

Forgotten Farmed Animals

*Welfare and Ethical Challenges Among
Aquatic Animals, Reptiles, Amphibians
and Insects*

by

Vicki Hutton

**Forgotten Farmed Animals: Welfare and Ethical Challenges
Among Aquatic Animals, Reptiles, Amphibians and Insects**

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Dedication

For my children who share my love for animals, for my parents who taught me to respect all animals, and for the animals who allowed me a glimpse into their world.

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Introduction

Fish, reptiles, amphibians, insects and other invertebrate animals play unique roles in ecosystem integrity and yet there are warning signs that their welfare—and even existence—face multiple threats. In the 1990s, global reports of disappearances among frogs, toads and salamanders left biologists alarmed and perplexed (Blaustein & Wake, 1990). The natural gender ratio in sea turtle hatchlings, determined by the temperature of the sand incubating the eggs, has been thrown out of balance with increasing temperatures, raising concerns about insufficient males to maintain populations (SWOT, 2026). Other reptiles, as typical ectotherms, are vulnerable to climate changes sweeping the globe and impacting distribution areas in unpredictable ways (Li et al., 2024). Meanwhile, by 2018 the Food and Agriculture Organisation (FAO) of the United Nations estimated that one third of fish stocks had been overfished to biologically unsustainable levels (Lam, 2020). This was accompanied by the rapid growth in aquaculture—the farming of aquatic organisms—to maintain supply, with potential environmental, welfare and ethical implications.

Insects were also vulnerable to some alarming trends. In 2017 a research article by a group of European scientists raised serious concerns about insect loss after finding that insect biomass had dropped by 76 per cent in just over 27 years in some protected nature areas in Germany (Hallmann et al., 2017). Ongoing reports questioned these results, while simultaneously conceding a general decline in some insect numbers and potential repercussions for ecosystem functioning (van Klink et al., 2024). Some estimates suggested up to 40 per cent of insects could be extinct by the end of the twenty-first century (Challenger, 2021).

A 2002 article in *Nature* journal by Nobel Prize winner Paul Josef Crutzen pointed a finger at humans as the dominant force over the last 300 years in shaping the environment, with potentially irreversible impacts on animal diversity, extinctions and ecosystems. In this article, the concept of the Anthropocene, an unofficial unit of geologic time, painted a picture of animal overexploitation, habitat loss, disease and climate change, all irrevocably changing the lives of many animals and the environments upon which they depended. Domesticated and wild animals alike were under threat, with the less cute or emotive animals with fins, scales or exoskeletons caught up in global industrial agricultural systems to meet human and livestock demands for cheap and sustainable protein in a rapidly changing world.

Humanity has become dependent on farmed animals and what their bodies provide. Unfortunately, confinement of these animals for ease of mass production coupled with selective manipulation of their bodies and minds to increase productivity has left farmed animals dependent on humanity during their shortened lifespans. Their welfare is bound by anthropocentric constructs of how they can best serve human needs, leaving them unable to survive in the natural environments of their wild relatives. The plight of terrestrial furry or feathered farmed mammals and birds has received increasing condemnation as images of crippled and distorted animals circulate on social media. Reports of chickens with shattered leg bones unable to sustain the rapid growth required to meet global demand for their flesh, or newborn calves torn from their mother's side so she can produce more milk for human consumption, assault the general public's moral values. There is still a long way to go before the world rejects the commodification of cows with their emotive eyes or pigs with a demonstrated intelligence of equivalence to a dog or a young child, and other relatable farmed mammals and birds. This further

highlights the plight of the forgotten farmed animals, those scaly, slimy, alien animals and those who wear their skeleton on the outside, all of whom remain obscure and less likely to raise empathic concern among consumers.

