Sapiens: A Brief History of Humankind

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The Tree of Knowledge

IN THE PREVIOUS CHAPTER WE SAW THAT although Sapiens had already populated East Africa 150,000 years ago, they began to o of planet Earth and drive the other human species to extinction only about 70,000 years ago. In the intervening millennia, even though th archaic Sapiens looked just like us and their brains were as big as ours, they did not enjoy any marked advantage over other human spe produce particularly sophisticated tools, and did not accomplish any other special feats.

In fact, in the rst recorded encounter between Sapiens and Neanderthals, the Neanderthals won. About 100,000 years ago, some Sa groups migrated north to the Levant, which was Neanderthal territory, but failed to secure a rm footing. It might have been due to nasty n inclement climate, or unfamiliar local parasites. Whatever the reason, the Sapiens eventually retreated, leaving the Neanderthals as mas Middle East.

This poor record of achievement has led scholars to speculate that the internal structure of the brains of these Sapiens was probably from ours. They looked like us, but their cognitive abilities – learning, remembering, communicating – were far more limited. Teaching su Sapiens to speak English, persuading them of the truth of Christian dogma, or getting them to understand the theory of evolution would p have been hopeless undertakings. Conversely, we would have had a very hard time learning their communication system and way of thi

But then, beginning about 70,000 years ago, Homo sapiens started doing very special things. Around that date Sapiens bands left Africa for a second time. This time they drove the Neanderthals and all other human species not only from the Middle East, but from the face of the e Within a remarkably short period, Sapiens reached Europe and East Asia. About 45,000 years ago, they somehow crossed the open sea in Australia – a continent hitherto untouched by humans. The period from about 70,000 years ago to about 30,000 years ago witnessed t invention of boats, oil lamps, bows and arrows and needles (essential for sewing warm clothing). The rst objects that can reliably be calle from this era (see the Stadel as does the rst clear evidence for religion, commerce and social strati cation.

Most researchers believe that these unprecedented accomplishments were the product of a revolution in Sapiens' cognitive abilities. maintain that the people who drove the Neanderthals to extinction, settled Australia, and carved the Stadel lion-man were as intelligent, c and sensitive as we are. If we were to come across the artists of the Stadel Cave, we could learn their language and they ours. We'd be explain to them everything we know – from the adventures of Alice in Wonderland to the paradoxes of quantum physics – and they could how their people view the world.

The appearance of new ways of thinking and communicating, between 70,000 and 30,000 years ago, constitutes the Cognitive Revol caused it? We're not sure. The most commonly believed theory argues that accidental genetic mutations changed the inner wiring of the Sapiens, enabling them to think in unprecedented ways and to communicate using an altogether new type of language. We might call it t Knowledge mutation. Why did it occur in Sapiens DNA rather than in that of Neanderthals? It was a matter of pure chance, as far as we it's more important to understand the consequences of the Tree of Knowledge mutation than its causes. What was so special about the n Sapiens language that it enabled us to conquer the

It was not the rst communication system. Every animal knows how to communicate. Even insects, such as bees and ants, know how one another of the whereabouts of food. Neither was it the rst vocal communication system. Many animals, including all ape and monkey use vocal signs. For example, green monkeys use calls of various kinds to warn each other of danger. Zoologists have identi ed one call that means, 'Careful! An eagle!' A slightly different call warns, 'Careful! A lion!' When researchers played a recording of the rst call to a group of monk monkeys stopped what they were doing and looked upwards in fear. When the same group heard a recording of the second call, the lion they quickly scrambled up a tree. Sapiens can produce many more distinct sounds than green monkeys, but whales and elephants have impressive abilities. A parrot can say anything Albert Einstein could say, as well as mimicking the sounds of phones ringing, doors slamm sirens wailing. Whatever advantage Einstein had over a parrot, it wasn't vocal. What, then, is so special about our language?

