12

OUR CLOSEST COUSINS

In which we try to identify the things that make us human.

We can now attempt to identify the origins of the characteristics that make us human – adaptability, tool use, intelligence, our social systems and, above all, our capacity for empathy. There are many versions of what it means to be human; what follows is our personal view. We argue that the characteristics of humanity do not stand outside of our biology but are part of it. Perhaps our intelligence is, for good or ill, the latest link in the golden network of Gaia. And we consider ourselves to be both ethical and moral beings.

> When the Himalayan peasant meets the he-bear in his pride
> He shouts to scare the monster, who will often turn aside.
> But the she-bear thus accosted
> Rends the peasant tooth and nail.
> For the female of the species is more deadly than the male.

In this, the first of 13 stanzas, Rudyard Kipling sets the scene for a discussion of the difference between ethics and morality. The way it is expressed will not be regarded as politically correct today, but his theme is the imperative of maternal care. The she-bear is responding to the paramount requirement of her biology in protecting her young; the he-bear has other things on his mind.

Ethics, according to the *New Shorter Oxford English Dictionary* is:

> a set of moral principles, especially those of a specified religion, schools of thought, etc.

Morals, on the other hand, are guides to behaviour:

> of or pertaining to human behaviour considered good or bad, or pertaining to the distinction between right or wrong …

We shall adopt these definitions. While we concede that ethics vs morality is a distinction that is subject to much debate by modern philosophers, it suits our purpose to use it here.

From the definitions, it will at once be apparent that 'morality' is a personal thing, coming from within. Ethics on the other hand, is a set of moral principles imposed on the person from without. Those who impose a particular system of ethics on others are inclined to think of them as absolute, entire – even fundamental – whereas morals differ according to the ways of thought of the people who are holding them and the societies they belong to. Using these definitions, a person holding an ethical principle may be completely amoral (in our view); perhaps a fifteenth-century Spanish inquisitor twisting the thumb-screws on a nonbeliever, acting in accordance with a religious ethic. Alternatively, a generally accepted moral act may be rejected in order to maintain an individual's personal moral integrity. This is the dilemma of one who conscientiously objects to killing in times of war. The ethic, the Commandment 'thou shalt not kill' must be suspended in favour of the perverted morality of jingoism.

Ethical systems are the province of human beings, and form part of the glue that holds social systems together. Mix in a bit of faith (Stephen Decatur's 'my country, right or wrong', for example) and continue to repeat the message of the Bellman in Lewis Carroll's *Hunting of the Snark*: 'What I tell you three times is true'. Reiteration is a powerful force. As long as people do not ask too many questions, you have the beginnings of a superstition. It is largely the conflict between ethics and morality that leads to the common phenomenon of cognitive dissonance, the ability to hold two or more contrasting views simultaneously.

An Australian magpie of our acquaintance has taken the first step towards superstition. It has learned that it will probably get a morsel of food if it knocks on the window. Many birds do that, but this one hops down, waits until you open the door and then rapidly turns around on the spot. The number of turns, up to four, is a rough measure of its eagerness and appetite. It has been doing this for several years now, a behaviour

that probably occurred accidentally on first acquaintance is now considered essential by the bird. It is in the position of the person who is an unfortunate performer of ritual behaviour to ensure a favourable outcome in a specific situation. Professional sportspersons often show this behaviour – footballers who insist on wearing the same socks for every game, cricketers who, when batting, perform a specific sequence of actions adjusting their armour before receiving the next delivery. It is not a great step from this to communities lighting ritual fires to ensure the Sun returns at the end of the winter. Such people – and, presumably the magpie – have an imaginary tiger by the tail. They dare not let go.

Consider the canonical Ten Commandments in Exodus 20 (King James Version). The Commandments were primarily designed for the observance of the 'Tribe' and could be relaxed in the event of an external threat. The same source in another location lists another 300 proscriptions, about such things as eating unclean meat but we will not consider them here.

