Introduction

Humans descended from the apes! My dear, let us hope that it is not true, but if it is, let us pray that it will not become generally known.

The wife of the Bishop of Worcester, after learning about Darwin's theory of evolution (1860).

A Man without culture resembles a zebra without stripes

African Proverb

In the 1600s, the "civilized world" was horrified to learn that there were barbarians in the Americas practicing cannibalism. However, the French philosopher Michel de Montaigne said: "There is nothing barbarian and savage in this nation, according to what I have been told, except that each of us call barbarian what is not in our habits; to be honest, it seems that we have no other reference of truth and reason than the example and idea of the opinions and habits of the country we come from. That country always has perfect religion, the perfect police, the perfect and accomplished usage of things."[1] In other words, Montaigne was reminding his contemporaries that western values are not universal and that we need to understand other cultures before judging them. He also provocatively suggested that it might be less barbarous to eat someone who was already dead than to dismember someone who was still alive (a practice that westerners had been doing for centuries in the name of civilized justice).

Humans are the only animals on Earth that have composed musical pieces like "La Traviata" and "Don Giovanni," painted works of art like the "Joconda," cooked food using a variety of energy sources, invented computers, constructed skyscrapers, and travelled to the moon. At the same time, different groups of humans also wear very different clothing, have developed very different eating habits, and use many different languages and types of social greeting. This must not be forgotten in our discussion about the evolution of culture. Culture here is defined as all socially learned behavior that distinguishes individuals belonging to one group from individuals belonging to other groups. At the same time, let us be candid for a moment; I have never done anything even remotely close to composing "Don Giovanni,"

[1] « *Il n'y a rien de barbare et de sauvage en cette nation, à ce qu'on m'en a rapporté, sinon que chacun appelle barbarie ce qui n'est pas de son usage ; comme de vrai, il semble que nous n'avons autre mire de la vérité et de la raison que l'exemple et idée des opinions et usages du pays où nous sommes. Là est toujours la parfaite religion, la parfaite police, le parfait et accompli usage de toutes choses.* » ("Des Cannibales", Essais, 1st volume, chapter 30, 1595.)

I have never painted a work of art, and I have no idea what is inside the computer I am writing this on. And the same is probably true for most of us. Hence, a more realistic way to describe the achievements of human culture would be to say that a few human geniuses invented computers and even fewer composed Don Giovanni, while the rest of us are happy to be able to drive a car and cook food on a gas stove and speak the languages and adopt the social habits of the group we belong to. For most of us, the world is made up of products that were invented and manufactured by other humans.

Culture has always been considered as one of the most important human characteristics. Researchers from many academic disciplines, including anthropology, archaeology, and much of psychology, are dedicated to studying this uniquely human ability. How can you not be impressed by the power of culture in humans when you see, for example, the unbelievable cave paintings in the "Grotte de Chauvet" in the South of France? The groups of elegant horses, lions, and antelopes were painted on the cave walls some 32 000 years ago by individuals who possessed skills that are comparable to Picasso's and Braque's. Similarly, when I play Chopin's "Nocturnes" on the piano, I share a cultural inclination and imagine myself giving life to Chopin's intentions by interpreting those pieces with the level of feeling he might have intended them to be played with some 160 years ago. These cultural skills, which humans have shared for centuries, are clearly hallmarks of humanity and many have thought them to be uniquely human.

But then the chimpanzee came along. The major finding that science has garnered about chimpanzees over the past 25 years is that each population in Africa differs to a surprisingly high degree from any other in many behavioral and social domains. The puzzle was that such behavioral differences could not be predicted directly from the chimpanzees' environments. In addition, these population differences are often strikingly arbitrary; in some populations, males initiate a sexual encounter with a female by knocking with their knuckles on the trunks of trees, while in others they do so by ripping leaves with their fingers. In yet another population, males rip leaves with their teeth to invite a female for sex, while in another this would signal the start of a play session. Some chimpanzee populations crack open nuts with hammers while others ignore nuts entirely. But all these differences sounded uncannily similar to culture to us and, thus, we were forced to rethink our ideas about culture being uniquely human.

