosion happened. There have been many theories, of course. Some have suggested that the cultural explosion was the result of major changes in the human mind. Perhaps our brains first assumed their current structure at that time. But since brains don't fossilize, this is a tough idea to test. A related idea, suggest by the cognitive archaeologist Stephen Mithen, is that the human mind became more flexible in the Upper Paleolithic. Mithen believes that early human minds were compartmentalized into separate, specialized domains. Natural history intelligence, for example, was entirely separate from social intelligence. Mithen suggests that these domains began to merge during the cultural explosion, resulting in a far more flexible mind with a much greater capacity for creativity. Others have suggested that the cultural explosion was due to the first appearance of language, or perhaps a mutation which suddenly improved our capacity for language. In fact, some genes are strongly associated with language ability. Perhaps one of these genes appeared at that time, and the sudden improvement in communication allowed a cross-fertilization of ideas that had never been possible before.

There are good arguments in favor of each of these ideas. But there are also problems. The biggest one is that humans had already dispersed across much of the globe by the time of the cultural explosion. This means that a single, catalytic change, such as a mutation or a new cultural innovation, would not be expected to have reached every human population. For example, every human culture, no matter how isolated, has language. This strongly suggests that language predates the diaspora of modern humans, which began long before the cultural explosion. If language began in one place afterward, and then spread—either by genetic or cultural transmission—it is very unlikely that it would have spread to every single culture on Earth. Similar arguments apply to changes in the human mind. If such changes were due to new genetic or cultural forms, then we would expect to find populations that these forms never reached. Such people have never been found.

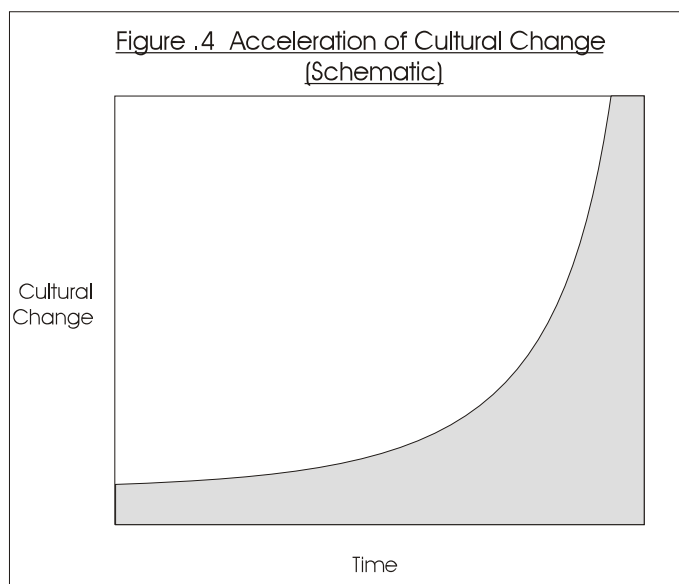
A different explanation of the cultural explosion, one that I personally prefer, is that it is simply a point at which the long term acceleration of culture began to accelerate even faster. Culture is a self-reinforcing process, in more ways than one, and self-reinforcing things tend to change at an accelerating rate. First of all, new cultural innovations can foster further innovations. The computer, for example, is an invention that has greatly accelerated the rate at which other inventions appear, because it helps with so many aspects of modern, technological

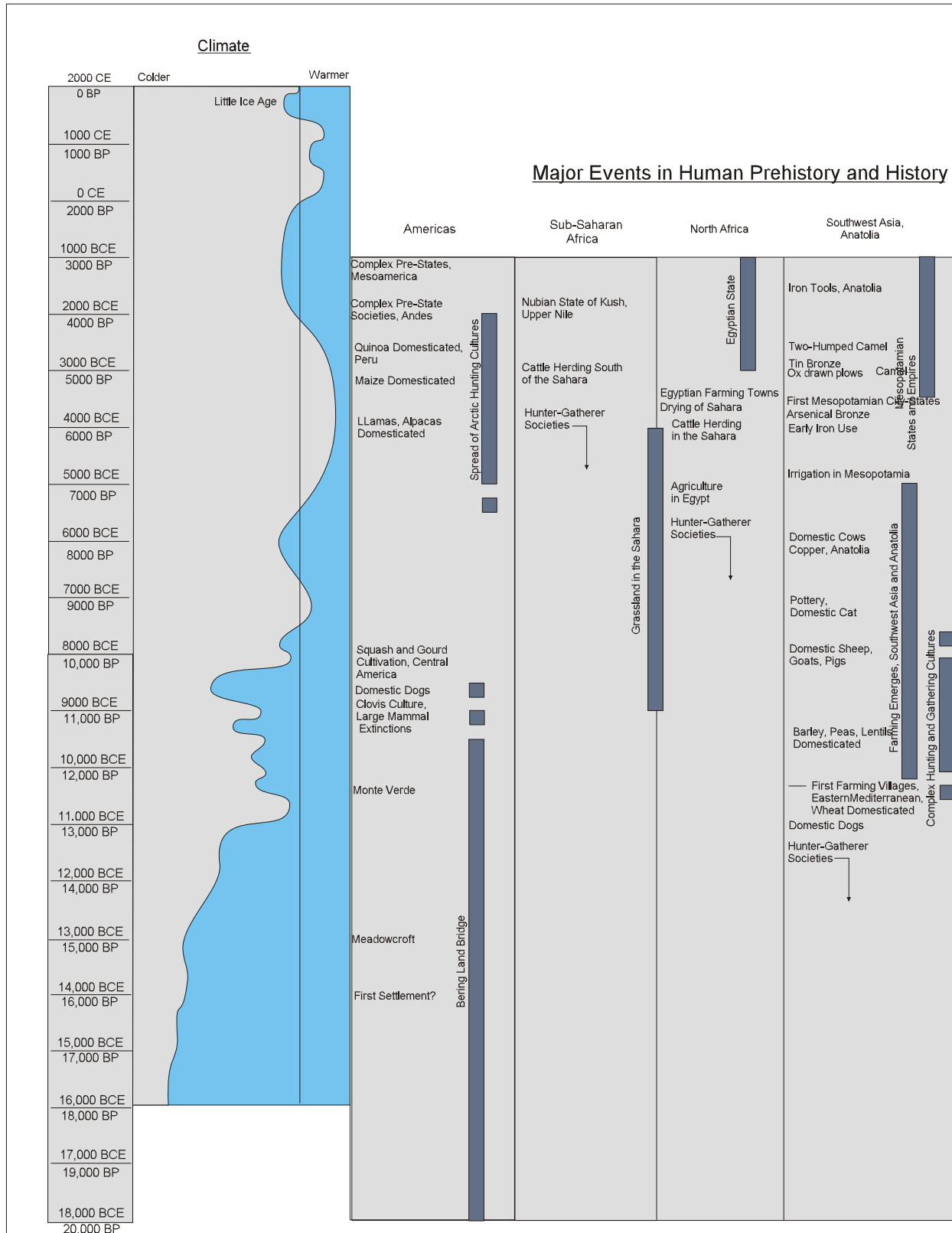
innovation, from performing calculations, to drafting plans, to testing virtual models, to communicating quickly with others. It is a sort of meta-innovation, which fosters further innovations. The blade technology of the Upper Paleolithic was another meta-innovation, because it seems to have initiated its own cascade of innovations, from bone tools to sewed clothing. The presence of such “meta-innovations” means that the more innovations accumulate, the more quickly *further* innovations will accumulate. The snowball gets larger and faster the further it rolls.