The Ten Commandments fall easily into two groups, each with a different intention. The first group is concerned with maintaining a proper observance of religion. They are rules that demand the acknowledgement of the power of the priesthood, on a daily basis.

1. Thou shalt have no other gods before me.
2. Thou shalt not make unto thee any graven image …
3. Thou shalt not take the name of the Lord thy God in vain …
4. Remember the sabbath day, to keep it holy …

The priests are the ones who are privileged to know God's will in this regard and thus ensure that the community shares periods of common devotion. Everyone would surely agree that Commandments 1–4 are imposed on the population from without. They are the commandments of the priests of a jealous god, imposing Jehovah's control on a Neolithic tribe from the Middle East. They are intended to focus the attention of the people on the Temple and to give them a sense of belonging to a particular community with a common ethical system.

The second group of Commandments is all about emphasising the social glue that holds a community together. Although they appear in the Bible, they are secular commandments that reflect the social issues of any community.

5. Honour thy father and thy mother …
6. Thou shalt not kill.
7. Thou shalt not commit adultery.
8. Thou shalt not steal.
9. Thou shalt not bear false witness against thy neighbour.
10. Thou shalt not covet thy neighbour's house … wife … manservant, nor his maidservant, nor his ox, nor his ass, nor any thing that is thy neighbour's.

It seems probable that Commandments 5–10 may have a far more ancient, perhaps even biological, origin. They offer a system of social morality. Commandment 5 serves two purposes. 'Honour your father and mother' suggests that moral persons should assist their parents as they age, as they owe both a debt of gratitude (a personal morality) and a responsibility to care for old persons as they are repositories of tribal knowledge (a community morality). But there is a darker side to this, the ancient avoidance of incest in all cultures as revealed in Leviticus 18:

> You shall not uncover the nakedness of your father, which is the nakedness of your mother; she is your mother, you shall not uncover her nakedness.
>
> You shall not uncover the nakedness of your father's wife it is your father's nakedness.
>
> You shall not uncover the nakedness of your sister, your father's daughter or your mother's daughter …

And so on.

This is a very explicit warning against incest with the text attempting to cover all eventualities. Such cultural taboos prevent most humans, except royal families, from inbreeding. There is a very clear biological imperative here. It is well established that continual inbreeding in humans and animals results in the accumulation of deleterious mutations. What is less well known is that numerous plants also go to considerable trouble to avoid inbreeding. Many reject their own pollen as well as that of close relatives, an exclusion achieved by a complicated enzyme mechanism. There are too many different mechanisms to be listed here, but they all testify to the evolutionary disadvantages that can be consequent on sex with close relatives.

Many animals also go to considerable lengths to avoid inbreeding. Mice can detect relatives by smell and refrain from mating with them. It is a phenomenon even observed in crickets (Simmons et al. 2006) although the mechanism is unknown. It is not surprising, therefore, that an evolutionary feature as fundamental and widespread as this should come to be reinforced by a system of morality and by folktale. The story of Oedipus Rex is a good example, so good in fact that an 'Oedipus complex' has entered the mythology of modern psychiatry and has even been lampooned in a song by Tom Lehrer.

In Sophocles's play of the same name, Oedipus unknowingly, because of a mix-up of babies at birth, had sex with his mother, Jocasta, who was also his queen. When he discovered this, Oedipus considered himself cursed, blinded himself and went to live in exile. In many royal dynasties, however, brother/sister matings are quite common as a means of legitimising succession. The possibility of substituting one baby for another at the time of birth has spawned many folk stories of changelings. Less commonly father/daughter and even mother/son pairings occur. Van Den Berghe and Mesher (1980) list 12 societies that have condoned royal incest: nine in Africa, including ancient Egypt; Thailand, Hawaii and the Incas of Peru. Others have a system of 'sister's son' inheritance on the grounds that while there might be uncertainty about the father, one usually knows who the mother is, as there are witnesses to the birth.