The most common answer is that our language is amazingly supple. We can connect a limited number of sounds and signs to produc number of sentences, each with a distinct meaning. We can thereby ingest, store and communicate a prodigious amount of information a surrounding world. A green monkey can yell to its comrades, 'Careful! A lion!' But a modern human can tell her friends that this morning, bend in the river, she saw a lion tracking a herd of bison. She can then describe the exact location, including the different paths leading t With this information, the members of her band can put their heads together and discuss whether they should approach the river, chase lion and hunt the bison.

A second theory agrees that our unique language evolved as a means of sharing information about the world. But the most important information that needed to be conveyed was about humans, not about lions and bison. Our language evolved as a way of gossiping. Acc theory Homo sapiens is primarily a social animal. Social cooperation is our key for survival and reproduction. It is not enough for individual m women to know the whereabouts of lions and bison. It's much more important for them to know who in their band hates whom, who is sle with whom, who is honest, and who is a cheat.

4. An ivory figurine of a 'lion-man' (or 'lioness-woman') from the Stadel Cave in Germany (c.32,000 years ago). The body is human, but the head is This is one of the first indisputable examples of art, and probably of religion, and of the ability of the human mind to imagine things that do not really exist.

Photo: Thomas Stephan © Ulmer Museum.

The amount of information that one must obtain and store in order to track the ever-changing relationships of even a few dozen indivi staggering. (In a band of fty individuals, there are 1,225 one-on-one relationships, and countless more complex social combinations.) All a keen interest in such social information, but they have trouble gossiping effectively. Neanderthals and archaic Homo sapiens probably also had a hard time talking behind each other's backs – a much maligned ability which is in fact essential for cooperation in large numbers. The ne skills that modern Sapiens acquired about seventy millennia ago enabled them to gossip for hours on end. Reliable information about wh trusted meant that small bands could expand into larger bands, and Sapiens could develop tighter and more sophisticated types of

The gossip theory might sound like a joke, but numerous studies support it. Even today the vast majority of human communication – the form of emails, phone calls or newspaper columns – is gossip. It comes so naturally to us that it seems as if our language evolved fo purpose. Do you think that history professors chat about the reasons for World War One when they meet for lunch, or that nuclear physic their coffee breaks at scienti c conferences talking about quarks? Sometimes. But more often, they gossip about the professor who caught h husband cheating, or the quarrel between the head of the department and the dean, or the rumours that a colleague used his research f a Lexus. Gossip usually focuses on wrongdoings. Rumour-mongers are the original fourth estate, journalists who inform society about a protect it from cheats and freeloaders.

Most likely, both the gossip theory and the there-is-a-lion-near-the-river theory are valid. Yet the truly unique feature of our language is n ability to transmit information about men and lions. Rather, it's the ability to transmit information about things that do not exist at all. As fa know, only Sapiens can talk about entire kinds of entities that they have never seen, touched or smelled.

Legends, myths, gods and religions appeared for the rst time with the Cognitive Revolution. Many animals and human species could say, 'Careful! A lion!' Thanks to the Cognitive Revolution, Homo sapiens acquired the ability to say, 'The lion is the guardian spirit of our tribe.' This ability to speak about ctions is the most unique feature of Sapiens language.

It's relatively easy to agree that only Homo sapiens can speak about things that don't really exist, and believe six impossible things before breakfast. You could never convince a monkey to give you a banana by promising him limitless bananas after death in monkey heaven. important? After all, ction can be dangerously misleading or distracting. People who go to the forest looking for fairies and unicorns woul have less chance of survival than people who go looking for mushrooms and deer. And if you spend hours praying to non-existing guard aren't you wasting precious time, time better spent foraging, ghting and fornicating?

However, ction has enabled us not merely to imagine things, but to do so We can weave common myths such as the biblical creation Dreamtime myths of Aboriginal Australians, and the nationalist myths of modern states. Such myths give Sapiens the unprecedented ab cooperate exibly in large numbers. Ants and bees can also work together in huge numbers, but they do so in a very rigid manner and on close relatives. Wolves and chimpanzees cooperate far more exibly than ants, but they can do so only with small numbers of other indivi they know intimately. Sapiens can cooperate in extremely exible ways with countless numbers of strangers. That's why Sapiens rule the whereas ants eat our leftovers and chimps are locked up in zoos and research laboratories.