As veganism and vegetarianism started to make inroads in the consumption of terrestrial mammals and birds, a strange phenomenon emerged that revealed the hierarchy of animals within a human-dominated world. Vegans reject all foods and products derived from animals, and vegetarians abstain from consuming meat. A third category, pescatarians, refuse terrestrial animals such as cows, pigs and chickens, but will eat aquatic animals such as fish and invertebrate seafood. This suggests fish and seafood are awarded a lower level of moral worth or mental capacities compared to terrestrial mammals and birds, a finding supported by research. Daniel Rosenfeld and A. Janet Tomiyama (2021) reported that around 40 per cent of pescatarians in their study did not consider fish to be a type of meat. The researchers speculated that viewing fish and seafood as distinct from mammal and bird products could be a strategy to reduce cognitive dissonance about eating a living creature. Maria Ioannidou and colleagues (2024) suggested that a combination of being removed from the production process of seafood and attributing lower mental capacity and moral standing to the animals they were consuming, negated any potential animal welfare concerns when eating seafood.

Fish and seafood are not the only animals awarded a lower status, with evidence that reptiles, amphibians, insects and other invertebrate animals may also be perceived through a speciesist lens when compared to the more relatable mammals and birds. English philosopher Richard Ryder (2011) described two types of speciesism. There was weak speciesism that rationalised the exploitation of

animals based on their perceived lack of morally important attributes such as capacity for intelligence, reasoning, autonomy and a moral sense. This contrasted with strong speciesism that simply validated the exploitation of animals because they were not human. Animal advocates argued against this, including Peter Singer who had earlier popularised the term speciesism in his 1977 book *Animal Liberation*. Singer argued that if an animal was capable of pleasure and pain, they should have moral consideration irrespective of species. However, denying capacity to suffer provides an opportune motivation to withhold moral concern from those animals perceived as more distal from humans. Lacking emotive features and the cute factor positions aquatic, cold-blooded animals or those with an exoskeleton as beyond moral concern and therefore legitimises their increasing confinement in intensive animal agriculture systems, also known as factory farms, to meet global demand.

A hierarchical model of animal life has guided humanity's perceptions of animal status explicitly and implicitly since Greek philosopher Aristotle directed that nature was ordered on a vertical scale extending from lifeless things to humans at the top (Cain, 1993). Taxonomy—the science of biological classification—reinforced the dominance of humans by drawing on phylum categories that provided rankings based on animal complexity. Those organisms least resembling humans physically and by assumption, mentally, remained at the bottom of the hierarchy, thus providing visual confirmation of the division between higher and lower order creatures. Invertebrate animals such as clams, mussels, snails, squid and octopus (Mollusca) and invertebrate insects, crustaceans and arachnids (Arthropoda) sat below the top tier of vertebrate Chordata, of which humans comprised only a tiny proportion. This division was succinctly summed up by Melanie Challenger (2021) when she wrote: “The world is now dominated by an animal that doesn't think it's an

animal. And the future is being imagined by an animal that doesn't want to be an animal" (p. 1).

Unquestioning acceptance of this hierarchy can start early in life, with studies indicating that young children are more likely to show preference for animals that are phylogenetically similar to them. Mammals are preferred to birds, but birds are favoured over frogs and lizards, and finally, frogs and lizards are preferred to invertebrate animals such as insects and worms (Piazza, 2020). This is despite children initially being less likely to assume moral superiority over animals, and to even give some chosen animals more moral weight than humans (Herzog, 2021). Children from as young as one or two years have natural empathy for all animals, but as they develop into young adults a dichotomy can develop between attachment to companion animals and less regard for "food" animals, especially when those food animals are not cute and cuddly, farmed out of sight or not perceived as sentient. Inevitably, attitudes to animals will be influenced by a number of intersecting factors including learned attitudes and values, cultural and religious practices, social norms, geographic location and economics.

The implications of awarding less moral worth to reptiles, amphibians, fish, insects and other invertebrates is evident in the staggering numbers that are farmed each year away from public scrutiny—for example, over one trillion insects are farmed for food and livestock feed (Barrett, 2024a), and approximately 124 billion fish and 440 billion shrimp are confined in intensive farm settings (Darlim, 2024; Shrimp Welfare Project, n.d.). This highlights the global ethical responsibilities if their welfare is not understood or acknowledged. These figures easily eclipse the 3.7 billion terrestrial mammals, and 73 billion birds slaughtered each year for human consumption (D'Silva et al., 2024).