Commandment 6, thou shalt not kill, really needs a rider: 'except where otherwise expedient'. Thus, highly ethical and moral people will go to war to kill other highly ethical and moral people, both sides claiming the special interest of their particular deity. Often it is the same deity. Murder is common in most modern human societies, but rarely is there murder within animals of the same species. Death may occur as an accidental by-product – as in the case of rutting deer when the object is merely to vanquish the opponent, or female spiders and mantises consuming their postcoital partners rather than waste the resource they represent. This could be described as collateral damage, as humans describe the slaughter when the inhabitants of a city are 'inadvertently' incinerated by an air attack. Rarely, however, murder in response to a genetic imperative does occur. A male lion, having fought for and won a group of females, may kill off the cubs, a mechanism that ensures his own genes are passed on, not those of the dominant male of the former pride. At least, that is a usual explanation. Interspecies killing is more common – after all, what else can a carnivore do? And that includes carnivorous plants that live on poor

soils and are desperate for nitrogen. Herbivores on the whole are prepared to let live and get on with living. It is difficult to think of examples of killing except incidentally in the plant world, although the strangler fig comes to mind.

Commandment 7, prohibiting adultery, at best is a pious hope, an ethic imposed on a community. The real commandment in many human societies seems to be 'thou shall not be found out'. In Western society simultaneous adultery is common but frowned upon, while sequential adultery is accommodated if not wholly approved by the ethical system. In the end it comes down to personal morality. In the animal world it is so common that there is a name for it, kleptogamy or, more vulgarly, the 'sneaky fucker strategy'. It is particularly common among species that keep harems. While the alpha male is otherwise occupied, the betas sneak around doing the best they can – which is often rather well, as genetic analyses of offspring show.

The biosphere is full of thieves (number 8: 'thou shalt not steal') from fleas, flukes and cuckoos to tapeworms. The flea steals blood and may leave something mortal behind in the form of plague. Liver flukes steal the life of a sheep and the livelihood of the farmer. The cuckoo steals the livelihood of the chicks whose place it has taken. The tapeworm steals sustenance from its host. All parasites are thieves, and some who cause the deaths of their host to complete their life cycle steal everything.

In human societies, thieving is well down on the list of imperatives – perhaps in recognition of its inevitability. Interspecific stealing – blue tits and milk, European magpies and jewellery, foxes and geese, mice and cheese to name some European cases that have entered mythology and literature – is common. In some human communities the *official* thief is recognised with exasperation but is tolerated because they are jealous of what they consider to be their preserve and discourage others. In a crisis, one can always round up the usual suspect. In literature the thief takes on an almost jovial aspect – when caught with their bag of swag: 'it's a fair cop, guv'nor' and goes quietly. There are many well-loved fictional gentlemen thieves. Robin Hood, stealing from the rich to feed the poor, is an archetype of the gentleman thief that has resonated in Britain for 600 years.

Commandment 9 could be rephrased as 'you must not tell lies'. Much of biology is beset with 'lies', with plants and animals pretending they are not there, that they are something else, that they are dangerous, that they are poisonous, that they are fitter (in an evolutionary sense). If you doubt this, consider orchids whose very existence depends on convincing their pollinators they are something else, or cactuses that pretend to be rocks in the desert, carnivorous plants, insects that mimic wasps so as not to be eaten, myriad examples of cryptic colouration. Lies, like stories, are really imagined futures.

Finally, little need be said about covetousness (10) which is largely an ethical commandment. Although the Leviticus interpretation includes human beings, the context suggests that such humans are to be considered as the property of the dominant male and the issues so raised have been dealt with in the considerations of the other Commandments.

These examples have been derived from the Judaeo-Christian oeuvre. The Mosaic Law is also observed by Muslims. The other great religions have similar strictures; thus the first four Buddhist commandments are: 'do not destroy life', 'do not take what is not given you', 'do not commit adultery', and 'tell no lies and deceive no-one'. Hindus are urged to be truthful, be nonviolent, refrain from adultery, not be covetous and be honest. These seem to be the desirable objectives that maintain social stability in human communities across the world.