Culture also reinforces itself in other ways. The effect is stronger if populations are large, because more heads mean more potential for new ideas. Communication and trade—the exchange of ideas and products—are also catalysts for cultural acceleration, because the more quickly new things diffuse to other areas, the sooner they can inspire further innovations. Changing environments are also catalysts, because new situations require new ways of dealing with them. Finally, new ideas and ways of thinking can “upgrade” our minds, allowing us to imagine and invent new things.

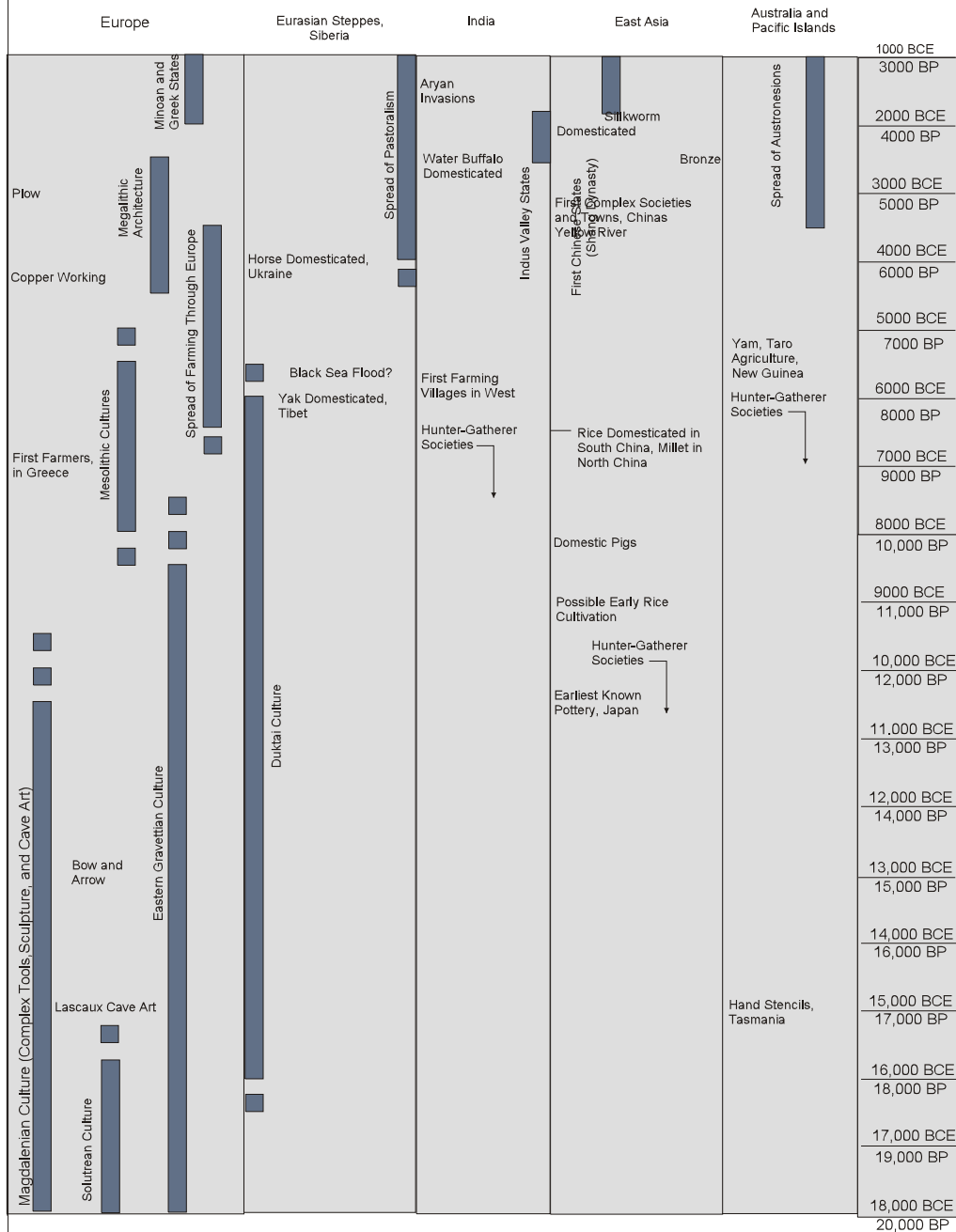
All these things make culture a self-reinforcing process, and like many self-reinforcing processes, it grows exponentially, following a characteristic curve, similar to Figure .4. Exponential growth starts slowly, but it increases all the time, until it reaches an inflection point, after which it starts to shoot through the roof. Perhaps the cultural explosion was simply the inflection point in the exponential growth of human culture. If this is true, then the biological and linguistic capacities of the first modern humans might have been the same as our own. Perhaps they were born with minds just like ours. The only difference is that we have a far wider selection of cultural ideas and values to furnish our minds with. And what a difference that makes.