Critical environmental and animal studies scholars have argued that the natural world can only accommodate a limited number of human manipulations and intensification before it reaches a critical tipping point (Nimmo, 2015). Unfortunately, agricultural concentration based on a profit-driven economic system is pushing many intensively farmed animals and environments to unsustainable biological limits, and tipping points. As consumers demonstrate growing welfare and ethical concerns about farmed terrestrial animals, less attention has been paid to the forgotten farmed animals—the reptiles, amphibians, aquaculture and insect farming. Given the sheer number of these animals now trapped within agribusiness commercial systems, greater consideration of associated moral, ethical and environmental issues is imperative.

Ironically the global increase in aquaculture (aquatic organisms), ranaculture (amphibians) and insects (so-called mini livestock) has been positioned as a remedy for anthropogenic activities of land degradation, deforestation, pollution and depleted water resources associated with terrestrial intensive animal agriculture systems. Insect farming in particular is cited as providing environmental benefits with less methane and carbon emissions compared to livestock farming, and with some insects such as soldier flies having the added bonus of eating food waste and other materials (Ólafsson, 2023). Once again, the moral status and capacity to suffer among these less cuddly creatures have been subverted to rectify human-made problems and service escalating human populations.

Refusal to recognise suffering among selected living creatures contributes to legislative inconsistencies and cruel farming practices in different regions around the world. This is compounded by a dearth of welfare frameworks capable of assessing animals whose mental lives have received less consideration compared to mammals

and birds. In 2012 the *Cambridge Declaration on Consciousness* formalised scientific consensus that humans were not the only conscious beings, and that many animals—not just mammals and birds—had neural substrates capable of supporting conscious experiences and awareness of their surroundings. This was reiterated over a decade later when the 2024 *New York Declaration on Animal Consciousness* again emphasised the capacity of animals to suffer and experience wellbeing—including the “realistic possibility” that this extended to reptiles, amphibians, fishes, and many invertebrates such as octopuses, crabs, shrimps, and insects (Andrews et al., 2024). Based on strong scientific support of animal sentience, the 2024 Declaration contended that humans have an ethical obligation to consider the welfare risks and interests of all those animals as individuals.

With an animal’s capacity to have affective states deemed a key factor in the attribution of sentience, many policies and codes around the world omitted to explicitly mention animals such as reptiles, amphibians, fish and invertebrates (Learmonth, 2020), thus leaving a loophole through which these forgotten animals frequently slipped. Despite the Cambridge and New York declarations drawing attention to the need to consider the welfare of all sentient animals, the sheer diversity of reptiles, amphibians, fish and invertebrate species, all with their unique morphological traits, ecological niches and limited confirmatory evidence of sentience, proved difficult to overcome.

The World Animal Protection *Animal Protection Index 2020*, which ranks 50 countries around the world according to their animal welfare policy and legislation, lists “recognition of animal sentience and prohibition of animal suffering” as key factors in promoting stronger laws to better protect animals. In order to be ranked highly on this indicator, countries must give legislative recognition of sentience applicable to, at a minimum, all vertebrates, cephalopods and

decapod crustaceans. Reptiles, fish and amphibians are included in vertebrate taxa, although not specifically named, while insects are largely omitted despite intensive farming of this mini livestock increasing globally outside of legislative and ethical protection. Fundamental to embedding the concept of sentience into global legislation is a clear and measurable definition of both welfare and sentience applicable to diverse taxa of animals. Over the years, three concepts infiltrated the animal sentience debate: the animal's awareness of what was happening around them, their cognitive processing, and their capacity for feelings such as pain (Broom, 2014). This required paying attention to the world as the animal perceived it, especially for those animals whose enigmatic features, expressions and lifestyles remained inscrutable to human interpretation.

In 1964 animal welfare activist Ruth Harrison's book *Animal Machines* drew graphic attention to the plight of terrestrial animals caught up in intensive farm systems, prompting changes in consumer and government perceptions of animal production systems and the potential harms inflicted on animals. Harrison's book focused on terrestrial mammals and birds, and the resultant publicity was a catalyst for ongoing reactions, reforms and increased focus on animal welfare science. Definitions of animal welfare and how an animal was coping with their environment became key factors, contributing to the development of the "Five Freedoms of Animal Welfare" in 1965 followed by the "Five Domains Model of Animal Welfare" in 1994 (with subsequent updates in line with advances in understanding of animal sentience). The Five Domains model placed particular emphasis on an animal's subjective experiences as being essential to their wellbeing (Mellor, 2017). Four physical/functional domains related to: nutrition and hydration; physical environment; health and functional state; and behavioural interactions. A fifth domain provided an assessment of the animal's overall affective experience

based on the preceding domains. While this proved valuable for defining and assessing welfare among mammals and birds more proximal to humans in behaviours and emotive expression, the subjective perceptions of reptiles, amphibians, fish, insects and other invertebrate animals presented obstacles to a confident assessment of mental wellbeing. However, for those who cared to look, it was not hard to find indicators that all was not well with the trillions of forgotten farmed animals.

