

Chapter Nine

Behaviour and Ways of Life of Other Species

Culture consists of certain biological activities, neither more or less biological than digestion or locomotion.... Culture is merely a special direction which we give to the cultivation of our animal potencies.

—José Ortega y Gasset¹

In much the same way that the idea of culture went through a profound transformation in the latter part of the nineteenth century when anthropologists and sociologists began to apply the concept of culture as a complex whole to human beings, so it has gone through another profound transformation in the latter decades of the twentieth century and first two decades of the twenty-first. This has resulted largely from research by biologists, zoologists, botanists, and horticulturalists who see and deal with culture in even more expansive terms by including other species, not just humans.

Like the earlier transformation, the present broadening of the concept of culture has not replaced the traditional manifestations of culture as the cultivation of the soul, the arts, humanities, and the heritage of history. Most people in the world as well as governments, corporations, foundations, international organizations, and even many educational institutions remain committed to dealing with culture in this way, as are many cultural organizations as well. Despite this, UNESCO did recognize and endorse the anthropological manifestation of culture as a complex whole or total way of life at its Second World Conference on Cultural Policies in Mexico City in 1982.² This confirmed that the anthropological manifestation of culture was gaining traction.

This is also true for the much more recent and expansive biological manifestation of culture. It has not replaced earlier

holistic manifestations of culture, such as the anthropological and sociological conceptions, or the more traditional definitions. What it did do, however, was to expand the holistic understanding of culture to include other species in a far broader conception of culture and cultures. This has powerful implications and consequences for human beings and other species in the years and decades ahead.

The origins of this biological manifestation of culture can be traced back more than a century and a half ago. Most prominent in this regard is the work of Charles Darwin, Gregor Mendel, Louis Pasteur, Carl Linnaeus, and George Washington Carver in earlier times, and Rachel Carson, Beatrix Potter, Desmond Morris, Jane Goodall, Dian Fossey, Anne Dagg, and many others more recently.

While anthropologists and sociologists were among the first scholars to make the case that cultures and societies are wholes and not just parts of wholes, their studies in this area were limited to human beings and did not focus a great deal on other species or the natural environment. These disciplines are still largely concerned with humans, despite the fact that more attention is now being accorded to the natural environment.

It took the work of biologists, zoologists, botanists, horticulturalists, and others to expand this domain by focusing on other species and specifically the similarities and differences among all the diverse species in the world. Very early in their studies they raised the question of whether all species have culture and create cultures, or are culture and cultures confined to human beings?

It wasn't long before the answer to this question emerged, since it was apparent that human beings and other species shared an enormous amount in common. Humans, like other species, are living organisms, and members of an order of animals called *primates*. Other primates include gorillas, chimpanzees, and gibbons. Like other living things, human beings need water, air, and food to survive. They also go through similar stages in their development and functioning over the course of their lives, such as birth, growth, decline, and death. Bodily functions like consumption and elimination, procreation, and communications and bonding are shared with other living organisms as such. Moreover, humans and other species have similar techniques of organization, social interaction, community development, and so forth.

Of course, there are many differences between species as well as similarities. This is especially true of the differences between human beings and other species. In fact, many people believe that culture in general—and the ability to create cultures, societies, social systems, and so forth in particular—is predominantly, if not exclusively, a human ability and therefore the sole preserve of human beings. Even if other species have the capacity to create cultures, societies, social systems, and the like, advocates of this belief contend that this capacity is so elementary compared to human beings that it is not worth thinking about. For such people, culture and the ability to create cultures, societies, social systems, and other human collectives is *the* principal difference between human beings and other species.

For centuries, it was assumed that only human beings possessed the ability to think, reason, and, perhaps most important of all, engage in self-reflection. This led to the conclusion that most human actions were grounded in intelligence—the ability to think things out and act in a logical, rational, and consistent manner. This contrasted fundamentally, as advocates of this belief were quick to point out, with the behaviour of animals, which was based largely on instinct.