Whether this is the correct explanation or not, the Upper Paleolithic did have many characteristics that would have fostered acceleration. First, it





From 18000 BCE to 1000 BCE



occurred at just about the time that humans had first occupied most of the globe. For the first time, people weren't as free to simply pick up and move when they wanted, because many other areas were already claimed. They stayed put a bit more, and in productive areas, their population grew, which added more heads to come up with more ideas. Trade began to emerge, and commodities such as amber and obsidian began to be traded over large areas. Ideas would have been exchanged as well, and culture would have accelerated further. But whatever caused the Upper Paleolithic explosion, its bang signified a beginning, not an end. Afterward, the pace of change would accelerate further, as we shall see.

## **RETREATING GLACIERS, ADVANCING CULTURES**

### **MESOLITHIC CULTURES**

The last glacial cycle reached its peak around 18,000 years ago (16,000 BCE), and then the world began to warm up, moving toward one of its warm interglacial periods (Figure .5). The glaciers began to retreat northward and back into the mountains, and sea levels began to rise. Vegetation zones began to shift to the north. Ice was replaced by tundra, which in turn was replaced by coniferous forests and grasslands. By 10,500 BCE, the climate was almost as warm as it is today. Then, abruptly, the climate turned cold again in the so called Younger Dryas event, which lasted from to . During this time, climate and sea levels fluctuated wildly, often changing dramatically in as little as a decade. By around 9,500 BCE, however, the climate had more or less stabilized, and its fluctuations have been relatively gentle ever since. The Pleistocene Epoch had given way to the Holocene.

As early as 13,000 BCE, the changing climate had begun to transform human societies around the world. Upper Paleolithic cultures like the Magdalenian and the East Gravettian began to fade away, replaced by very different Mesolithic cultures. These were adapted to the greater biological productivity of warmer climates, as well as to the environmental variation of the early Holocene. Populations had grown, the world was growing more crowded, and many Mesolithic peoples became more settled than their Paleolithic predecessors. Many began to accumulate more possessions. Some mesolithic graves are more richly decorated than others, suggesting that

differences in status and wealth were beginning to emerge, especially in naturally productive areas. Because people were less mobile, they made more intensive use of local foods, such as fish and shellfish, nuts, small animals, and wild grains. They became more concerned with storing reserves of food, probably in response to the uncertainty of the environment. Their tools became lighter and more sophisticated, often based on tiny slivers of stone called microliths. The bow and arrow seem to have come into wide use around this time. All in all, mesolithic cultures were more settled, more variable, more sophisticated, and more hierarchical than those that had gone before.

## THE NATUFIANS

A good example of Mesolithic people comes from the eastern Mediterranean. Around 11,000 BCE, the warming climate was making this region more biologically diverse and productive, pushing it toward the moderate Mediterranean climate of today. A people now called Natufians began to adapt to this environment. They lived on nuts such as almonds, acorns, and pistachios; wild cereals such as emmer wheat and barley; and animals, especially wild gazelles. They developed tools for processing wild grains, including grinders, sickles, and storage bins. Their intensive foraging was quite productive, and they began to settle down, spending part of their time in more or less permanent villages of a few families. Populations grew, and graves show clear differences in status.

Around 10,500 B.C.E, the climate grew colder and drier, and wild plants became less productive. In response, Natufians and other peoples of the area began to deliberately plant wheat, barley, and rye. They would have known quite well how to do this before, but until the climate changed, they had not needed to. Before long, selective planting had changed the character of the grasses they were planting, making their seed heads larger and less brittle. As early as 10,000 B.C.E, these grasses may have been **domesticated**—genetically altered by human cultivation. Harvests became larger, and so did human populations. Deliberate cultivation had begun as way of supplementing wild foods, especially during lean times. But the population soon grew too large to live on wild foods, even when the climate was good. There was no way back. The Natufians and their neighbors of the eastern Mediterranean were the first people in the world to make the fateful transition from hunting and gathering to agriculture.

## AGRICULTURE

### THE CONSEQUENCES OF CULTIVATION

The example of the peoples of the eastern Mediterranean illustrates a central fact about the emergence of agriculture—it develops only partly as a conscious choice. Of course, the decision to cultivate certain plants—first by clearing ground to give them room to grow, and then by deliberately planting them—was perfectly conscious. The people doing these things knew perfectly well what they were doing, at least in the short term, which was expanding the supply and reliability of food. What they did not realize were the long term effects of these practices. For one thing, they did not realize that they were transforming the plants that they were cultivating.

### DOMESTICATION

The deliberate cultivation of wild plants was only the first step in the emergence of agriculture. The transition was complete only when the crops they were cultivating, and a little later, the animals they were hunting, were domesticated. A domesticated plant or animal is physically different from its wild ancestors, often in ways that make it better suited for human use. It has more of what we like, and less of what we don't. The edible parts of domestic plants, for example, are larger and more easily harvested, as we saw with the cereal grasses domesticated in the eastern Mediterranean. At the same time, domestic plants are less likely to have thorns or other irritants. Many domestic plants, such as the almond, have poisonous ancestors, which had to be processed intensively before they could be eaten. Domestic animals have been transformed according to the same principles. Domestic sheep have more wool, smaller horns, and less attitude than their wild ancestors.

When the first plants and animals were domesticated, the process was at least partly inadvertent. This is well-documented with the first domestic cereal grasses. Wild wheat, for example, has a very brittle seed head, which shatters to release narrow, barbed seeds, which work their way into the ground. Occasionally, however, a mutant shows up with tougher seed heads that do not shatter. When wheat is harvested with a sickle, these stay intact, which means they

will be over-represented among the harvested seeds. When the next crop is planted, there will be more of the tougher seed heads, which would soon compose the entire crop. Of course, early farmers weren't completely oblivious to what they were doing. They probably saved the biggest seeds to plant, knowing that like begets like. They just didn't realize that in a few generations they would entirely transform their crops, and their animals, to their purposes.