The Legend of Peugeot

Our chimpanzee cousins usually live in small troops of several dozen individuals. They form close friendships, hunt together and ght sho shoulder against baboons, cheetahs and enemy chimpanzees. Their social structure tends to be hierarchical. The dominant member, wh always a male, is termed the 'alpha male'. Other males and females exhibit their submission to the alpha male by bowing before him wh grunting sounds, not unlike human subjects kowtowing before a king. The alpha male strives to maintain social harmony within his troop individuals ght, he will intervene and stop the violence. Less benevolently, he might monopolise particularly coveted foods and prevent lo ranking males from mating with the females.

When two males are contesting the alpha position, they usually do so by forming extensive coalitions of supporters, both male and fe within the group. Ties between coalition members are based on intimate daily contact – hugging, touching, kissing, grooming and mutua Just as human politicians on election campaigns go around shaking hands and kissing babies, so aspirants to the top position in a chimp spend much time hugging, back-slapping and kissing baby chimps. The alpha male usually wins his position not because he is physicall but because he leads a large and stable coalition. These coalitions play a central part not only during overt struggles for the alpha positio almost all day-to-day activities. Members of a coalition spend more time together, share food, and help one another in times of trouble.

There are clear limits to the size of groups that can be formed and maintained in such a way. In order to function, all members of a gr know each other intimately. Two chimpanzees who have never met, never fought, and never engaged in mutual grooming will not know they can trust one another, whether it would be worthwhile to help one another, and which of them ranks higher. Under natural condition chimpanzee troop consists of about twenty to fty individuals. As the number of chimpanzees in a troop increases, the social order destab eventually leading to a rupture and the formation of a new troop by some of the animals. Only in a handful of cases have zoologists obse larger than a hundred. Separate groups seldom cooperate, and tend to compete for territory and food. Researchers have documented p warfare between groups, and even one case of 'genocidal' activity in which one troop systematically slaughtered most members of a nei

Similar patterns probably dominated the social lives of early humans, including archaic Homo. Humans, like chimps, have social instincts that enabled our ancestors to form friendships and hierarchies, and to hunt or ght together. However, like the social instincts of chimps, those humans were adapted only for small intimate groups. When the group grew too large, its social order destabilised and the band split. Eve particularly fertile valley could feed 500 archaic Sapiens, there was no way that so many strangers could live together. How could they a should be leader, who should hunt where, or who should mate with whom?

In the wake of the Cognitive Revolution, gossip helped Homo sapiens to form larger and more stable bands. But even gossip has its limits. Sociological research has shown that the maximum 'natural' size of a group bonded by gossip is about 150 individuals. Most people can intimately know, nor gossip effectively about, more than 150 human beings.

Even today, a critical threshold in human organisations falls somewhere around this magic number. Below this threshold, communitie businesses, social networks and military units can maintain themselves based mainly on intimate acquaintance and rumour-mongering. need for formal ranks, titles and law books to keep order. platoon of thirty soldiers or even a company of a hundred soldiers can function basis of intimate relations, with a minimum of formal discipline. A well-respected sergeant can become 'king of the company' and exercis even over commissioned of cers. A small family business can survive and ourish without a board of directors, a CEO or an accounting depa

But once the threshold of 150 individuals is crossed, things can no longer work that way. You cannot run a division with thousands of same way you run a platoon. Successful family businesses usually face a crisis when they grow larger and hire more personnel. If they c reinvent themselves, they go bust.

How did Homo sapiens manage to cross this critical threshold, eventually founding cities comprising tens of thousands of inhabitants and empires ruling hundreds of millions? The secret was probably the appearance of ction. Large numbers of strangers can cooperate succe believing in common myths.