Other people have a different take on this matter, although it boils down to much the same thing in the end. They tend to see all the different species as living organisms in the world as forming a gigantic pyramid or hierarchy with human beings at the top of the hierarchy, animals beneath, plants much farther down than animals, and all other living organisms—for instance, protozoa and bacteria—at the bottom.

Views like this were often condoned by religions such as Christianity that were based on the belief that human beings were created in the image of God, granted “domination over the earth” by God, and therefore occupy a privileged position at the very apex of the pyramid. This was often interpreted to mean that people could act in any way they liked towards other species since those species had been placed on the earth to serve human beings.

Beliefs like this made it possible for human beings to create a huge divide between themselves and other species. This helped to mitigate the sense of guilt they felt from the way they treated other species, especially animals. As a result, they dominated animals,

subordinated them to their will, killed them for their meat, used their hides and fur to make clothes and create shelters to provide warmth, put them to work carrying heavy loads or lifting awkward objects, displayed them in circuses and caged them in zoos, and so forth. Whatever the explanation, attitudes like these were prevalent at one time and used to justify the separation of the human realm from the realm of other organisms. Consequently, not a great deal of research was undertaken about other species except as sparked by the curiosity of various scholars. This was especially true for animals' basic behaviour, capabilities, organizational forms, structures, activities, and traits, as well as for their overall ways of life. It was decided that such things were not all that important in the larger scheme of things.

These beliefs have changed dramatically over the last few decades. There is today a remarkable amount of interest in the ways of life of other species. This interest has grown substantially, so much so that research into the nature, behaviour, traits, sensory abilities, cognitive capabilities, and organizational forms, structures, and ways of life of other species is compounding rapidly. With this has come growing awareness and acceptance of the fact that other living organisms have culture and create cultures, just as humans do. Moreover, the similarities between human beings and animals and plants are now deemed to be far greater than was assumed earlier. This has led to the conclusion that the differences among all the diverse species in the world are largely differences in degree and magnitude and not in substance or kind. Every species in the world has its own forms of culture that are manifested in its way of life.

There is a vast number of living organisms and different species in the world. This includes not only animals (including humans) and plants, but also micro-organisms such as bacteria, archaea, protozoa, algae, and fungi. Viruses are often included in the list as well, but most scientists do not consider them living organisms because they cannot reproduce themselves outside a host cell. Interestingly, the biggest living organism that has ever existed in the world is not a blue whale or giant redwood tree, as most people would think, but rather a colossal honey fungus that exists in the Blue Mountains of Oregon and measures more than three kilometres across. All these

species create cultures in one form or another, even if they may be very different than the ones created by human beings.

Consider bees and their culture as one of the best illustrations of this. Without the capabilities of bees, it is very likely that human beings and many other species might not exist today.

Like human beings and human cultures, bees create highly complex and intricately designed cultures that are concerned with their survival, habitation, community development, solidarity, communication, interaction, and well-being. These cultures, with their queen, drone, and worker bees, rigid hierarchies and divisions of labour, finely tuned communications systems, sensing capacities, and productive capabilities, structure how bees live as well as ensuring their survival. Like human beings, bees create a continuous flow of products. These products, such as honey, wax, beehives, and honeycombs, are much in demand in the human realm and have both a functional and aesthetic significance. Beehives and honeycombs, for instance, are remarkable creations, comparable in their style, design, function, and complexity to many of the cultural creations of human beings, though on a much smaller scale.

Just as bees prefer certain types of habitats and create their homes, so all animal species have habitats and homes of one kind or another. These homes or habitats may be in a city, forest, desert, grassland, wetlands, tundra, or mountainous area, or, in the case of fish, oceans, lakes, streams, and rivers. Animals live in a variety of accommodations, such as dens, lairs, holes, tree trunks, hollow branches, caves, nests, hills, woods, ponds, and so forth. We now know that octopuses are capable of using clam and coconut shells to create their homes on the ocean floor. Moreover, the homes of some animals can be very elaborate and ornate, such as bird nests, beaver dams, and ant hills.