Now that the notion of culture in animals was no longer heresy, examples of population-specific differences in other animal species also began to emerge. Observers working with Sumatran orangutans noted that some populations used tools to open a certain variety of fruit, while populations on the other side of the river ate the same fruit but never used tools. There were reports of dolphin populations producing "clicks" in different, group-specific ways in the Atlantic compared to the Pacific Ocean. Capuchin monkeys in Central America have been observed to develop astounding group-specific play techniques, like one individual poking a finger in the eye of another or biting hair from the partner's shoulder, and, like fashion trends, these behavioral patterns spread rather quickly to most other group

members. One population of New Caledonian crows was seen to make and use simple tools to fish insects out of branches, while a subpopulation invented a more efficient hooked tool. Baboons and bonobos have also been proposed to belong to the culture club and you can be sure that the list will grow as researchers observe and compare more populations of animal species.

And the culture war started …

The entire history of our quest to understand "what makes us human" has been punctuated with debates. Following the remarks by the Bishop of Worcester's wife, one such debate began on whether or not humans are a class of living beings separated by divine intervention from all other living beings. Luckily, it quickly included some scientific questions. Is tool use uniquely human, as is suggested by the name of our famous ancestor "*Homo faber*," or are tool-using abilities shared with chimpanzees? This debate has been ongoing since the Gombe chimpanzees were first reported to use tools in the early '60s. This is a particularly heated debate as, even today, the association with tools remains one of the most important criteria for deciding if a fossil belongs to our genus, *Homo*. So it should not come as a surprise that observations of tool use in animals have immediately been questioned. Like Desmond Morris said, "our climb to the top has been a get-rich-quick story, and, like all *nouveaux riches*, we are very sensitive about our background."[2]

Similarly, does hunting define humanity as the label "Man the hunter" would suggest, or are other primates hunters as well? Evidence of our hunting past is abundant; however, hunting has now been observed in all chimpanzee populations in Africa, which undoubtedly brings the value of using hunting to define humanity into question. Maybe it is something in the way we hunt. For example, could cooperative hunting be a marker of humanity, or are the cooperative hunts seen in lions and chimpanzees similar in kind? Since it was suggested that cooperation requires sophisticated social intelligence, the debate about cooperation has grown in visibility and became a very lively contest in which observations from the field are pitted against experiments with captive animals, and vice versa.

Life was much simpler for anthropologists 50 years ago. Without any observations of wild animals for comparison, it was easy to define what was strictly human. When culture was thought to be a uniquely human ability, defining it was very straightforward and all scientists happily embraced definitions that incorporated a direct reference to human or uniquely human abilities like language and writing. Now that we know the situation is not so simple, however, there is an urgent need to better understand what culture means in nature. Nevertheless, some minimal agreement prevails in the sense that all would agree, at the very least, that culture is a distinctive collective practice that is passed on to group members, and, at the insist-

[2] *The naked ape* by Desmond Morris (2nd edition, 1983, p. 241).

ence of some culture anthropologists, includes elements based on shared meanings between members of the same group or society.[3]

The factions of the culture debate can be summarized as follows: The "human uniqueness" faction holds that only humans have culture and that what we observe in animals is something different altogether and therefore must be named differently. The "human superiority" faction holds that what is observed in other animal species could be conceded to be culture but regardless, it is of a lower form, and higher forms of the culture phenomenon, like imitation, teaching, and sharing goals and intentions, are strictly human. The "ape–human clade uniqueness" faction proposes that all great apes, including humans, share such abilities and they are based on some cognitive abilities that are unique to them. And finally, the "biological" faction proposes that culture is widespread and we should look at it in a comparative way. Culture, from this point of view, is expected to be especially important in species with enough learning abilities and in environments where flexible solutions are required.

Chimpanzee ethnography to uncover culture

As a field worker who has now spent 30 years observing chimpanzees in many parts of tropical Africa, I have been lucky enough to see for myself most of the behavioral differences that I discuss in this book. My aim is to present culture from a different perspective than previous works have. First, I will focus on the different properties of the culture phenomenon as observed in different species. I will not discuss whether or not culture exists in species other than humans as 40 years of studies on whether or not chimpanzees and other animal species *have culture* has rendered this last question a little outdated. Second, I will concentrate on animal culture rather than on human culture and by doing so, I will highlight the different levels of cultural complexity that can be reached in animal species, with a special emphasis on chimpanzees. Third, I will guide the reader through the ever-increasing diversity of cultural behaviors that we are discovering in chimpanzees. Over the years, it has become apparent that each chimpanzee population possesses a distinct behavioral repertoire. In fact, these differences are so clear that if you tell me how a chimpanzee behaves, I can tell you where he or she comes from. This is akin to a behavioral fingerprint! Fourth, using this knowledge, I will try to identify the specifics of the culture phenomenon in humans. However, to answer the question of "what makes us human," we should not forget the great sociologist Pierre Bourdieu's advice to concentrate on what humans do in practice and not what they say they do.