Honey bees, featured in Chapter 8, provide one such example. The inclusion of bee keeping in industrial agriculture created multiple interacting stressors for individual bees and the colony as a whole. Bees are eusocial creatures, with evidence of self-awareness, personality and the capacity to experience stress (Chittka, 2022). In the mobile equivalent of factory farming, commercial pollination operators truck millions of colonies around countries to provide services that free flying bees can no longer perform in the quantities required for commercial agriculture. Despite indications that confinement during transport and lack of diversified forage on arrival negatively impacted the individual bees and the colony's survival, the process became essential to maintain monocultures such as almond orchards (Melicher et al., 2019).

Farmed crocodiles also suffer to meet human demand. Crocodiles have survived relatively unchanged for 200 million years and display unique personalities, yet many are slaughtered well before their natural lifespan of 70 years to provide skins for luxury bags and accessories in the high-end fashion industry. When locked in the overcrowded intensive farm settings described in Chapter 3, increased incidents of aggression and serious fighting among animals who normally co-habit peacefully in their natural environment suggest awareness, fear, distress and anxiety is endemic (Learmonth, 2020).

Aquaculture is not exempt from indicators of trouble. Confined salmon swimming in endless circles—similar to the stereotypies seen among terrestrial farmed animals—suggest the inability to swim freely has a strong negative psychological impact (Vindas et al., 2016). And shrimp who have experienced routine eyestalk ablation to improve production are seen to recoil, flick their tails and rub the site of the wound, all indicative of pain at this cruel procedure (Birch et al., 2021). Chapters 4, 5, 6 and 7 provide more examples of negative affective experiences among the less researched reptiles, amphibians, fish, decapod crustaceans, cephalopod molluscs and insects. Information and examples in these chapters also reinforce the growing awareness that simply removing any obvious negative events is insufficient to facilitate a “good life” for captive animals.

Biologist Carl Safina (2015) asked the logical question that if we recognise that an animal is hungry or thirsty, why cannot we recognise when they are happy or joyful if acting that way? While evidence of “joyful” terrestrial farmed animals can be seen in the emotive faces and relatable behaviours of mammals and birds observed freely interacting with each other, or prancing with joy when rescued and rehabilitated at a farmed animal sanctuary, recognising similar reactions in cold-blooded vertebrate and invertebrate animals may not be as clear. However, as often pointed out, absence of evidence of sentience does not mean absence of sentience.

Projected human population growth shows that escalating requirements for food sources has become a priority. Suggestions that some of these smaller, less visible animals—with questionable sentience—could provide a more environmentally sustainable option to the larger terrestrial farmed animals increases the urgency to acknowledge their sentience and avoid cruelties being inflicted on an unimaginable scale. Compounding this urgency is the longstanding

recognition that both human and non-human animal health and welfare are closely entwined and that both are interdependent on healthy ecosystems and global environmental sustainability. Principles of what would become known as the One Health approach have been practised for centuries, ranging from indigenous peoples' respect for, and connection to, the natural world to Canadian physician and veterinary pathologist William Osler's assertion in the 1880s that there was only one medicine that required collaboration between medical and veterinary disciplines (Pettan-Brewer et al., 2024). The term One Health increasingly appeared in papers such as Wilcox and Aguirre's (2004) *One Ocean, One Health* where they confirmed "... the interdependence of health across the diverse species and systems within the biosphere—providing the impetus for a 'one health' perspective that bridges human, wildlife, and ecosystem health" (p. 211), and the "One World, One Health" Conference in September 2004, organised by the Wildlife Conservation Society.