Interestingly, contemporary research is revealing that ants are much better traffic engineers than people because they never have to endure traffic jams and gridlock. Investigations into this matter at the University of Potsdam and the Martin Luther University in Germany revealed that a nest of black meadow ants had four main trunk lines leading to their foraging area in a forested region of Saxony. The ants treated each track to and from the ant hill like a three-

lane highway: when traffic volume was low they travelled down the centre of the track, whereas when it was high they spread out. Similar arrangements were made with respect to leaving and returning to their ant hills; ants searching for food went out on one side of the line or track and returned with food on the other side. There were also strict rules with respect to how and when to pass, deal with obstacles and encumbrances, and speed up or slow down depending on the density of the traffic.

In order to compete for survival and ensure their well-being, many animals have been compelled to develop, adopt, and cultivate very specific traits, attributes, and sensory capabilities that may not only be on a par with those of human beings, but actually in many cases are far superior. This is especially true with respect to the different senses. Elephants, bears, and sharks, for example, are said to have the strongest sense of smell. Bears can detect a dead carcass some 20 miles away; elephants can detect water 30 miles away; and dogs can sniff out drugs and other items in densely packed suitcases, as well as detect illnesses in people, through their highly cultivated sense of smell. When it comes to sight, hawks can see far better than people, even though their eyes are substantially smaller than those of humans. Apparently, moths have the best sense of hearing in the world, largely as a result of having to evade their most dreaded predator, the bat. Moreover, catfish have the best sense of taste, primarily because they have more than 100,000 taste buds situated in their mouths and other parts of their bodies whereas humans have only about 10,000 taste buds.

And this isn't all. Recent research is revealing that animals have many different ways of communicating in general and communicating information related to their survival and well-being in particular. When bees leave the hive to hunt for flowers in order to extract their nectar to produce honey, they dance when they return to their hives in order to communicate this information to other bees. This tells the bees in the hive what direction to fly by following the position of the sun in the sky, how far away the flowers are from the hive, and how large the food supply is at this specific location.

Communication of this type—as well as language in general—is not restricted to bees. Every animal species has its own form of

language and communication that enables members of that species to communicate with other members of the species and even members of other species on occasion. Birds, for instance, have different dialects in song that enable them to communicate information about who they are, where they are, what their territories are, whether or not they want to copulate, and a great deal else. The master at this is without doubt the mockingbird. It was made famous as the principal symbol or metaphor in Harper Lee's novel *To Kill a Mockingbird*. Interestingly, T. Gilbert Pearson called the mockingbird "the songking of the lawn," and, as far back as 1929, the noted ornithologist E. H. Forbush wrote that the mockingbird equals and even exceeds "the whole feathered choir." These birds are renowned for their ability to mimic the sounds of dogs, cats, trucks, and people. They are said to have over 200 songs, tunes, and words in their vocabularies and repertoires, which is why their scientific name—*mimus polyglottos*—means "many-tongued mimic." This description might be contested by lyre birds and parrots: lyre birds are able to mimic the sounds of chainsaws, heavy trucks, and so forth; and parrots are able to mimic or duplicate the voices and words of human beings and even talk or sing to them on some occasions. Small wonder a bird was Mozart's favourite companion, in this case a starling that he loved and was attached to so much that he wrote a musical work—*A Musical Joke*—in its honour.