The important thing now is to ask whether these attributes, either in whole or in part, can be identified in other animals. If there is no evidence of such phenomena, then *Homo sapiens* is truly unique. The evidence, however, seems to suggest that we are merely the first among equals. The evidence is all around us. It concerns consciousness and empathy and the roots of these are to be seen in animals that are evolutionarily remote from us.

A study of the palaeontology of birds (Moore and Varricchio 2016) suggests that there was strong selection for parental care. Those evolutionary lines that did not invest in it as highly as modern birds, with which we are familiar, died out. How did this come about? It apparently depended on the sort of breeders they were. There is a mathematical expression, in vogue in the 1970s and 80s, which attempted to define the rate of growth of a population (Pianka 1970). There are two important quantities; r is the growth rate of an organism and K is the carrying capacity of its

environment. Ecologists described species as either *r*-selected, maximising their reproductive capacity, or *K*-selected, investing heavily in few offspring. Corals, with their copious annual egg and sperm production belong in the former group, humans in the latter.

Modern birds are *K*-selected. They make a great investment in providing safe nesting sites and weaving protective nests for their young. They incubate their eggs for weeks and, often, both male and female take turns. Where the female has sole responsibility for incubation, as in the eclectic parrot, the male feeds the female. When the young hatch, they have to be fed and protected. This requires intelligent, purposive behaviour from the parents and – dare we say it – a form of empathy. Empathy is needed to recognise danger to the young and to interpret their physiological needs, like hunger, and then to behave accordingly.

It is thought, then, that the relatives of modern birds died out because, the fossil record suggests, they did not invest heavily enough in parental care. A little examination of your own experience should convince you of the incredible bravery and aggression of modern birds defending their nests and young. Almost everyone must have seen small birds mobbing a hawk several times their size to drive it away from their nesting sites. In Australia, 'magpie season' occurs when these otherwise friendly and harmless birds swoop passers-by with a loud clack of the beak, perhaps drawing blood with their claws as they pass. Even the most stout-hearted pedestrian is wise to choose another path. Or imagine the shock, when walking across a large grassy paddock, of suddenly spying a spur-winged plover heading towards you, at your eye level, at full speed and with outstretched spurred wings as it aims to drive you away from its young that are hidden somewhere in the grass. (You have two options – run or drop flat. The second is better if the plover is close – it buys you a little more time to run for it!)

Mammals generally are *K*-selected. Kipling's Himalayan she-bear with cubs is concerned for their safety, which implies that she recognises a threat to their wellbeing. Her instinct is to attack, but she can override that, depending on how the encounter with a potential enemy develops. Perhaps a threat display will serve. Attack is a last resort when that fails.

The business of raising young over a relatively long period requires a bigger brain with the capacity to perceive a potential danger to offspring and respond as if it were a danger to itself. This is a form of empathy

possessed by both sexes of many species of birds and mainly by the females among mammals. Humans have the largest brains and the longest period of care for children of any animal except elephants. In both cases, the offspring hang around until adulthood – and beyond. It is hard not to conclude that the empathic faculty is particularly well developed under these circumstances and the elephant and human ways of life provide the opportunities for it to be displayed in dealings with adults beyond the immediate family.

If one is to look for an evolutionary origin of human social morality one would be hard put to go to the elephant, however legendary its intellectual prowess, as our evolutionary trajectories have diverged for more than 40 million years. Instead, one must look at our nearest relatives, who share about 99 per cent of our DNA (Diamond 1992). We must look at the chimpanzees.

A study of chimpanzee mitochondrial DNA suggests that their evolutionary pathway and that of humans diverged 6 or 7 million years ago. Bonobos (*Pan paniscus*) and the chimps (*Pan troglodytes*) parted company some 4 million years later and are now separated by the Congo River. Their DNAs are very similar to each other, at the level of 99 per cent, but their ways of life are very different. Bonobo body proportions are similar to the australopithecines, especially apparent when they stand or walk upright.