Overlapping and extending the concept of One Health is the One Welfare approach that embeds animal welfare within the One Health framework of interconnection between human, animal and environmental health (One Welfare, 2025). Fundamental to animal welfare are environmentally friendly animal-keeping systems that acknowledge the feelings and emotions of sentient animals subjected to confinement in commercial settings. These feelings and emotions contribute to welfare through the provision of adaptive mechanisms relevant to their environments. When farmed animals are deprived of basic needs and rights through high stocking densities and denial of natural behaviours, there can be negative flow-on effects for animal and human health and welfare (Tarazona et al., 2019). Inescapable stressors including reduced genetic diversity, inappropriate living conditions and mass confinement all combine to suppress an animal's immune system with resultant increased vulnerability to infections

and spillover zoonotic diseases. Many reptiles, amphibians, fish, insects and other invertebrate animals are farmed in a range of environments and regions. That means One Health, One Welfare agendas must highlight the shared challenges requiring a science-based global strategy for animal welfare that is also transferable to local efforts to manage the diverse ways that humans take advantage of farmed animals and natural resources.

Recognition of the increasing interdependence between animals and humans is important as humanity seeks alternative food sources to sustain ever-increasing global population growth. The temptation to turn to less visible animals with scaly and slimy skins or wearing their skeletons on the outside or with emotionless faces and disputed sentience to fulfil anthropocentric needs is wrought with inherent dangers for the animals and the environment. However, denying feelings and emotions in these exploited groups can also be beneficial to consumers by eliminating cognitive dissonance—those uncomfortable feelings associated with commodifying and consuming yet another group of living beings. The following chapters look at sentience among some of the forgotten farmed animals—the reptiles, amphibians, fish, decapod crustaceans, cephalopod molluscs and insects—and draw attention to the physiological and psychological effects on these animals when deprived of their natural environments in intensive farm settings. There are long-term ethical and welfare implications for individual animals, the species and the environment as these less visible farmed animals become enmeshed in the escalating environmental and sustainability issues on the planet.

Many animals have been deprived of autonomy and a voice in anthropocentric societies, instead relegated to roles that fit human needs and expectations. This book explores humanity's chequered

history with the forgotten farmed animals, giving the reader vicarious access to the birth, growth, maturity and slaughter of a range of animals caught up in intensive farm systems around the world. Drawing on the genre of animal biographies as a means to reject traditional attempts to de-individualise and automatise the behaviours of animals, each chapter includes hypothetical case studies of some specific animals living and dying to meet humanity's insatiable demands. No attempt has been made to "speak for" these animals who have been rendered silent and powerless by humanity, instead the individuality of each case study animal is juxtaposed against the structural barriers that permit the continuation of some horrific animal suffering. These stories convey only a portion of the experiences that an animal may endure during their confinement and death, but sufficient to identify that their current and future treatment should not continue unchecked.

Chapter 1

The Many Meanings of Sentience

Sentience, from the Latin *sentire*, to feel, is often described as feelings that matter. This sounds simple and concise, but look deeper and you will find a multitude of contrasting definitions arising from disciplines such as animal welfare science, neuroscience, cognitive science, physiology, animal behaviour science, cognitive ethology, ecology, evolutionary science, comparative psychology, philosophy, animal ethics, bioethics, policy and law. Each discipline has specific terminology, criteria and theories as to the nature of sentience and, importantly, who and what are worthy of inclusion under the sentience umbrella. These unique perspectives and applications have led to controversy, especially around sentience in fish, reptiles, amphibians and invertebrates, with varying implications for individual animals, species and the environment.

The adjective sentient became popular in the early seventeenth century when it was used to encompass any creature, both human and non-human, that responded to sensory stimuli. The meaning was refined over the years to emphasise the inner quality of that experience, usually interpreted and qualified by the way a human would feel about a similar experience. As neuropsychologist and writer Nicholas Humphrey (2022) succinctly said, “what it’s like for us” (p. 1).

Philosopher Thomas Nagel (1974) had earlier described this as the “what-it-is-like-ness” of an experience—in other words, its subjective feel. In 1974 Nagel posed a simple, yet complex question, “what is it like to be a bat?” Embedded within this question was the expectation

that humans should look beyond the confines of anthropocentric views on animal minds and suffering and consider an organism's subjective conscious experience. As shown in Figure 1.1, bats hang upside down, then use echolocation to navigate when they take off, a skill that is beyond human experience. Therefore, seeking to understand and interpret echolocation from the point of view of the bat cannot be achieved within the context of human experience—but it does not make it any less real in the world of bats.