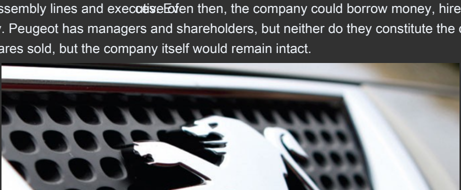
Any large-scale human cooperation – whether a modern state, a medieval church, an ancient city or an archaic tribe – is rooted in com myths that exist only in people's collective imagination. Churches are rooted in common religious myths. Two Catholics who have never nevertheless go together on crusade or pool funds to build a hospital because they both believe that God was incarnated in human esh a allowed Himself to be cruci ed to redeem our sins. States are rooted in common national myths. Two Serbs who have never met might risk t lives to save one another because both believe in the existence of the Serbian nation, the Serbian homeland and the Serbian ag. Judicia are rooted in common legal myths. Two lawyers who have never met can nevertheless combine efforts to defend a complete stranger be both believe in the existence of laws, justice, human rights – and the money paid out in fees.

Yet none of these things exists outside the stories that people invent and tell one another. There are no gods in the universe, no natio money, no human rights, no laws, and no justice outside the common imagination of human beings.

People easily acknowledge that 'primitive tribes' cement their social order by believing in ghosts and spirits, and gathering each full m dance together around the camp re. What we fail to appreciate is that our modern institutions function on exactly the same basis. Take fo the world of business corporations. Modern businesspeople and lawyers are, in fact, powerful sorcerers. The principal difference betwee tribal shamans is that modern lawyers tell far stranger tales. The legend of Peugeot affords us a good example.

An icon that somewhat resembles the Stadel lion-man appears today on cars, trucks and motorcycles from Paris to Sydney. It's the hood that adorns vehicles made by Peugeot, one of the oldest and largest of Europe's carmakers. Peugeot began as a small family business of Valentigney, just 200 miles from the Stadel Cave. Today the company employs about 200,000 people worldwide, most of whom are c strangers to each other. These strangers cooperate so effectively that in 2008 Peugeot produced more than 1.5 million automobiles, ear revenues of about 55 billion euros.

In what sense can we say that Peugeot SA (the company's of cial name) exists? There are many Peugeot vehicles, but these are obviously not company. Even if every Peugeot in the world were simultaneously junked and sold for scrap metal, Peugeot SA would not disappear. It w continue to manufacture new cars and issue its annual report. The company owns factories, machinery and showrooms, and employs m accountants and secretaries, but all these together do not comprise Peugeot. A disaster might kill every single one of Peugeot's employe on to destroy all of its assembly lines and executive of ces. Even then, the company could borrow money, hire new employees, build new factori and buy new machinery. Peugeot has managers and shareholders, but neither do they constitute the company. All the managers could b dismissed and all its shares sold, but the company itself would remain intact.



5. The Peugeot Lion

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It doesn't mean that Peugeot SA is invulnerable or immortal. If a judge were to mandate the dissolution of the company, its factories w remain standing and its workers, accountants, managers and shareholders would continue to live – but Peugeot SA would immediately v short, Peugeot SA seems to have no essential connection to the physical world. Does it really exist?

Peugeot is a gment of our collective imagination. Lawyers call this a 'legal ction'. It can't be pointed at; it is not a physical object. But i legal entity. Just like you or me, it is bound by the laws of the countries in which it operates. It can open a bank account and own propert taxes, and it can be sued and even prosecuted separately from any of the people who own or work for it.

Peugeot belongs to a particular genre of legal ctions called 'limited liability companies'. The idea behind such companies is among hu most ingenious inventions. Homo sapiens lived for untold millennia without them. During most of recorded history property could be owned only esh-and-blood humans, the kind that stood on two legs and had big brains. If in thirteenth-century France Jean set up a wagon-manufa workshop, he himself was the business. If a wagon he'd made broke down a week after purchase, the disgruntled buyer would have sue personally. If Jean had borrowed 1,000 gold coins to set up his workshop and the business failed, he would have had to repay the loan b private property – his house, his cow, his land. He might even have had to sell his children into servitude. If he couldn't cover the debt, h thrown in prison by the state or enslaved by his creditors. He was fully liable, without limit, for all obligations incurred by his workshop.