When it comes to intelligence, certain types of animals are no slouches. There are many examples of this. It is a well-known fact that chimpanzees are very smart, and why not in view of the fact that they share 98 percent of their DNA with human beings. Chimps can easily recognize and remember changing signs and flashing images on computer screens when they are taught to do so. Dolphins can identify themselves in mirrors when specific markings are made on them, which they immediately try to rub off or remove. Elephants can tell whether it is a man, woman, or child talking, and some crows, which have long been recognized as being very intelligent and incredibly creative and crafty, were able during one experiment to get a toy floating on top of the water under a tall, narrow glass by dropping pebbles into the glass until enough water was displaced that the toy rose to the top of the glass where it was quickly grabbed by the

crow in its beak. But perhaps the most intelligent feat of all performed by animals may be reserved for raccoons and their ability to figure out how to open garbage cans, bins, and other containers! For years, they have been waging a war with humans and outsmarting designers by opening ever more complicated and sophisticated garbage cans, bins, and containers that have been specifically designed to keep them out.

And there is more. Much more. Modern advances in biology and zoology are revealing that animals possess many other capabilities, traits, and characteristics similar to those of human beings. These includes the capacity to experience joy, happiness, pain, sorrow, and suffering, protect their young, respect their elders, and assist other animals that have disabilities or are handicapped or distressed in some way. They also have feelings and emotions such as sympathy, empathy, love, and compassion, engage in acts of kindness, generosity, and reconciliation as well as retaliation and vengeance, make concessions and compromises, seek and extend forgiveness, and cooperate when needed. They make aesthetic judgements and choices, especially during the courting and mating season, as well as appreciate beauty and beautiful things, indulge in play and recreation, recognize and follow rules, act morally in certain situations, have memories and—consistent with the finding of Anne Dagg, Jane Goodall, and others—have personalities and personality traits much like human beings, such as agreeableness, aggression, extroversion, introversion, depression, anxiety, and self control.

It is impossible to think about the personalities of animals and their various traits and characteristics without mentioning Camille Saint-Saëns' famous musical work *Carnival of the Animals* and the wonderful description of this evocative composition and the animals in it written by Ogden Nash. While not all animal species may display human characteristics, many do. And why not? Other animals are just like people in many ways, and people like animals in numerous ways as well. If they didn't possess similar qualities, characteristics, and abilities as humans, their lives would be very different from ours, and ours from theirs. However, we are similar because humans are animals themselves—we evolved from a common ancestor we share with chimpanzees.

Much like humans, animals have many different mating customs,

habits, and rituals. These can be very elaborate and even ceremonial in certain situations, extending all the way from puffing up their chests and ruffling their feathers in the case of birds to many different types of dances, hoots, and calls for other animals. Interesting, when swans court and date, they curve their necks towards each other in the shape of a heart, lift their wings, and bow, a reason why swans are regarded as genuine courtiers in the animal realm.

Just as it is for courting, dating, and mating habits, so it is for “hiving off,” procreation, and sexual practices. Some animals spend their entire lives together while others only come together during mating season, some of these reuniting with the same partner year after year, others taking a new partner each year. Animals who remain together for life or rejoin the same partner every mating season include gibbons, macaroni penguins, sandhill cranes, seahorses, grey wolves, barn owls, bald eagles, beavers, and doves. Of course, sexual practices of animals vary greatly from one species to another. One of the most fascinating species in this regard is corals, which are giant colonies of very tiny creatures. Their sexual practices result from mass spawns tied to seasonally warming water and lunar cycles. They ejaculate collectively in the sense that when one ejaculates all the others follow suit immediately afterward, creating a wave-like effect similar to the types of waves in crowds that are often seen at sporting events.³

Similarly, how animals look after their offspring after birth can vary significantly. Animals that stay together tend to assume parental responsibilities together, except that it seems to be more commonplace among many animal species for the male to remain in the home while the female goes out foraging for food. Interestingly, this seems to be happening more frequently in the human domain as well in recent years, due to all the changes that have occurred in the workforce and the fact that more women are now working outside the home.