Figure 1.1. “What is it like to be a bat?”

(Image provided by Rebecca Hutton and reproduced with permission)

Philosopher Ned Block coined the term “phenomenal consciousness” in the 1990s to encompass properties related to what is it like for someone undergoing a conscious experience. This required taking into account what it was like to be in a particular state through sensations that had a qualitative dimension (Block, 1995). Irrespective of how it was interpreted, sentience appeared to be a subjective experience linking the way an organism’s brain represented something happening at their sense organs, and how the conscious organism felt about that.

The “what is it like for someone” question was fundamental to the burgeoning field of cognitive ethology, a discipline that was initially criticised for being too subjective, anecdotal, anthropomorphic—and therefore by default unscientific in a world that demanded evidence-based outcomes for credibility. As the decades passed and naturalistic observations were increasingly supported by laboratory-based experiments and sophisticated neuroscience techniques, an organism’s subjective experiences within the context of sentience gained credibility.

Early definitions of sentience focused on these subjective experiences as having positive or negative valence, making sentience an important component of animal welfare and ethics. Any animal deemed capable of experiencing pleasurable or aversive feelings to an event or situation could potentially feel pain, pleasure, anxiety, distress, boredom, hunger, thirst, pleasure, warmth, joy, comfort and excitement—all feelings within the realm of human understanding and experience (Browning & Birch, 2022). These subjective, valenced feelings, coupled with the concept of phenomenal consciousness, made sentience an important component in respecting the lived experience of any organism capable of having a point of view about the world around them. Capacity to experience these feelings could

vary along a continuum, described by Donald Broom (2014) as their “degree of sentience”, but recognition and acceptance of any degree had huge ethical, welfare and financial implications for the intensive farming of animals. Changing decades or centuries of production methods that had positioned many land and aquatic animals as unfeeling commodities to be captured, confined, bred and slaughtered for human benefit risked up-ending anthropocentric perceptions of humanity’s right to control the planet’s resources.

As scientists stepped into the debates on sentience, they developed a list of attributes core to assigning sentience to an animal. These included: nociception (the process of encoding and processing noxious stimuli); subjective sensory awareness that the world looks and feels a certain way; and a sense of significance or salience (Nussbaum, 2022). Or, as Donald Broom (2014) commented succinctly: is the animal aware of what is happening around them? Are they capable of cognitive processing? And can they have feelings such as pain? However, even these three commonsense questions could not silence decades of debate around degree of—or even capacity for—sentience among the non-mammalian animals whose bodies, facial expressions, environments and lifestyles remained unfathomable to humans.

Fundamental to ongoing controversies around sentience were differing viewpoints on how sentience should be assessed. These ranged from scientists who demanded empirical evidence and absolute certainty before accepting animal sentience—fittingly described by professor of zoology Donald Griffin (1998) as “paralytic perfectionism”—to those who adopted capacity for negative experiences as the determining factor in the attribution of sentience. This latter sentiment was summed up in the famous words of ancient philosopher Jeremy Bentham when he asked “Can they suffer?”

With the emergence and strengthening of an interdisciplinary community invested in the concept of sentience, some important milestones were achieved in the twenty-first century. These included the 2012 *Cambridge Declaration on Consciousness*, the 2024 *New York Declaration on Animal Consciousness*, establishment of the Sentience Institute (2017-2026), and the *Animal Sentience Journal*. However, the field remained subject to some fundamental controversies around definitive criteria and the extent of sentience, thus leaving some organisms in limbo and unprotected amidst inconsistent global regulatory protection or social licence.

Mammals as a group have achieved wide acceptance as sentient beings, despite a lack of specific studies among every mammalian species. In fact, philosopher and investigator on animal sentience, Jonathan Birch, pointed out that much of the mammalian sentience evidence base has been derived from studies on the lab rat, *Rattus norvegicus*, and the rhesus macaque, *Macaca mulatta*, from which inferences were drawn and largely accepted (Birch, 2024). More perplexing and controversial are the less relatable cold-blooded, scaled, slimy, aquatic, multi-legged or invertebrate animals among whom recognition and acceptance of sentience can depend on human cultural or economic requirements.