If you had lived back then, you would probably have thought twice before you opened an enterprise of your own. And indeed this lega discouraged entrepreneurship. People were afraid to start new businesses and take economic risks. It hardly seemed worth taking the c their families could end up utterly destitute.

This is why people began collectively to imagine the existence of limited liability companies. Such companies were legally independe people who set them up, or invested money in them, or managed them. Over the last few centuries such companies have become the m in the economic arena, and we have grown so used to them that we forget they exist only in our imagination. In the US, the technical ter limited liability company is a 'corporation', which is ironic, because the term derives from ('body' in Latin) – the one thing these corporatio Despite their having no real bodies, the American legal system treats corporations as legal persons, as if they were esh-and-blood huma

And so did the French legal system back in 1896, when Armand Peugeot, who had inherited from his parents a metalworking shop th springs, saws and bicycles, decided to go into the automobile business. To that end, he set up a limited liability company. He named the after himself, but it was independent of him. If one of the cars broke down, the buyer could sue Peugeot, but not Armand Peugeot. If the borrowed millions of francs and then went bust, Armand Peugeot did not owe its creditors a single franc. The loan, after all, had been giv Peugeot, the company, not to Armand Peugeot, the Homo. Armand Peugeot died in 1915. Peugeot, the company, is still alive and well.

How exactly did Armand Peugeot, the man, create Peugeot, the company? In much the same way that priests and sorcerers have cre and demons throughout history, and in which thousands of French curés were still creating Christ's body every Sunday in the parish churches. It all revolved around telling stories, and convincing people to believe them. In the case of the French the crucial story was that of Christ's life as told by the Catholic Church. According to this story, if a Catholic priest dressed in his sacred garments solemnly said the right words a moment, mundane bread and wine turned into God's esh and blood. The priest exclaimed (Latin for 'This is my body!') and hocus pocus – the bread turned into Christ's esh. Seeing that the priest had properly and assiduously observed all the procedures, millions of devout Catholics behaved as if God really existed in the consecrated bread and wine.

In the case of Peugeot SA the crucial story was the French legal code, as written by the French parliament. According to the French l certi ed lawyer followed all the proper liturgy and rituals, wrote all the required spells and oaths on a wonderfully decorated piece of pape af xed his ornate signature to the bottom of the document, then hocus pocus – a new company was incorporated. When in 1896 Armand wanted to create his company, he paid a lawyer to go through all these sacred procedures. Once the lawyer had performed all the right r pronounced all the necessary spells and oaths, millions of upright French citizens behaved as if the Peugeot company really existed.

Telling effective stories is not easy. The dif culty lies not in telling the story, but in convincing everyone else to believe it. Much of history revo around this question: how does one convince millions of people to believe particular stories about gods, or nations, or limited liability com when it succeeds, it gives Sapiens immense power, because it enables millions of strangers to cooperate and work towards common go to imagine how dif cult it would have been to create states, or churches, or legal systems if we could speak only about things that really ex as rivers, trees and lions.

Over the years, people have woven an incredibly complex network of stories. Within this network, ctions such as Peugeot not only exist, accumulate immense power. The kinds of things that people create through this network of stories are known in academic circles as 'ctions', 'social constructs', or 'imagined realities'. An imagined reality is not a lie. I lie when I say that there is a lion near the river when I know perfectly there is no lion there. There is nothing special about lies. Green monkeys and chimpanzees can lie. A green monkey, for example, has b calling 'Careful! A lion!' when there was no lion around. This alarm conveniently frightened away a fellow monkey who had just found a b leaving the liar all alone to steal the prize for itself.