Unlike the chimps, bonobos live in extended mixed communities of females, males and offspring. Apparently, mother–son and female–female bonds are paramount. Theirs is a matriarchal community where females exert social dominance over the males. The social groups occupy specific territories, but territories may overlap with others. Between-group mating occurs. In contrast, the male chimps are 50 per cent larger than females and run a masculine society with an alpha male. Male–male bonding is paramount. They have specific territories, each with a 'border force', and tend to avoid neighbours.

Bonobos use sex as the social glue. They engage in frequent sex in every partner combination, although there is some indication that they avoid incest. A female gives birth to a single infant every five or six years. Thus there seems to be a distinction between sex for social purposes and for reproduction, at the physiological level at least.

Fruit and leaves form the main diet of both bonobos and chimps but the latter also eat meat when they can get it. Bonobos do eat invertebrates and the occasional small vertebrate, but their diet does not include much animal protein. Unlike chimps, they have not been observed to hunt monkeys.

It is fascinating to compare ourselves with bonobos and chimps. Sapiens partakes of a bit of both dishes. We are mildly sexually dimorphic; men are rather larger than women. We live in mixed communities of females, males and offspring. Female–male and same-sex bondings are common. Alpha males, usually self-appointed, also commonly occur. Parent–offspring relationships are strong for both sexes but are particularly so for females. It is surmised that human societies were primitively matriarchal, but today both matriarchal and patriarchal systems occur, the latter more commonly. Humans occupy specific territories and guard the borders fiercely in times of danger. They show varying degrees of xenophobia, from none to extreme; the latter is especially evident when there is a war on. In spite of this, between-group matings are common. Like the bonobos, they have a strong social system but separation into recreational and reproductive sex is now achieved by artificial means. Unlike the bonobos, human society is only mildly held together by sex; religion or other ethical systems play a stronger role. Sex can be divisive; sexual jealousy is a strong motive for murder.

Bonobos have neither ethics nor morals, as we understand them; they have social behaviour. Such behaviour is not imposed from outside but comes from within, from emotional states that are a response to the immediate circumstances of the social group. The appearance of these emotional states and the appropriateness of the behaviour consequent on them has been shaped by millions of years, according to the following criteria. Do they in any way increase the capacity for positive social interaction between individuals, thus contributing to the evolutionary fitness of the individual and, through the individual's behaviour, of the group?

First place among these emotions must be held by empathy. Maternal care is probably the starting place. Female guinea pigs are not noted for their maternal qualities, as their pups, when born, hit the ground running, in an advanced state of development. They feed their young, however, for perhaps three weeks, depending on whether they have one pup or four. With only two teats, the mothers must ration their resources.

They respond more strongly to a calling pup if it is one of four than if it is a singleton. This implies, even in guinea pigs, a sense of empathy, of the need to respond to her offspring, but without comprehension.

Empathy, then, is a process of recognising the need, then matching emotional states with the 'empathee', resulting in concern for the other and, ideally, providing a helpful response. If a response is seen to be frequently successful, in restoring harmony within the group, say, it will be learned and adopted by others. If the outcome is favourable for the individual as well as the group, and contributes to his or her survival, the empathic response can then be manipulated by the evolutionary process and expanded to other situations – becoming worried about the plight of others, adopting their viewpoint and taking action to relieve the perceived distress. The decision to help does not necessarily depend on rational evaluation. This is, at its evolutionary beginnings, intelligent behaviour without consciousness of a possible outcome. This in turn can lead to altruistic behaviour, a topic that has caused many a battle between evolutionary biologists. We will leave them to it.

In bonobos, and to a lesser extent in chimps, the consolation of the victim of accident or aggression is a predictable outcome. For the descriptions of bonobo social behaviour that follow, the authors are indebted to the excellent book by Frans de Waal (2014), *The Bonobo and the Atheist*.

A bonobo, a victim of aggression who had just escaped from a life-threatening situation, sits alone, distressed and panting, licking an injury. Another bonobo who witnessed the encounter goes over to hug the victim, and to lick the injury as well. The victim begins to cheer up.

Bonobos may suffer accidental grooming injuries or get into the occasional fight. If one gets bitten, the biter always shows remorse and licks the wound and later, when the wound has healed, will inspect the wound and continue to show remorse.