Debate over the existence and relevance of non-human animal sentience has permeated historical and cultural literature, philosophical and ethical frameworks, legislation and policies, and physiological and neuroscientific research. While there is increasing consensus on capacity for sentience in some animal groups, others remain trapped in the murkiness of uncertainty, to the detriment of the individual, the species and ultimately, humanity and the planet.

Historical and cultural perspectives of sentience

Controversy surrounding the existence of sentience beyond humanity has lingered for centuries and across cultures. Ancient Greek philosopher Aristotle asserted in the fourth century BCE [Before Common Era] that humans were superior to all other creatures, describing a *scala naturae*, or natural scale which always positioned humans at the top of a hierarchical view of organisms (Nussbaum, 2022). Although out-dated as modern evolutionary theory shifted towards life as a branching tree, not a linear ladder of perfection, it remained influential in many cultures and legal systems by reason of the scale privileging humanity.

Belief in the inferiority of animals was reinforced by French philosopher, scientist and mathematician Rene Descartes (1596-1650) who described animals as “automata” without the ability to reason or feel pain. Initial interpretations of Descartes’ writings positioned animals as nothing more than complex machines lacking thoughts, feelings and souls, but subsequent debate over the years re-interpreted his words as a concession that some could fear, hope and enjoy (Rowan et al., 2021). However, these feelings were experienced without thought, making them “unfelt” emotions, a vague term that nevertheless made it acceptable for vivisectionists to continue treating research animals as non-sentient. Philosophers Thomas Aquinas (1225–1274) and Immanuel Kant (1724–1804) similarly perceived animals as non-sentient.

Many non-Western traditions have been more open to degrees of sentience, although any benefits to the animal were sometimes qualified by the role they were assigned in human life. For example, Chinese philosopher Confucius (born Kongzi; 551-479 BCE) considered animals to be there for human needs, whether food, clothing, labour or medicinal properties, but later Chinese

philosophers such as Mengzi (372-289 BCE) softened this view to acknowledge that animals could suffer and that the “superior man” was the one who could not bear to see them die or to eat their flesh (D’Silva et al., 2024). Influential neo-Confucian philosopher Zhu Xi (1130-1200) positioned animals as categorically different from humans in their capacity for moral improvement. Although some animals could attain and fulfil certain—but not all—virtues, humans with their capacity for moral improvement remained morally higher (Back, 2018). However, Korean Confucian thinker Dasan (Jeong Yakyong; 1762-1836) believed humans to be superior to animals because of a distinctively human phenomenon—the ability to make moral choices. Despite any differences, both philosophers agreed that animals could be used for human purposes, but must also be cared for and not harmed recklessly.

Buddhism and Hinduism are known for their respect of animals. In Hinduism, a belief arose that the divine was in all creatures, while Buddhism accepts that animals are sentient, thus banning animal abuse in acknowledgement of suffering as a common property of all sentient beings (Nussbaum, 2022). Matthieu Ricard, Buddhist monk, author and photographer with a PhD in cell genetics, commented during a dialogue with Jane Goodall:

But a superior intelligence does not give humans the right to slaughter at will billions and billions of animals every year. It seems that the value of an animal is practically zero compared to that of a human (Ricard, 2013).

In Western worlds, the arrival of the Age of Enlightenment (also known as the Age of Reason) in the seventeenth and eighteenth centuries heralded in some strong views about animal suffering from philosophers such as Jeremy Bentham and David Humes. Scottish philosopher David Humes (1711-1776) pointed out that experience

allowed a dog to be apprehensive of pain when menaced, while English philosopher and social reformer Jeremy Bentham (1748-1832) coined the famous phrase that would subsequently be adopted by animal welfare advocates globally: “The question is not, Can they *reason*? nor, Can they *talk*? but, Can they *suffer*?” That meant as long as an animal was subjectively aware and could suffer—in other words, sentient—ignoring that suffering because of their species or designated use was immoral. Importantly, Bentham acknowledged that some time in the future animals may obtain rights, irrespective of how their appearance differed from humans. Preceding the more famous quote about suffering, he wrote:

Under the Hindu and Mahometan religions, the interests of the rest of the animal creation seem to have met with some attention. [...] The day *may* come, when the rest of the animal creation may acquire those rights which never could have been withheld from them but by the hand of tyranny (Bentham, 1789, p. 245).