Unlike lying, an imagined reality is something that everyone believes in, and as long as this communal belief persists, the imagined re force in the world. The sculptor from the Stadel Cave may sincerely have believed in the existence of the lion-man guardian spirit. Some are charlatans, but most sincerely believe in the existence of gods and demons. Most millionaires sincerely believe in the existence of m limited liability companies. Most human-rights activists sincerely believe in the existence of human rights. No one was lying when, in 201 demanded that the Libyan government respect the human rights of its citizens, even though the UN, Libya and human rights are all gme fertile imaginations.

Ever since the Cognitive Revolution, Sapiens have thus been living in a dual reality. On the one hand, the objective reality of rivers, tr and on the other hand, the imagined reality of gods, nations and corporations. As time went by, the imagined reality became ever more p that today the very survival of rivers, trees and lions depends on the grace of imagined entities such as the United States and Google.

Bypassing the Genome

The ability to create an imagined reality out of words enabled large numbers of strangers to cooperate effectively. But it also did somethi Since large-scale human cooperation is based on myths, the way people cooperate can be altered by changing the myths – by telling dif stories. Under the right circumstances myths can change rapidly. In 1789 the French population switched almost overnight from believin myth of the divine right of kings to believing in the myth of the sovereignty of the people. Consequently, ever since the Cognitive Revolut Homo sapiens has been able to revise its behaviour rapidly in accordance with changing needs. This opened a fast lane of cultural evolution, by traf c jams of genetic evolution. Speeding down this fast lane, Homo sapiens soon far outstripped all other human and animal species in its ability to cooperate.

The behaviour of other social animals is determined to a large extent by their genes. DNA is not an autocrat. Animal behaviour is also by environmental factors and individual quirks. Nevertheless, in a given environment, animals of the same species will tend to behave in way. Signi cant changes in social behaviour cannot occur, in general, without genetic mutations. For example, common chimpanzees hav tendency to live in hierarchical groups headed by an alpha male. Members of a closely related chimpanzee species, bonobos, usually liv egalitarian groups dominated by female alliances. Female common chimpanzees cannot take lessons from their bonobo relatives and st feminist revolution. Male chimps cannot gather in a constitutional assembly to abolish the office of alpha male and declare that from here on out all chimps are to be treated as equals. Such dramatic changes in behaviour would occur only if something changed in the chimpanzees' DN

For similar reasons, archaic humans did not initiate any revolutions. As far as we can tell, changes in social patterns, the invention of technologies and the settlement of alien habitats resulted from genetic mutations and environmental pressures more than from cultural in This is why it took humans hundreds of thousands of years to make these steps. Two million years ago, genetic mutations resulted in the appearance of a new human species called Homo erectus. Its emergence was accompanied by the development of a new stone tool technology, now recognised as a de ning feature of this species. As long as Homo erectus did not undergo further genetic alterations, its stone tools remained roughly the same – for close to 2 million years!

In contrast, ever since the Cognitive Revolution, Sapiens have been able to change their behaviour quickly, transmitting new behavio generations without any need of genetic or environmental change. As a prime example, consider the repeated appearance of childless e as the Catholic priesthood, Buddhist monastic orders and Chinese eunuch bureaucracies. The existence of such elites goes against the fundamental principles of natural selection, since these dominant members of society willingly give up procreation. Whereas chimpanzee males use their power to have sex with as many females as possible – and consequently sire a large proportion of their troop's young – t alpha male abstains completely from sexual intercourse or raising a family. This abstinence does not result from unique environmental c such as a severe lack of food or want of potential mates. Nor is it the result of some quirky genetic mutation. The Catholic Church has su centuries, not by passing on a 'celibacy gene' from one pope to the next, but by passing on the stories of the New Testament and of Cat law.