To better understand what culture is and how it is acquired, I will distinguish between three main cultural domains. The first domain, *material culture*, includes all aspects of culture that are concerned with the external material world that

[3] Some examples of discussions about human cultures can be found in Kuper (1999), Barnard (2000), and many other publications.

individuals encounter daily. Most of the work that has been published so far on animal culture has focused on this domain and through such studies it has been possible to use artifacts such as tools to document cultural diversity in a variety of species, including chimpanzees, orangutans, and New Caledonian crows.[4] The second domain, *social culture*, includes all social aspects that allow individuals to develop and benefit from the advantages provided by living in social groups. The third domain, *symbolic culture*, encompasses all means of communication, in a very general sense, between individuals during their social interactions. These last two domains have rarely been considered in primates, although they have been more systematically discussed for sea mammals, like whales and dolphins, and for birds.[5] These three domains are, of course, not mutually exclusive; for example, a symbolic cultural behavior may include an object of the environment or a social partner. However, all three domains encompass primarily different substrates – tools, social partners, or arbitrary meanings – and rely upon different cognitive abilities, and, most importantly, they are acquired with the help of different learning mechanisms.

As a general rule, the more we learn about animals and their behavior, the more we are forced to redefine "what makes us human." In this book, I hope to familiarize the reader with some of the chimpanzees that I have known over the last 30 years and through them, share how culture affects the way they live. Indeed, early propositions of what defined humanity, such as "Man the hunter," "*Homo faber*" – the tool user, "Cultured Man," "*Homo reciprocans*" – the sharer of food, the Cooperator, and the Mind Reader[6] have all been challenged by observations of wild animals. But our knowledge of animals is still limited in comparison with our knowledge of humans and thus, one essential approach to learning what really makes humans unique is to study animals in the wild and consider all the evidence they present us with.

Cultural biases and scientific progress

All of us, myself included, are influenced by our personal experiences. Those of us who had a strongly religious upbringing might have difficulty with the idea that, for millions and millions of years, we shared a common ancestor with chimpanzees and many other mammals. On the other hand, those of us trained as biologists sometimes have difficulty imagining that human behavioral patterns might not have a precursor form in one of our closest animal relatives. In a similar

[4] For chimpanzees, see McGrew (1992, 2004), for orangutans, see van Schaik and Knott (2001) and van Schaik *et al.* (2003) and for New Caledonian crows, see Hunt (1996) and Hunt and Gray (2003).

[5] The main exception for primates has been the work of Sapolsky (2006) on baboons. For whales and dolphins, see Whitehead (1998) and Rendell and Whitehead (2001).

[6] "Man the Hunter" (Lee and DeVore 1968), *Homo faber* (Leakey 1961, Mithen 1996, Wolpert 2007), *Homo reciprocans* (Bowles and Gintis 2002), Cooperator (Henrich *et al.* 2006), Mind Reader (Meltzoff 1996, Tomasello *et al.* 2005).

way, experimental psychologists have been trained extensively to think in terms of experiments and they remain skeptical of any observations that cannot be duplicated in an experiment with controlled conditions. With a parallel bias, mathematicians tend not to accept a conclusion that is based on observations if it is not supported by a mathematical model confirming the causal link between a parameter and an effect. Those who observe animals in the wild, in contrast, tend to be skeptical of captive observations if they are not supported by natural observations, and stress the limitations of captive studies as being unnatural and therefore difficult to generalize. All approaches have their benefits and limitations and the key to making progress is to be aware of them and combine the beneficial aspects of each approach.

Our brain should see through our eyes. As a fieldworker, I tried to accept what I observed about the behavior of an animal species in the wild without being influenced by my education, experiences, and beliefs. What determines how chimpanzees behave is not what we think they are capable of doing; we should document what we see in a detailed way without preconception. The challenges encountered in the dense rainforests of Africa are very different from those encountered in the open savannas, but this only became apparent after observers compared their observations of chimpanzees finding fruit or a driver ant nest or hunting for monkeys in both environments. To me, a city boy without any such prior experience, this was a lengthy education.