Actually, one way of looking at domestication is that plants and animals domesticated themselves, as a form of adaptation. Those that are better suited to human use are favored by humans, which allows them to reproduce better than other types. The plants that have the biggest and tastiest fruits, nuts, seeds, or roots are carefully tended, and selectively planted. The wooliest sheep and the beefiest cows are the ones chosen to have the most offspring. It may seem like a paradox, but most domesticated species have found the adaptive niche of being eaten by humans. This is adaptive because domestic species have great reproductive fitness. The fact that individuals are usually eaten is, in evolutionary terms, beside the point. Evolution only favors individual well-being to the extent that this aids in reproductive fitness. Seen from this perspective, that of the domesticated species, the process of domestication is entirely unconscious. It's not that animals made a decision to be domesticated. The selection of their genes over generations made the decision for them, whether they liked it or not.

## SOCIAL COMPLEXITY: FOR BETTER AND FOR WORSE

Domestication is just one of the long-term consequences of the deliberate raising of plants and animals that its first practitioners would not have guessed at. The emergence of agriculture would be one of the most momentous transitions in the history of the world, because it transformed the societies that adopted it. Agriculture allows a great deal of food to be produced in a relatively small area. This encourages large populations and low mobility. Agricultural societies became larger, and more densely populated. They also became, at first, less healthy. The first farmers had to work much harder than their hunting and gathering ancestors for a less varied and nutritious diet. The dense settlements encouraged diseases, many of which seem to have crossed over to humans from domestic animals.

As settlements grew, they became more complex and hierarchical. Innovations in farming

techniques allowed fewer people to produce more food. This meant that not everyone had to work in the fields. Some became specialized craftspeople. Other social divisions appeared, as social classes began to emerge. Roughly speaking, as agriculture became more productive, human societies became more complex. Their organization passed from the ancient style of hunting and gathering bands to more complex forms. These often take on certain characteristics, which allows anthropologists to classify them into three types, in order of increasing complexity- **tribes**, **chiefdoms**, and **states**. These divisions are somewhat controversial, partly because there are no hard and fast divisions between each category, and partly because of the old “classification implies ranking” fear. Some people object that such categories imply a ranking in terms of value- that chiefdoms are being touted as more “advanced” or “better” than bands, for example. But they need not imply any such thing. More complex does not mean better. Indeed, for most members of such groups, it can be worse. Also, while most states evolved from chiefdoms, and most chiefdoms evolved from tribes, this does not mean that all human societies would follow this progression if given enough time. In some parts of the world, tribes have been the most stable form, in other parts, states have.

### *TRIBES*

The first permanent agricultural villages, wherever they occurred throughout the world, represented a major change in human social organization, from bands to tribes. While bands seldom number more than 100 people, tribes may have a few thousand people, scattered out in small groups, each with a few hundred people. These groups consider themselves part of the same tribal group, because they group themselves into clans, based on common ancestry. This kind of organization is usually associated with simple, settled agricultural societies, because these are the most common types of tribal peoples. But the first tribal organizations formed among hunter-gatherers living in rich environments, often in places where they could rely on seafood. Such peoples have existed in Japan and the west coasts of North and South America. Tribes are usually, but not necessarily, agricultural. They are also usually, but not necessarily, settled. Many nomadic pastoralist societies had a tribal organization. Basically, tribal societies seem to arise when populations become larger than hunter-gather bands, because of access to more plentiful or

reliable resources, either crops, abundant fish, or herd animals.

Mobile hunter-gatherer bands and nomadic pastoralists have to travel light, which means that every aspect of their lives must be portable. They live in temporary shelters and accumulate few possessions. Settled tribal cultures, on the other hand, develop a more imbedded, permanent style. They live in huts or houses meant to last for years, and fill them with furniture, heavy tools and decorations, and children, none of which band-level societies can afford to have in large amounts. Tribal villagers express their religious beliefs with permanent shrines, sometimes to their ancestors, whom they bury in permanent cemeteries. Tribal societies are much more complex than band-level societies. Still, any distinctions in status tend to be relatively minor. They tend to be governed by charismatic leaders and religious elders, but neither of these hold hereditary, formal offices. When this happens, tribes begin to give way to chiefdoms, much larger, more complex, and with far greater social distinctions.

### *CHIEFDOMS*

Chiefdoms may number from a few thousand to around 20,000 people. They usually form when a leader of one clan or tribe gains control over others, and set themselves up as a ruler—a chief. These rulers collect tribute from subordinate tribes and the general population, which they redistribute as they see fit. More often than not, they see fit to keep a great deal for themselves, using their wealth for impressive houses and ceremonial clothing. Many throw spectacular feasts for their subordinates, intended to demonstrate generosity as well as wealth and power. Chiefs, and members of their clan, distinguish themselves sharply from others. Commoners may avert their eyes or make submissive gestures when the chief's entourage passes by. When they die, chiefs pass their position to their offspring. In many chiefdoms in the past, servants were sacrificed at the chief's death, and placed in graves along with other chiefly possessions.

The emergence of chiefdoms represents the beginning of a longstanding conflict within human societies. Once human settlements reached a certain size and complexity, they began to require some degree of top-down organization and planning to prevent chaos. Some executive element had to arise, and chiefs were the original top-down overseers of human societies. Societal complexity, with all its pros and cons, could not have arisen without such oversight.

However, these chiefs were not generally in it simply to bestow order. They were also in it to gain power, wealth, and privilege for themselves, their families, and their friends. They functioned as leaders, but they also functioned as plunderers, growing rich off of the work of others. Of course, some were closer to the leader end of the spectrum, and some closer to the plunderer end, but very seldom have leaders of human societies been entirely selfless. And this is not surprising. In a band or a tribe, each person is connected to most others by kinship, marriage, or friendship. In a chiefdom or larger grouping, many people will be absolute strangers to each other, and feel no particular obligation to treat each other well. This was true for the first chiefs to attain control of such large groups—they had attained control over thousands of strangers, whose welfare was not always first in their mind. So, they tried to strike a balance, between bestowing order among, and exploiting, those under their control. There have been many elaborations on this system since then, but no one can deny that both faces of government are still with us.