In other words, while the behaviour patterns of archaic humans remained xed for tens of thousands of years, Sapiens could transform social structures, the nature of their interpersonal relations, their economic activities and a host of other behaviours within a decade or tw Consider a resident of Berlin, born in 1900 and living to the ripe age of one hundred. She spent her childhood in the Hohenzollern Empir II; her adult years in the Weimar Republic, the Nazi Third Reich and Communist East Germany; and she died a citizen of a democratic a Germany. She had managed to be a part of ve very different sociopolitical systems, though her DNA remained exactly the same.

This was the key to Sapiens' success. In a one-on-one brawl, a Neanderthal would probably have beaten a Sapiens. But in a con ict o Neanderthals wouldn't stand a chance. Neanderthals could share information about the whereabouts of lions, but they probably could no revise – stories about tribal spirits. Without an ability to compose ction, Neanderthals were unable to cooperate effectively in large numbe could they adapt their social behaviour to rapidly changing challenges.

While we can't get inside a Neanderthal mind to understand how they thought, we have indirect evidence of the limits to their cognitio compared with their Sapiens rivals. Archaeologists excavating 30,000-year-old Sapiens sites in the European heartland occasionally nd seashells from the Mediterranean and Atlantic coasts. In all likelihood, these shells got to the continental interior through long-distance tr between different Sapiens bands. Neanderthal sites lack any evidence of such trade. Each group manufactured its own tools from local

6. The Catholic alpha male abstains from sexual intercourse and raising a family, even though there is no biological reason to do so.

© Andreas Solaro/AFP/Getty Images.

Another example comes from the South Paci c. Sapiens bands that lived on the island of New Ireland, north of New Guinea, used a volcanic called obsidian to manufacture particularly strong and sharp tools. New Ireland, however, has no natural deposits of obsidian. Laborator revealed that the obsidian they used was brought from deposits on New Britain, an island 250 miles away. Some of the inhabitants of the must have been skilled navigators who traded from island to island over long

Trade may seem a very pragmatic activity, one that needs no ctive basis. Yet the fact is that no animal other than Sapiens engages in all Sapiens trade networks were based on ctions. Trade cannot exist without trust, and it is very dif cult to trust strangers. The global trade network of today is based on our trust in such ctional entities as currencies, banks and corporations. When two strangers in a tribal socie trade, they establish trust by appealing to a common god, mythical ancestor or totem animal. In modern society, currency notes usually d religious images, revered ancestors and corporate totems.

If archaic Sapiens believing in such ctions traded shells and obsidian, it stands to reason that they could also have traded information creating a much denser and wider knowledge network than the one that served Neanderthals and other archaic humans.

Hunting techniques provide another illustration of these differences. Neanderthals usually hunted alone or in small groups. Sapiens, o hand, developed techniques that relied on cooperation between many dozens of individuals, and perhaps even between different bands particularly effective method was to surround an entire herd of animals, such as wild horses, then chase them into a narrow gorge, wher easy to slaughter them en masse. If all went according to plan, the bands could harvest tons of meat, fat and animal skins in a single afte collective effort, and either consume these riches in a giant potlatch, or dry, smoke or (in Arctic areas) freeze them for later usage. Archa have discovered sites where entire herds were butchered annually in such ways. There are even sites where fences and obstacles were order to create arti cial traps and slaughtering grounds.

We may presume that Neanderthals were not pleased to see their traditional hunting grounds turned into Sapiens-controlled slaughte However, if violence broke out between the two species, Neanderthals were not much better off than wild horses. Fifty Neanderthals coo traditional and static patterns were no match for 500 versatile and innovative Sapiens. And even if the Sapiens lost the rst round, they co quickly invent new stratagems that would enable them to win the next time.

What happened in the Cognitive Revolution?