However, you see only what you know! This learning to see is a painstaking experience that can move one away from what you had previously learned to be "true." Once during my early days in the Taï Forest, I was following Brutus and Falstaff, the two oldest male chimpanzees of the study community, on a hunt when they suddenly passed behind me and disappeared in the dense undergrowth. I was totally astounded; why were they running in the seemingly wrong direction? It took me many months and many more hunts until I realized that they were anticipating what would happen during the hunt and knew that under the pressure of the other hunters high up in the tree, the prey would try to escape in a particular direction, which they would then head towards to close the trap. I was lucky enough to study a chimpanzee population that lived in a habitat where group hunting was required and that included two old, gifted hunters like Falstaff and Brutus, who would repeatedly perform complicated anticipatory hunting movements for me to learn to see and understand them. Descriptions of the cooperative hunts by Taï chimpanzees can read like a foreign language if you have not experienced them firsthand. Furthermore, some might dismiss such descriptions as purely anthropomorphic[7]

[7] "Anthropomorphism," defined as the attribution of mental states or properties to nonhuman animals, has been criticized by some as being a non-scientific explanation of animal behavior (Keeley 2004, Goodrich and Allen 2007, Wynne 2007). It has then been used to dismiss the work of animal advocates, who they believe are too emotional about and believe they see human feelings in animals. As such, anthropomorphism would prevent observers who have spent too much time observing animals from making rational judgments. On the other hand, some argue that a certain level of anthropomorphism, based on empathy and intuition, are essential to deciphering animal behavior patterns that

and not realize that they might be the ones wearing the anthropocentric glasses that lead them to place humans as the reference for all comparisons.

Similarly, too many still believe that the western way of life is representative of the entire human species, but this is simply not true. In my opinion, scientists who hold such ethnocentric beliefs are in no way helping to improve our knowledge of "what makes us human." Only without these glasses can we see, for example, that humans throughout the world have very different ways of understanding distances and directions and have developed very original solutions to orient themselves under different socio-economical situations. Similarly, humans belonging to different cultural groups exhibit an incredible diversity of responses to tests for altruistic propensity and willingness to enforce rules through punishment. As we will see later in this book, there is an abundance of persuasive examples of cultural solutions in different cognitive domains in humans. In many instances, it is actually our western way of life that is different from the way humans think throughout the rest of the world. No one way of life should be considered more valuable than any other, as all are responses to the socio-ecological conditions faced by each of these populations. Leaving ethnocentrism aside, what is so fascinating about humans is how much more diverse our range of possible solutions seem to be compared to chimpanzees and any other species (we will come back to this point later).

Finally, we see only what we want to see. It requires a special effort to put aside our anthropocentric and ethnocentric glasses – after all, we have "always known" that our food tastes better, that our grass is greener, that domestic cars are more reliable, and that our music is the most harmonious – and open our eyes without being judgmental to the richness of human cultural differences and to the behavior of animals. Humans are the judges when it comes to comparisons with other animal species and this makes us prone to hasty or unjustified claims. In this book, it is my intention to consider all our knowledge on chimpanzees and to show that, with the help of all observations, a productive distinction can be reached that pinpoints the unique cultural abilities of humans and chimpanzees.

To address these issues, I propose to take you on a trip into the tropics and into the lives of the chimpanzees, where we will follow some individuals as they develop in their respective cultures. I will first review some of the different approaches to animal culture, starting with my personal experiences when I worked in Africa (Chapter 1), and then try to explain why "culture" is such a hotly debated concept and why the resistance of some to accept it in nonhuman animals is so great (Chapter 2). I will then present some evidence for what chimpanzees have achieved in the material culture (Chapter 3), social culture (Chapter 4), and symbolic culture (Chapter 5) domains. To finish this review, I will concentrate on how cultural traits are taught and acquired in different chimpanzee and human groups (Chapter 6).

are new and unexpected (de Waal 2001). Finally, critiques of anthropomorphism often come from people who are anthropocentric themselves and therefore extremely reluctant to concede any so-called "human prerogatives" to nonhuman species and too often anthropomorphism is used as a last-resort argument to avoid considering the evidence.

Next, I will discuss how chimpanzees react to death and what this indicates about their feelings (Chapter 7). Then, through a direct comparison between chimpanzees and humans, I will explore the relationship between culture and cognition in both species (Chapter 8). Finally, I will revisit the question of human and chimpanzee cultural uniqueness (Chapter 9).

1 Studying culture in the wild

Every circumstance concurs in demonstrating that the brutes are actuated by appetite only, and that man is influenced by a superior principle. The only doubt that remains is the difficulty of conceiving how appetite only should produce in animals effects so similar to those produced in men by intelligence

George de Buffon (Natural History, History of Man, vol. 3, 1748, English translation 1812)

In the 4th century, Diogène asked Plato what a man is. Plato said, "It is a bipedal with a naked skin." Diogène left the room and came back a bit later with a featherless chicken and told the audience, "Here, Plato's man!"