### *STATES*

Societies more complex than chiefdoms are called states. States are larger, with more formal, permanent government institutions; such as laws, armies, and bureaucracies. Government is often centered in cities, which are a key feature of states. States have sharp social distinctions—vertical distinctions between classes, and horizontal distinctions between those practicing various occupations. Today, most of the globe is carved into states, some of which, such as China and India, have over a billion people. But states have evolved a great deal over time. The first small states were strikingly similar to one another. They arose in highly productive areas, often based on very intensive agriculture. Early states were centered around cities of over 20,000 people. These cities were full of specialized craftspeople, officials, priests, and warriors, though the vast majority of people were peasants who worked in the fields, producing the surpluses on which the urban folk lived. At first, states were ruled by priests, who were able to bind great numbers of people together with new religions. When the people weren't working in the fields, they were often put to work on huge religious monuments, such as the pyramids of Egypt and Mesoamerica, or the Ziggurats of Mesopotamia. The priests had discovered the power of symbols in controlling people; a lesson future rulers would never forget.

Over time, as states began to grow and compete with each other, as well as against simpler societies who learned to raid them, warriors began to rule alongside the priests.

## THE SPREAD OF AGRICULTURE

Agriculture, and the complex, state-level societies that it allowed, emerged independently in different places, and at different times. As Figure .6 (**awaiting permission for image**) shows, agriculture seems to have emerged independently in the Near East, China, Mesoamerica (in what is now Mexico), eastern North America, and the Andes. It may have also arisen independently south of the Sahara, in the Ethiopian highlands, and in the Amazon. Once agricultural techniques and domestic animals made their appearance in most of these places, they began to spread. This occurred partly through cultural diffusion, as hunter gatherers adopted the animals and practices of neighboring farmers. Oftentimes, they would start farming with imported domesticates, and then domesticate other species on their own. However, most hunter gatherers probably would not have chosen farming unless they had to. Some may have adopted it to feed growing populations, or to guard against lean times, and then gotten locked in the way the first farmers had.

Oftentimes, farming spread through migration, as growing populations of farmers expanded into the territories of hunter gatherers. Sometimes the two would occupy different environments, and thus share the same regions. Other times, the farmers, with their more sophisticated cultures and greater numbers, would displace hunter-gatherers altogether. In many cases, farmers would spread their languages over wide areas. Figure .7 (**Awaiting permission for image**) shows the language families of the world just before the age of European colonization. We will refer back to this map, to see how many of the families, especially in the Old World, were spread far and wide by early farmers. The spread of agriculture was a complex process, but after a few thousand years, most of the world's people had come to rely on agriculture. Now let's take a closer look at how this happened in various regions.

## THE MIDDLE EAST

As we have seen, the world's first known farmers lived along the eastern Mediterranean, around 10,000 BCE. Over the next couple of thousand years, people took up settled farming in the area shown in Figure .8 (**awaiting permission for image**). The area from the eastern Mediterranean, across the upper Tigris and Euphrates rivers, through the highlands northeast of the Tigris, is known as the **Fertile Crescent**. This, as well as a strip of land extending into Anatolia (Turkey), is where the first known farmers lived. Farmers may have existed even earlier along the lowlands of the Tigris and Euphrates rivers, but it is hard to tell because evidence would now be buried under deep layers of alluvial soil from the rivers. In any case, farming seems to have spread across this region partly through diffusion, and partly through independent innovation. Barley, wheat, peas, and lentils were domesticated before 9,000 BCE, by which time small villages had begun to spring up throughout the region. At first, people in these villages hunted wild gazelles, but they gradually switched to sheep and goats, and in Anatolia, pigs, all of which were domesticated by 8000 BCE. Tools of chipped obsidian were replaced to some extent by tools of ground, hard stone, marking the transition from the Mesolithic to the Neolithic.

Many Neolithic villagers lived in connected, one-room houses made of dried mud, the remains of which can still be found at the sites of larger villages. The most famous of these is Jericho, a walled town of a few hundred people, founded on a fertile plain near a large spring. The agricultural people of Jericho developed religions very different from those of the Upper Paleolithic hunter-gatherers. They would sculpt plaster faces on the skulls of their dead, perhaps as part of ancestor worship rituals. Trade became important between villages throughout the region, and some towns prospered by dealing in certain goods. One of the more prosperous was Çatalhöyük in Anatolia, located near a good source of obsidian. The inhabitants of Çatalhöyük built shrines decorated with bull horns and images of women and birth. A few richly adorned burials suggest that Çatalhöyük's wealth was not distributed equally. Still, Neolithic villages seem to have been extremely egalitarian by later standards.

#### SURROUNDING REGIONS: EUROPE, NORTH AFRICA, AND SOUTH ASIA

Between 5,000 and 7,000 BCE, farming began to spread west into Europe, east across the Iranian Plateau toward India, and south into north Africa. This happened through some

combination of diffusion, independent innovation, and migration. Naturally, people disagree on which process was the most important. Many archaeologists favor the first two, while some linguists and geneticists favor migration. In fact, there is linguistic and genetic evidence that farmers themselves migrated out of the near east, and into these other lands.

Consider the case of Europe. The Basque people of the Pyrenees are genetically and linguistically distinct from other Europeans. All other European languages, except for a couple of historical arrivals, belong to the Indo-European language family. The Basque language, on the other hand, is not known to be related to any other. Some have suggested that farmers from Anatolia colonized Europe, displacing the native hunter gatherers in some places, and intermarrying with them in others. Their languages, which may have been early Indo-European languages, were adopted throughout Europe, except in the isolated Basque region. If this is true, then the Basques are the modern people who most resemble Upper Paleolithic peoples, in genetics as well as language. But this theory is hotly contested. In any case, agriculture arrived in Greece by 7,000 BCE, and had spread through the British Isles and southern Scandinavia by 3,500 BCE.