To illustrate this behaviour, Franz de Waal tells a remarkable story about a male bonobo who was very protective of ageing females. In the morning he would lead a blind and deaf female out of the sleeping enclosure to her favourite spot in the sun. In the evening, he would lead her back to the sleeping quarters. One day this male bit the hand of a woman who was handing out vitamin pills and, in pulling away, he crunched down on a finger and, we must assume inadvertently, bit it off. A few days later, the woman returned and showed him her bandaged hand. The male

took one look and, obviously distressed, retired to the furthest corner of the enclosure. Fifteen years later the woman returned to visit. The male immediately approached her, anxious to inspect her hand.

Recently, in bonobos, a very remarkable behaviour has been observed. It is the behaviour of female bonobos when one of their number is about to give birth. They cluster around the expectant mother, effectively excluding the males, though it has to be said that the males show little or no interest. The females protect the mother and soothe her with nurturing gestures and even appear ready to help manually. Chimps show no such behaviours, so it seems reasonable to assume that the last common ancestor of bonobos and humans also showed this behaviour, some millions of years ago.

Females generally are more likely to offer consolation than males, and friends and relatives are more likely to do so than strangers. What the bonobos displayed was behaviour appropriate to the situation. That this is not accidental is shown by an experiment with chimps. Two chimps sit side by side in transparent cages. In front of each of them is a container containing a reward that can only be got by using a special rake. Chimp 1 has an assortment of tools. Chimp 2 has no tools at all. Chimp 1 chooses a suitable tool, retrieves the reward and then pushes the useful tool through a gap in the partition for Chimp 2 to use. If the experiment is repeated so that Chimp 1 cannot see into Chimp 2's enclosure to know how the reward is presented, it will select tools at random to pass through, presumably on the assumption that eventually one will suit.

According to Scherer (2005), 'Emotions are an intelligent interface that mediates between input and output on the basis of what is most important to the organisms at a particular time'. In other words, they are part of an internal state that demands instant response. If you doubt this, remember falling in love for the first time. It is an all-encompassing feeling that demands an immediate behaviour. It is such an urgent response that it transcends rationality, and only a deeply planted ethic and a personal morality prevents the forlorn lover (of either sex) from acting on it at once!

There are very clearly elements of chimp, and especially bonobo, behaviour that are similar to human behaviour. If these were physical or physiological characteristics, for example in three separate related whale species, we would have no difficulty in postulating that they were also present in their common ancestor. Why, then, should we have difficulty in supposing that behavioural traits, which are based on an evolutionary imperative and

which we admire so much in ourselves, are similar, so far as we can tell, in our hominin cousins? And why should we have difficulty believing that they had their origins in the last common ancestor perhaps 4 million years ago? Occam's Razor demands that we should not multiply our unknowns. The less economical explanation, that these behaviours arose three times quite independently in Sapiens, Paniscus and Troglodytes, is not impossible but very unlikely and must be rejected until evidence to the contrary is found. The conclusion must be that if three related species, with more than 98 per cent genetic congruity, act in similar ways in similar circumstances, then the mental processes that give rise to these similar behaviours are also likely to be similar.

For primate and human children there are two great reinforcers; the first is the ability to empathise with their siblings and others of a comparable age; the other is a desire for good interaction with adult members of the social group. The threat of physical consequences from the grown-ups promotes what de Waal calls 'one on one morality'. This enables individuals with disparate abilities and physical strength to form congenial social structures, males and females, adults and juveniles, to make a successfully functioning social group. In human history, this is first the nuclear family of hunters and gatherers, then the extended one of uncles and aunts and cousins, as available resources permit, and finally, the tribal village of several families mutually dependent on agriculture.

As part of Gaia, humans have never lost contact with all other forms of life with which, after all this time, we still share important genes and to which we are clearly related. Surely we are permitted to echo Charles Darwin's great appeal to his fellow humans: to see that there is grandeur in this view of life.

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