In 1979, just a short time after beginning my PhD research on the chimpanzees of Taï National Park, I experienced my first culture shock. Our friends, the Sangbé, a Baoulé family who lived near the park boundary, were very supportive of us living in the middle of the forest and "working" with wild chimpanzees. The Sangbés came to live there because it had become impossible to sustain themselves in their home village, which was located in the progressively drying savannah region in the middle of Côte d'Ivoire. Rains were much more abundant close to the large Taï forest and they felt privileged to be able to grow cocoa, yams, bananas, and Raphia trees, which are used to make Bangui wine. Their hospitality remains one of our greatest memories of life deep in traditional Africa. I remember us gathering around the petrol lamp under the starlit sky in their village and dancing to the music of their second-born son, N'Guessan, with his homemade guitar. Mama Sangbé held our son in a "boubou" tied around her back, and N'Goran, their first-born son, drummed on an empty plastic gasoline jug that held the Bangui wine we drank until very late in the night. Without ever asking us, they knew that we did not eat primates and they declared them to be our totem. N'Dri, their third son, often gave me the best parts of the meat in honor of my status as a guest, so I received the heads of the duikers, the long hairless tail of the big Gambian rats, the crest of the chickens, and the eyes of the goats. I was always jealous of Hedwige, my wife, who received the lesser-esteemed parts like goat and duiker legs, or the white meat of the chicken. It took me many years before I realized that I was not forced to eat these prized pieces as long as I recognized the honor they were bestowing upon me and would sacrifice some of my Bangui wine to the ancestors by pouring the last drops from my gourd onto the floor. Once it had gotten late and we were ready to take our leave, following the Baoulé tradition, we asked "for the road" so that we would find

our way home. More Bangui wine would then appear from the dark and our hosts would offer us only half the road so that we would be sure to visit again.

Once in the forest, another culture shock awaited me. When I first saw chimpanzees, I found it impossible to distinguish between all the furry black shadows in the dark forest and this made me panic; how on earth would I be able to study their social interactions and follow their behavior? Hedwige shared my dismay at this challenge. As if this was not enough, the Taï forest was so dark and so dense that after taking 20 steps in, you had no idea where you were and could very easily get lost. Valentin, a local Guéré hunter who was our first guide, felt very confident in the forest and continually saw interesting plants and animals. However, he was totally unconcerned about bringing us back to our camp, and would happily bring us to his village, a good 6-hour walk away, instead. It was not that he had a poor sense of orientation; in fact, his amazing navigational skills allowed him to walk in a perfectly straight line for kilometers without the help of any technological devices as long as the sun was out, a feat no city boy like me could even dream of. It was possible that the time he spent as a child in the forest with his father had taught him about moving in the forest and he acquired a sense of orientation that, in comparison to my own, made me feel like a broken weathervane.

Understanding cultural diversity first requires modesty. Fresh after graduation from Geneva University, enrolled in a PhD program in one of the best Swiss Universities, and armed with a three-year grant from the highly competitive Swiss Science Foundation, I had the perfect plan to understand the nut-cracking behavior of the Taï chimpanzees. They were one of the rare African chimpanzee populations that were believed to use stone hammers to crack nuts. There were no eyewitness reports of this behavior, only accounts from local people who had attributed signs of nut-cracking in the forest to the chimpanzees. I had come to Côte d'Ivoire to elucidate this. But when I arrived in the middle of Africa, in the extraordinary Taï forest, all my knowledge about mathematics, statistics, chemistry, and evolutionary theory did not seem to be of great use. I could draw a perfect map of the park from satellite images, but would be irreparably lost in it the minute I lost my compass.

To observe chimpanzees, one first has to find them, and due to the dramatic increase in the number of humans in Africa, all of them hunting in one form or another for meat, they survive only in the most remote places on the continent. To reach such places, I needed the help of local guides who knew the area. We went looking for information about intact populations of chimpanzees near the village of Keïbly, north of Taï. The villagers all agreed that they could be found near their village, but when I asked where exactly, it was difficult to gain a clear answer. Incurably optimistic, Hedwige and I decided to try to find them. Our guide, Valentin, a former hunter and game warden, knew the region and pointed to the south as the place where we needed to go, but we first headed east and then more northeast, between cocoa fields intertwined with banana and yam plantations. We greeted some farmers as we crossed their "campements," which consisted of a couple of huts they used during the week, and each time, Valentin stopped to accept a drink of the palm wine they had offered us. Time passed quickly, which naturally