In a study conducted recently by Paul Zak at Claremont Graduate University, it was found that the feeling of attachment can be very strong in animals, in much the same way as it is for human beings. According to Zak, the hormone oxytocin is as strong a bonding agent in other animals' relationships as it is for humans, and “animals are capable of falling in love the same way humans are.” And much

like humans, this love can extend well beyond one's own species to members of other species. There are numerous cases of an animal of one species becoming strongly attached to a member of a different species. Moreover, everyone knows that humans have great affection and an incredible amount of love for their pets and these pets have an incredible amount of love and affection for their owners as well. This may be especially true for dogs and dog owners. Many dogs have lamented the loss of their owners for a very long time after their deaths and have gone to the grave sites of their owners every day for years and sometimes for decades to show their love, affection, devotion, and remorse. The same is true for animal owners, who often show the same feelings and emotions when they lose their cherished pets. It often takes years to recover from tragedies such as this if at all.

Given all the individual traits, attributes, and capabilities of animals, it is not surprising that animals and animal species have culture and create cultures much like humans. In addition, their culture and cultures can be highly developed and very sophisticated wholes or total ways of life. Take the culture of elephants as a well-known example of this. Elephants have been known and appreciated for centuries for their symbolism in the human domain, and are greatly admired for such qualities as sensitivity, wisdom, stability, loyalty, intelligence, reliability, peacefulness, and determination. Often called "gentle giants," these remarkable animals show a great deal of affection, care, and compassion towards each other, including toward their offspring and elders, thereby acting as excellent role models for other animals and humans, too. Not only do elephants bond with each other in much the same way that human beings bond, but also they are each other's keepers. They are very attentive when other elephants are sick, elderly, in distress, or threatened in some way. They also form circles to protect themselves from other animals when they are being attacked, just as humans "circle the wagons" and "have each others' backs."

Elephants also look after their young in much the same way that humans do, often doting over them and actively participating in their upbringing, education, and development. It is not surprising in this regard that mother elephants and their children often live together for decades. Elephants mourn the deaths of loved ones, return to the

bodies and bones of deceased elephants, and often leave sticks, stones, or leaves on their grave sites. Perhaps more than any other group of animals, elephants have many different ways of communicating, such as trumpeting and creating low and deep sounds that cannot be detected by humans. They also have many different types of gestures, taps, nudges, kicks, grunts, the caressing of trunks, the flapping of ears, and a variety of head movements to convey their feelings. Living in groups of up to 400 members, they can be very sensitive as well, consoling other elephants in distress by sticking close together and putting their trunks in the mouths of other elephants as a sign of friendship, love, trust, companionship, and devotion.

This contrasts sharply with the culture of meerkats, who gorge themselves during mating season in order to be and remain dominant. While they live in one of the animal kingdom's most cooperative cultures, the offspring of meerkats are usually raised communally rather than by a single mother (as is the case with elephants and most other animal species), since only one "alpha pair" of parents is permitted to breed. This makes the competition for alpha status fierce, often causing the dominant females to eat the siblings of other meerkats in order to ensure that only their own descendants survive. They may also exile offending meerkats from their colony. Since only the largest and heaviest female meerkats have the right to reproduce, all other meerkats must resign themselves to spending their lifetimes as babysitters since the alpha mothers may give birth to as many as fifty babies during their lives. This seems a much better system of reproduction, however, than is employed by guinea hens, mother pandas, and African black eagles, which are known to eat some of their siblings, or permit their healthier siblings to feed on less physically endowed and weaker ones in order to survive. They also kick some siblings out of their homes if they are not likely to make it in the "dog eat dog" world of animal survival.

Another good example of animal culture and cultures, and one that has always generated a remarkable amount of interest, curiosity, fascination, and attention among humans, involves wolves. In many ways, it bears the closest resemblance to human culture and cultures. Wolves also have well-organized social structures, obey strict rules of conduct and behaviour, and are playful when they are

well-fed but ferocious and vicious when they are hungry. They live in packs ranging from two to 36, usually averaging about six per pack, which consists generally of a single family with possibly one or two additional members. The one exception to this general rule is the lone wolf, which decides to go it alone.