Similar arguments about migration suggest that other peoples expanded out of the Middle East, spreading their languages and cultures as they went. The Afro-Asiatic language family, which includes Semitic languages such as Hebrew and Arabic, may have spread from the eastern Mediterranean through North Africa and Arabia. The Dravidian language family is suggested to have originated in the eastern part of the fertile crescent, spreading as far as India. Today, Dravidian languages are spoken in southern India, and in a small pocket between Pakistan and Afghanistan. However, the Elam language of the area west of Mesopotamia, spoken until 2,000 years ago, was Dravidian. Dravidian languages, then, once stretched from the Persian Gulf to southern India. Later, many of these areas were occupied by Indo-European speakers, leaving only pockets of Dravidian outside of India. Of course, whether the Afro-Asiatic and Dravidian languages were first spread by migrating farmers is not clear. What is clear is that agriculture was well established along the Nile by 5,000 BCE, and along the Indus by 4,000 BCE. Both rivers, as well as the Tigris and Euphrates, would be the sites of early states.

## AGRICULTURE IN CHINA: A TALE OF TWO RIVERS

River valleys on the other side of Asia were the sites of an independent emergence of farming, which would one day provide the basis for Chinese state societies. Rice was domesticated along the Yangtze river of southern China, while millet was domesticated along the Huanghe, or Yellow, river in the north. Exactly when either process happened is hard to say. There is ambiguous evidence for rice cultivation as early as 9,200 BCE, in caves along the Yangtze. People seem to have intensely foraged wild grasses, if not domesticated them, as early as 12,000 BCE in northern China. However, the earliest certain evidence of domesticated rice and millet dates to around 6,500 BCE, coinciding with a slight cold snap in the world's climate. Perhaps people knew how to cultivate wild plants long before then, but never had to rely on it until the climate turned. In any case, farming villages were widespread by 6,500 BCE, along both rivers. After 4,800 BCE, the expanding Yangshao culture of the north had clear characteristics of later Chinese culture. By 3000 BCE, clear social distinctions had begun to appear across China, as societies became more complex. The Longshanoid culture, which appeared in the north around this time, would be a major foundation of the Chinese culture.

## INTO SOUTHEAST ASIA

Once it got started, agriculture began to spread in east Asia, although high mountains and harsh climates to the north and west meant that it mostly spread to the south—to Southeast Asia, and perhaps eastern India. Rice cultivation had reached Southeast Asia by at least 2,500 BCE, either by diffusion or migration from southern China. Migration and displacement may have been a factor, because many of the languages of Southeast Asia may have originated in south China. In fact, most of the people in Southeast Asia are likely to have originated in south China, displacing the original inhabitants, who, like the remaining Andaman islanders and Negritos of the Malay Peninsula and Sri Lanka, may have resembled the natives of New Guinea and Australia. In China itself, these southern languages become fragmented, because they were overrun by Sino-Tibetan languages from the north, where the first Chinese states emerged.

## AMONG THE ISLANDERS

## *NEW GUINEA*

The only other place in the Old World where agriculture is almost certain to have developed independently is New Guinea. After falling sea levels separated New Guinea and Australia, cultures on the two landmasses went in very different directions. Australia is mostly flat and dry, and the natives there remained hunter-gatherers until Australia began to be colonized by Europeans in the late 18<sup>th</sup> century. New Guinea, on the other hand, is a land of high mountains, with a moist, tropical climate; much more biologically diverse and productive than Australia. The New Guineans were growing yams, and taro, another root crop, by 4000 BCE, and possibly as early as 7000 BCE. New Guinean farmers cleared forests, dug irrigation ditches, and settled in villages. Their early adoption of agriculture, combined with the rugged environment, would keep the New Guineans from being overrun by other farmers, as we are about to see.

## *THE AUSTRONESIAN VOYAGERS*

The Austronesian family of languages has an extremely interesting distribution. Of its four sub-families, three are confined to native peoples of Taiwan. The fourth, Malayo-Polynesian, can be found on islands across more than half the globe, from Madagascar off the coast of Africa to Easter Island, west of South America. What this probably means is that the Malayo-Polynesian speakers originated in Taiwan, and then spread to these far flung islands. They made these voyages in outrigger canoes, with no compasses. Actually, the Austronesian people of Taiwan probably came from south China, arriving in about 3,500 BCE. These people were probably expert sailors and fishers, who also ate domesticated rice and pigs, and possibly, their domestic dogs. From Taiwan, the Malayo-Polynesians traveled to the Philippines by 3,000 BCE, and into central Indonesia by 2,500 BCE, picking up tropical crops like taro, yams, bananas, and coconuts. Most likely, they also displaced the first growers of such crops, whose societies were still quite simple.

Some of the colonists went east, reaching Java and Sumatra by 2000 BCE. They colonized parts of the Malay peninsula and Vietnam by 1000 BCE, but they did not expand far

inland, probably because they were a coastal people who had no upper hand over the peoples of mainland Southeast Asia. By 500 AD, they had colonized the previously uninhabited island of Madagascar. Some voyagers went west, colonizing the Bismarck and Solomon archipelagoes by 1600 BCE. In this region, they mainly colonized the smaller islands, which were either uninhabited or occupied by simple hunter-gatherer societies, and developed a distinctive pottery style known as the Lapita style. They were able to occupy only the northern coast of New Guinea, whose indigenous farmers held them at bay, as did the farmers on the larger islands. Later, the Austronesians would intermarry with the indigenous people, becoming the Melanesians who still occupy this region. But by then, some of the Malayo-polynesians had already moved on. These were the ancestors of today's Polynesians. They had colonized Fiji, Tonga, and Samoa by 1,200 BCE, the Marquesas by 0 A.D, and Hawaii and Easter Island by 500 AD. New Zealand which was colonized around 1000 AD, had until then been the last major inhabitable region empty of humans.