New ability	Wider consequences
The ability to transmit larger quantities of information about the world surrounding Homo sapiens	Planning and carrying out complex actions, such as avoiding lions and hunting bison
The ability to transmit larger quantities of information about Sapiens social relationships	Larger and more cohesive groups, numbering up to 150 individuals
The ability to transmit information about things that do not really exist, such as tribal spirits, nations, limited liability companies, and human rights	a. Cooperation between very large numbers of strangers b. Rapid innovation of social behaviour

History and Biology

The immense diversity of imagined realities that Sapiens invented, and the resulting diversity of behaviour patterns, are the main compo what we call 'cultures'. Once cultures appeared, they never ceased to change and develop, and these unstoppable alterations are what 'history'.

The Cognitive Revolution is accordingly the point when history declared its independence from biology. Until the Cognitive Revolution of all human species belonged to the realm of biology, or, if you so prefer, prehistory (I tend to avoid the term 'prehistory', because it wro that even before the Cognitive Revolution, humans were in a category of their own). From the Cognitive Revolution onwards, historical n replace biological theories as our primary means of explaining the development of Homo sapiens. To understand the rise of Christianity or the French Revolution, it is not enough to comprehend the interaction of genes, hormones and organisms. It is necessary to take into accou interaction of ideas, images and fantasies as well.

This does not mean that Homo sapiens and human culture became exempt from biological laws. We are still animals, and our physical, emo and cognitive abilities are still shaped by our DNA. Our societies are built from the same building blocks as Neanderthal or chimpanzee s the more we examine these building blocks – sensations, emotions, family ties – the less difference we nd between us and other apes.

It is, however, a mistake to look for the differences at the level of the individual or the family. One on one, even ten on ten, we are em similar to chimpanzees. Signi cant differences begin to appear only when we cross the threshold of 150 individuals, and when we reach 1,00 2,000 individuals, the differences are astounding. If you tried to bunch together thousands of chimpanzees into Tiananmen Square, Wall Vatican or the headquarters of the United Nations, the result would be pandemonium. By contrast, Sapiens regularly gather by the thous such places. Together, they create orderly patterns – such as trade networks, mass celebrations and political institutions – that they coul have created in isolation. The real difference between us and chimpanzees is the mythical glue that binds together large numbers of indi families and groups. This glue has made us the masters of creation.

Of course, we also needed other skills, such as the ability to make and use tools. Yet tool-making is of little consequence unless it is c the ability to cooperate with many others. How is it that we now have intercontinental missiles with nuclear warheads, whereas 30,000 ye we had only sticks with int spearheads? Physiologically, there has been no signi cant improvement in our tool-making capacity over the last 30,000 years. Albert Einstein was far less dexterous with his hands than was an ancient hunter-gatherer. However, our capacity to coop large numbers of strangers has improved dramatically. The ancient int spearhead was manufactured in minutes by a single person, who the advice and help of a few intimate friends. The production of a modern nuclear warhead requires the cooperation of millions of strang the world – from the workers who mine the uranium ore in the depths of the earth to theoretical physicists who write long mathematical fo to describe the interactions of subatomic particles.

To summarise the relationship between biology and history after the Cognitive Revolution:

- Biology sets the basic parameters for the behaviour and capacities of Homo. The whole of history takes place within the bounds of this biological arena.

- However, this arena is extraordinarily large, allowing Sapiens to play an astounding variety of games. Thanks to their ability to invent c Sapiens create more and more complex games, which each generation develops and elaborates even further.

- Consequently, in order to understand how Sapiens behave, we must describe the historical evolution of their actions. Referring only to biological constraints would be like a radio sportscaster who, attending the World Cup football championships, offers his listeners a deta description of the playing eld rather than an account of what the players are doing.

What games did our Stone Age ancestors play in the arena of history? As far as we know, the people who carved the Stadel lion-man so years ago had the same physical, emotional and intellectual abilities we have. What did they do when they woke up in the morning? Wha eat for breakfast – and lunch? What were their societies like? Did they have monogamous relationships and nuclear families? Did they h ceremonies, moral codes, sports contests and religious rituals? Did they ght wars? The next chapter takes a peek behind the curtain of t examining what life was like in the millennia separating the Cognitive Revolution from the Agricultural Revolution.