Wolf packs generally consist of an alpha male and alpha female, usually the father and mother, but not always the strongest male and female in the pack. Siblings and offspring are organized and ranked in descending order of importance as far as the pack is concerned, and especially in terms of hunting and attacking other packs or animals. This includes beta members—next in line in the hierarchy to the alpha male and alpha female—and zeta members, who are usually the “war generals” of the pack and organize an attack after the alpha male or alpha female has provided the plan and gives the command. Interestingly, the rank of wolves in the pack is often revealed through how they hold their tails. If their tails are held high, they are usually alpha wolves; if they hold their tails lower or halfway down, they are likely to be in the middle of the pack; and if they hold their tails between their legs or drag them on the ground, they are likely to be the lowest members in the pack.

Recent research into wolf packs has revealed that older wolves often share their knowledge, experience, and hunting strategies and techniques with younger wolves, maintain lifelong friendships and bonds with them, and often pass on special cultural habits, characteristics, and secrets from one generation to the next, thereby creating a cultural legacy or heritage for the pack that is not unlike the cultural legacies and heritages of human beings. Moreover, what neighbourhoods, communities, legacies, and heritages are to humans is also true for wolves. It is matters like this that caused Rudyard Kipling to claim that “the strength of the pack is the wolf, and the strength of the wolf is the pack.”

This is by no means the end of the story, or why wolves and wolf packs are especially captivating for human beings. In recent years, there has been a tendency in the world and especially in some Asian countries to talk about “wolf cultures” and “lamb cultures,” as well as to compare and contrast these two cultures in business circles, corporations, politics, and diplomatic affairs. The wolf culture is

usually depicted as using any means possible to achieve a specified goal, disregarding or setting aside ethics and morality in order to achieve it, eliminate competitors, and reign supreme. Many of these characteristics were set out in a book called *Wolf Totem* and an eight-disc DVD set called *Wolf-like Managers* that were and still are extremely popular, especially in China.

This is often contrasted with lambs and the “lamb culture.” Whereas wolves and the wolf culture represent ruthlessness, lambs and the lamb culture represent kindness, meekness, gentleness, obedience, trust, serenity, and goodness. These dichotomous and very different types of animal cultures are sometimes used to describe or advocate for different forms of behaviour among humans, especially corporations and business but also governments and entire countries. In order to even odds between these two very distinct types of behaviour and cultures, some people contend that while the wolf culture might be more successful *in the short run* in business and government, the lamb culture might be most successful *in the long run*. However, the problem here, as John Maynard Keynes, the British economist, pointed out many years ago, is that “in the long run we are all dead!”

Finally, and perhaps most interesting of all in terms of animals’ abilities that have a great relevance for human beings and their development, is the capacity that some sea creatures have to regrow hearts and even whole new bodies, just as some lizards can lose their tails to get away from predators when necessary.⁴ When sea creatures eat a certain type of algae, they can photosynthesize their food from oxygen and sunlight, much like plants do. This “regenerative capacity,” which makes it possible for some sea creatures to create new organs, may perform a very valuable function in the future by enhancing our knowledge of how the molecular mechanisms in human cells and tissues can be used to repair damage to certain organs or possibly even replace them.

One person who has done a great deal of empirical research on animals and especially the similarities and differences between animals and humans in general—and animal brains, behaviour, characteristics, traits, capabilities, and cultures in particular—is Georges Chapouthier, a neuroscientist, philosopher, and emeritus

research director at the French National Centre for Scientific Research (CNRS). According to Chapouthier, most of the differences between human beings and animals can be explained by differences in the size, strength, and capabilities of their brains. Since humans have more powerful brains than other animals, they are able to create and produce many more sophisticated things and deal with more complex problems and situational difficulties.