## AGRICULTURE AND PASTORALISM IN AFRICA

### *THE DRYING OF THE SAHARA*

Today, the Sahara desert is one of the harshest regions on earth. But it hasn't always been so bad. From roughly 9,000 BCE to 4000 BCE, the Sahara was a grassland, with abundant animals and even a few lakes. In the Sahel, the region just south of the Sahara, and possibly the Sahara itself, sorghum and an African type of rice may have been grown as early as 5,000 years ago,;about the same time crops from the fertile crescent reached Egypt. At the same time, domestic cattle appeared in the Sahara, though we don't know if they arrived from the Middle East or were independently domesticated in the Sahara. In either case, people in the Sahara made their living mainly by herding cows, supplementing their food supply with Middle Eastern crops in the north, and native African crops in the south. This reliance on herding animals was the first instance of a new way of life called **pastoralism**, which would become quite important later on. The first pastoralists were probably black Africans speaking Nilo-Saharan languages. By 3,500 BCE, the Sahara had begun to dry up, pushing the pastoralists to the south and west, where some

still live as herders.

### *THE BANTU EXPANSION*

A little later, around 3000 BCE, humid land crops such as African yams and oil palms began to appear in the tropical forests of west Africa. The people who first domesticated these crops were probably speakers of early Niger-Congo languages, who supplemented their crops with cows and hunting. One group of Niger-Congo speakers, those speaking the Bantu languages, began to expand into the dense forests of the Congo. They were probably driven by population growth, in search of new land to grow their crops on. They had to abandon their cows when they moved into areas with Tsetse flies, which carry sleeping sickness—fatal to cows and often to humans. Even without cows, they probably displaced the native Pygmies of the forests, who now live in isolated pockets and speak the Bantu languages of their farming neighbors. The Bantu eventually expanded out of the forests into the open country of east Africa, and once again acquired cows from the Nilo-Saharan and Khoisan herders living there. It was here, not long after 1000 BCE, that iron working first emerged in Africa. This technology may have diffused from the Middle East, though it is very possible that the Bantus invented it independently. With their iron, crops, and cows, the Bantu people began to expand even faster, sweeping through southern Africa and displacing the Khoisan natives. By 500 AD, they had reached the tip of southwest Africa. A little over 1000 years later, crops grown by the newly arrived inhabitants of Madagascar began to filter onto the mainland, completing the suite of crops traditionally grown in Sub-Saharan Africa.

### THE AMERICAS

Agriculture seems to have originated independently in the Americas in at least three places—Mesoamerica (around southern Mexico), in the Andes region, and in eastern North America. In addition, plants such as manioc may have been independently domesticated in the lowlands of the Amazon. The crops of Mesoamerica and the Andes would prove to be the most important. In both of these regions, people seem to have cultivated plants part-time long before

they domesticated most of them, or came to be dependent on them (or, one might say, before they were domesticated *by* them). Simple slash and burn cultivation, where forests were cleared and planted with sweet potatoes and manioc, may have been going on in tropical lowland areas of Central America as early as 8,000 BCE. Squash and gourds seem to have been domesticated by this time. Intensive cultivation, perhaps in response to environmental variations and rising populations, seems to have increased between 5000 and 4000 BCE.

True reliance on domesticated crops seems to have begun in Mesoamerica around 3500 BCE. Squash, beans, and maize, which is a highly modified descendent of a wild plant called teosinte, were grown together. This combination is extremely effective, because these plants grow well together, and because beans provide some amino acids that maize lacks, allowing people to fulfill all their protein needs. Farming villages began to emerge in southern Mexico, and then in surrounding regions as the trinity of crops diffused to other areas. They had spread to the Southwestern United States between 2000 and 1,500 BCE. In the eastern United States, crops such as goosefoot, sunflowers, marsh elders, and sumpweed were cultivated by 2,000 BCE, and relied upon by 150 BCE. Shortly afterward, however, the Mesoamerican trinity of crops arrived there, and took over as the main staples. Of the original crops of eastern North America, only sunflowers are still widespread today.

Farming took hold in the Andes and along the coast of what is now Peru around 3000 BCE. The crops grown here included lima beans, squash, peppers, potatoes, cotton, and a grain called quinoa. While populations had previously been rather high in oasis-like river valleys along the dry Peruvian coast, where people had relied on abundant seafood; denser and more sedentary populations followed the emergence of farming.

One big difference between New World and Old World history is that the New World never domesticated many animals. One reason is that many of the large mammals native to the Americas had become extinct at the end of the last glacial cycle, possibly in part because of over-hunting by the first native Americans. Because native American bison hunters, famous from western movies, relied on horses, most people assume that they must have domesticated them. In fact, native horses were one of the species that had vanished in the Americas, and were reintroduced much later by Europeans. Llamas and alpacas were the only large mammals to be domesticated in the Americas. People in the Andes also domesticated the guinea pig, which they

relied on for food. The main domesticate from North America is the turkey.

This livestock-impooverished situation would have major consequences. The state level societies of the Americas would have to get by with far fewer food animals and beasts of burden than those of the Old World. In addition, people on horses have an enormous military advantage over those on foot, and horses were one of the many advantages Europeans had over native Americans when they began to colonize the New World. Perhaps the biggest consequence of the greater reliance on livestock in the Old World was that Old World peoples contracted, and then developed immunity to, many diseases that may have originated in their livestock, including tuberculosis, smallpox, influenza, and measles. New World peoples had no exposure to such diseases, which would prove to be the most lethal weapons the European invaders possessed.

## **INTENSIVE AGRICULTURE AND COMPLEX SOCIETIES**

Around the world, the first agricultural villages were organized as tribes—more complex and more materially wealthy than hunter-gatherers, but showing only the faintest signs of social inequality. But this simple egalitarianism began to change as agriculture became more productive, as populations continued to grow, and as settlements grew larger. Two of the main engines of this process were new domesticated species and new agricultural innovations, which combined and accumulated to make agriculture more productive.

## **NEW USES FOR ANIMALS**

One important kind of innovation involved new ways of using domestic animals. The first people to keep domestic animals had simply eaten them and used their hide and bones for clothing and tools. Before long, though, they found other uses for them. They realized that sheep, for example, could provide wool, which could be woven into new kinds of textiles. Later, some peoples in western Eurasia and North Africa developed the ability to digest milk as adults. This allowed them become dairy farmers, raising goats and cows for milk, which they drank or converted into other products like cheese and butter. Some of these people became pastoralists, living off livestock in lands where crops were unproductive. Because milk is a good source of

vitamin D, milk drinkers with pale skins were doubly able to live in far northern regions, and populations of pastoral farmers began to grow in northwestern Eurasia.