This is particularly evident in the ability human beings have to create “super tools” such as computers and complicated machines and technological devices that are becoming more and more complex and sophisticated all the time. It is also evident in the development of languages and techniques that enable people to transmit information from one person or group to another, one generation or century to the next, and one country or part of the world to others. Humans also possess the ability to be inventive and innovative, the capacity to discuss ethics, morality, ideas, and philosophy, and the capacity to have visions and discuss these visions with other people as well as to create highly complex works of art, science, and scholarship, and a great deal else. Chapouthier believes the gap between other animals’ and humans’ brain capabilities is widening rapidly and will probably widen even more in the future.

Nevertheless, there is a great deal to be learned from animals and animal behaviour as well as their cultures and ways of life. As Frans de Wahl said in his book *Are We Smart Enough to Know How Smart Animals Are?*:

Animals should be given a chance to express their natural behaviour. We are developing a greater interest in their variable lifestyles. Our challenge is to think more like them, so we can open up our minds to their specific circumstances and goals and observe and understand them *on their own terms*.⁵

This is true for plants as well, although perhaps not to the same extent or on the same scale. Plants are also living organisms and as such they share many needs and wants in common with humans and other animals, such as the need for food, water, air, sunlight,

and other nutrients. They share life stages and processes like birth, development, and death, consumption and elimination, the ability to communicate with one another, and a great deal else with other living beings. In fact, recent research is revealing that the gap between plants and animals (including humans) is not as great as was once assumed.

Nevertheless, there are some basic differences between plants and animals. Plants are able to create their own food using water, sunlight, and carbon dioxide through a process called photosynthesis, while animals must eat other animals or plants to survive. There is another key difference between plants and animals that turns out to be a real advantage for animals and disadvantage for plants. Since animals have specialized nervous and muscular systems, most of them are able to move and travel from place and place. Lacking this ability, plants are confined to a specific location. As a result, animals can flee when they are in danger or are attacked, whereas plants remain in one place.

Despite these differences, do plants experience pleasure, pain, emotions, love, and affection much as animals and humans can? In his book *The Secret Lives of Plants*, Cleve Backster claims that some of these things can be experienced by plants, although this has been disputed by many natural scientists. All the same, Susan Dudley, a professor of biology at McMaster University in Hamilton, Ontario, did recently discover that plants prefer to be near their offspring rather than other plants that are not related to them. She concluded that “the ability to recognize and favour kin is common in animals, but this is the first time it has been shown to exist in plants.” Her research on this matter revealed that plants become competitive when they share pots with other types of plants by growing more roots that enable them to suck up more moisture and mineral ingredients. However, they don’t do this when they are sharing pots with members of their own species or family.

Then there are trees. They are undoubtedly in a class by themselves. In their book *Tree Cultures: The Place of Trees and Trees in Their Place*, authors Paul Cloke and Owain Jones confirm the fact that trees have many practical uses as well as an incredible amount of symbolic significance. Not only do trees provide us with wood, bark, fruit, and

other types of materials and ingredients that are required to create specific types of products and certain kinds of chemicals, but they also draw carbon dioxide out of the air and consequently are one of the best assets of all in fighting climate change.

Trees have served as cultural symbols for centuries. There are many examples of this, such as maple trees in Canadian history and culture, as well as the “mighty oak” in British history, culture, and folklore. Among other things, the ancient Druids in England worshipped oak trees and groves, as well as burning yule logs made of oak at the time of the winter solstice. Moreover, many people have carried the fruit of the oak tree—acorns—with them for good luck and good health for centuries; “Heart of Oak” is the official march of the Royal Navy; and the composer Charles Dibdin wrote a piece about the oak as “England’s Tree of Liberty” in 1795. To this list should be added fig tress, which are cherished in African culture and history. This fact came to light recently when a revered 100-year-old, four-storey-high fig tree situated in a prominent square in Nairobi, Kenya was saved after it was about to be chopped down and removed to make way for the construction of a superhighway. Protestors reacted so vigorously and forcefully to this that the president of Kenya, Uhura Kenyatta, was compelled to step in and to save this special tree by declaring that it is a real “beacon of Kenya’s cultural and ecological heritage.”