## IRRIGATION

In Mesopotamia, from about 6,500 to 4,000 BCE, a significant cultural innovation was taking root—massive irrigation based on diverted river water. This sort of public work requires enormous amounts of manpower. The large towns that lived off of this labor-intensive agriculture were among the world's first chiefdoms, with powerful leaders capable of conscripting subjects into large projects.

## METALWORKING

Another catalyst for rising social complexity was a steady advance in metal-working skills. Neolithic peoples had long been taking native metals (those which occur in a relatively pure state in nature, such as copper, gold, and silver, and hammering them into decorations. Around 6000 BCE, people in Anatolia were melting this native copper, which would have led to the discovery that more copper, as well as other metals, could be extracted from nearby copper ores. Copper is a soft metal, losing its edge quickly, so it was no improvement over stone tools. It is pretty, though, and it was soon being made into ceremonial tools and ornaments, which may have belonged to people holding higher status, in increasingly stratified societies. Copper began to be traded far and wide. Eventually, people learned to make a harder alloy of copper and arsenic, which is sometimes called arsenical bronze. This material could actually be used to make useful tools, as well as weapons, but working with arsenic was unhealthy. The frozen “iceman” from the Italian Alps, for example, seems to have accumulated dangerous levels of arsenic in his body from working with such alloys. Nevertheless, arsenical bronze was spreading by 3,500 BCE, inaugurating the early Bronze Age.

## THE PLOW

Between 4,500 and 2,500 BCE people developed the habit of hitching powerful animals like oxen to plows. This allowed much faster turning of the soil than the previous method, which had relied on hand tools wielded by people. In order to use a plow, however, fields needed to be leveled and cleared of rocks, so that evenly spaced furrows could be made. This was easy enough in the soft, flat ground of Mesopotamia, but it would be more difficult in more rugged regions. Nevertheless, the plow allowed farmers to live on land where the ground had been too hard to plant before, especially in steppe areas with tightly bound sod. Agriculture became still more productive, able to support more people in a wider range of areas.

### INTENSIVE AGRICULTURE AND THE STATUS OF WOMEN

The ever intensifying nature of agriculture may have been a factor in the growth of social inequality between men and women. The first cultivators of crops may have been mainly women. After all, in most hunter-gatherer societies, women do most of the gathering, which really supplies most of the food. It makes sense, therefore, that women would have been the first to experiment with deliberate planting of crops. When agriculture became more labor intensive, however, and able to support large populations, it began to make economic sense for families to have many children, because children were fairly easy to feed, and could work in the fields when they got big enough. Before, hunter-gatherers had relied on sexual taboos, extended breast feeding (which can inhibit fertility), and sometimes infanticide to keep families small. Now women were pregnant and caring for small children most of the time, which kept them from doing the increasingly difficult labor in the fields. They stayed at home, preparing food and raising children. As is true today, such work was undervalued, and women became more dominated by men than ever before. Eventually, patriarchal religions arose that helped rationalize this dominance, and women were locked in a trap from which they are only now beginning to emerge.

### THE HORSE AND THE SPREAD OF INDO-EUROPEANS

Sometime around 4,000 BCE, north of the Black Sea, pastoral farmers began to domesticate some of the wild horses that they hunted. Like donkeys (domesticated in the Middle

East around the same time) horses could be used to carry loads. At first people loaded packs on their backs, and then harnessed them to sledges or wheeled wagons, invented not long after. Later, inventions like the chariot and the stirrup would turn horses into formidable vehicles of war, allowing horse-keeping pastoralists to raid, and occasionally conquer, settled people. Among the first horse-keeping people were speakers of early Indo-European languages, who began to expand from their home north of the black sea into western Europe. These may have been the first speakers of such languages. But, as we have seen, it may be that the first farmers to move into Europe spoke proto-Indo-European languages. If so, the Indo-European horsemen were the descendants of these farmers, and were simply migrating back the way they had originally come. There are persuasive arguments for both ideas. In any case, these people seem to have imported a more aggressive style of culture into Europe. They would do the same later when they moved into India. They seem to have been a rather warlike, patriarchal people. They mainly worshiped a god of the sky, who they called something like *dyu piter*, or “sky father”. This name would survive in Greek as Zeus Pater, and in Latin as Jupiter.

## THE FIRST STATES

After about 5000 BCE, towns in lowland Mesopotamia, supported by very extensive irrigation works, began to grow larger and larger. Temples sprang up in the larger towns. Both the temples and the irrigation works are signs that a small group of people had set themselves up as rulers through a combination of force and claims of spiritual authority. By 3,500 BCE, many of these towns had evolved into small cities, with as many as 10,000 inhabitants. Because agriculture had long since become productive enough that not everyone needed to work in the fields, many of these inhabitants were specialists—priests, warriors, craftspeople, and bureaucrats. By 3,500 BCE, the largest of the Mesopotamian cities had become true city-states.

## WRITING: THE REST IS HISTORY

Trade became highly organized and widespread around this time, connecting not just Mesopotamian city-states, but peoples from the Nile, the Mediterranean, the highlands, and even

India. By 3400 BCE, bureaucrats in the cities began to scratch simple pictograms in clay tablets in order to keep track of goods. This simple system of accounting soon evolved into the cuneiform system of writing. Over the next few hundred years, people learned to use this script for more than just accounting, realizing that anything which could be spoken could be written down—from epic tales and myths, to political propaganda, to love letters. Before writing, the only permanence that language had was in human memory and tradition. These are wonderful, creative media, but not very accurate ones. With the advent of writing, thoughts could be preserved, in their exact, original words, indefinitely. This had far reaching results. It allowed knowledge to be preserved, and to accumulate, much more efficiently. This accelerated the pace of cultural change yet another notch. It solidified philosophies, ideas, and mythologies that had previously been much more mutable. It provided a new means of communication, and helped bind societies together more efficiently (if not more equitably). Finally, it recorded events. For societies with writing, the record of the human past suddenly becomes much more clear. In other words, starting with the city-states of Mesopotamia, writing marks the beginning of the transition from prehistory to history.