And this is not all. Peter Wohlleben, who has spent the bulk of his life studying tress in general and forests in particular, revealed recently that decades of empirical research show that trees like to stand close together, enjoy each other’s company, feel pain, have emotions, and experience “fear.” In his recently published book *The Hidden Life of Trees*, Wohlleben states that there is a great deal of friendship among trees. They can “bond like an old couple, where one looks after the other,” are not competitive, are incredibly social, and have memories. Trees also exchange a great deal of chemical information, not only among their own types but also among other types of trees as well as other plants and shrubs. When dangers occur or they are threatened by other species, some trees will immediately alert other trees, shrubs, and plants in the vicinity to this threat through the sense of smell, primarily by emitting volatile and often bitter organic compounds which boost the tannin levels in their trunks, branches, and leaves.

This makes them less attractive to animals and herbivores as well as alerting other plants in the area.

Trees also create cultures, especially when they grow close together and interact constantly with each other through their root systems. This is especially true in forests, where submerged underground exist massive root systems not unlike icebergs in the ocean. As Wohlleben explains in his book:

If you look at roadside embankments, you might be able to see how trees connect with each other through their root systems. On these slopes, rain often washes away the soil, leaving the underground networks exposed. Scientists in the Harz mountains in Germany have discovered that this really is a case of interdependence, and most individual trees of the same species growing in the same stand are connected to each other through their root systems. It appears that nutrient exchange and helping neighbors in times of need is the rule, and this leads to the conclusion that forests are superorganisms with interconnections much like ant colonies.⁶

The roots systems of trees are really quite remarkable. They are not unlike cultures in many ways because they are composed of many elements that are constantly interacting with each other and impinging on one another. Tim Flannery, in the introduction to Wohlleben's book, writes:

A tree's most important means of staying connected to other trees is a "*wood wide web*" (this is a phrase created by Suzanne Simard, a forest ecology professor at the University of British Columbia in Canada in talking about the "language of trees") of soil fungi that connects vegetation in an intimate network that allows the sharing of an enormous amount of information and goods. Scientific research aimed at understanding the astonishing abilities of this partnership between fungi and plant has only just begun.⁷

The fact that trees and other plants share much in common with

human beings and can create cultures and benefit from them in much the same way is exceedingly important, especially as far as the future of humanity and life in general is concerned. Unlike many other disciplines that are focused primarily or entirely on human beings and their cultures, the biological manifestation of culture does not confine culture to the human realm but includes many other types of living organisms as well.

There is no doubt that this is one of culture's greatest assets and foremost capabilities. Culture is both partial and holistic because it is perceived and defined in many different ways and not just in one way. This makes it possible for culture to move backward and forward as well as horizontally and vertically across a vast array of different disciplines and diverse fields.

As a result, culture is an ideal discipline in coming to grips with climate change, global warming, and the environmental crisis since it encompasses all these different areas. We urgently need an activity or discipline of this type if we are to be successful in preserving the natural environment, protecting the biosphere and vulnerable ecosystems, improving the well-being of humans and other species, achieving sustainable, self-sustaining, and regenerative development, dealing effectively with infectious diseases, and overcoming the biggest threat to humanity and the planet of all, namely a universal environmental catastrophe.

Frans de Waal summed this up best when he said:

Instead of making humanity the measure of all things, we need to evaluate other species by what *they* are. In so doing, I am sure we will discover many magic wells, including some as yet beyond our imagination.⁸

Perhaps this is what caused Alfred Kroeber and Clyde Kluckhohn to highlight the centrality and quintessential importance of culture and its remarkable potential in both the human and natural realms:

Culture constitutes the topmost phenomenal level yet recognized—or for that matter, now imaginable—in the realm of nature. This of course does not compel the prediction that

emergence into our consciousness of a new and higher plane is precluded.⁹

Whether this new and higher plane ever emerges, there is no doubt that the biological manifestation of culture possesses a remarkable potential to contribute to the world of the future in all areas of life and among all the different species in the world.