However, Bentham’s view on suffering and sentience did not preclude killing animals for human benefit. He contended that animals were not self-aware, simply living in the present with no connection to their future end, and therefore they had no sense of what they lost when killed for human benefit. Bentham explained: “we [humans] are the better for it, and they are never the worse. They have none of those long-protracted anticipations of future misery which we have”. This sentiment permeates animal slaughter methods, with the perception that as long as animals are stunned prior to slaughter, welfare standards have been maintained. While stunning is intended to ease the moment of death, slaughter represents only one fleeting point in time during an animal’s lifelong journey through the cruelties of the intensive farm system. The morality of commodifying animals who can suffer for their entire lives leading up to “humane slaughter” remains in question.

Throughout the 1800s acceptance that animals—largely mammals—had feelings escalated among animal researchers, veterinarians and the general public. English philosopher, biologist and sociologist Herbert Spencer (1820-1903) linked the feelings underpinning sentience to evolutionary processes that allowed organisms and societies to survive and adjust to their environment. When combined with memory and reason, this capacity to feel allowed an animal to adapt to environmental change through natural selection. In 1871, naturalist Charles Darwin (1809-1882) similarly conceptualised animals' (primarily mammals) shared biological kinship with humans by drawing attention to the lack of any fundamental differences between humans and the "higher mammals" in their mental faculties, and that even the "lower animals" were excited by the same emotions as humans (Darwin, 1871, reprinted 2004). As products of natural selection, humanity's common ancestry with other mammals supported a basic emotion approach across species. Any differences were of degree rather than kind, he asserted, and clearly manifested in some animals' capacity to feel pleasure, pain, happiness and misery. The emphasis remained focused on mammals, with their playful, frolicking offspring demonstrating an irresistible joy in life, and whose soulful eyes and paedomorphic features triggered empathy and nurturance in human observers. Less consideration was awarded to the cold-blooded, slimy, scaly alien-looking creatures, many of whom had an exoskeleton rather than a backbone.

The emergence of the School of Behaviourism in the twentieth century relegated subjective terms such as sensation, perception, desire and emotion in both human and non-human animals to the archives for several decades. Key figures, including Russian physician and researcher Ivan Pavlov (1849-1936), and American psychologists William James (1842-1910), John Watson (1878-1958) and B.F. Skinner (1904-1990), believed that observable behaviour was the gold

standard. The only way to learn behaviour was through environmental stimuli and conditioning—in other words, reward and punishment—not through internal thoughts and feelings (Rowan et al., 2021). Developed by human psychologists, theories of behaviourism encompassed both human and non-human animal behaviours, an ironic situation for those humans who had fought so hard to position humans in a different, and higher, category to animals.

Some dissenters voiced opposing views to these somewhat simplistic explanations, including social psychologist William McDougall (1871-1938) who continued to write about emotions. Each kind of emotion, he contended, was underpinned by a biologically basic instinct—or urge to act—that both humans and other mammals shared (McDougall, 1923). Importantly, McDougall argued that if animals and humans shared instincts, logically animals must experience emotions as humans did, a concept foreshadowing neuroscientist and psychobiologist Jaak Panksepp's work on affective neuroscience.

By the mid-1970s Donald Griffin's ground-breaking book, *The Question of Animal Awareness: Evolutionary Continuity of Mental Experience* (1976) created controversy when asserting that human mental experiences were not unique in the animal kingdom. Contrary to some lingering acceptance of Renee Descartes' tenet that the only evidence of sentience lay in the use of language to reveal an awareness of what things mean, Griffin boldly stated: "The belief that mental experiences are a unique attribute of a single species is not only parsimonious; it is conceited" (1981, p. 170).

The concept of sentience gained further prominence as the animal rights movement escalated in the late twentieth century. Activists and writers including Peter Singer, Tom Regan, Gary Francione, Paola Cavalieri and Gary Steiner positioned capacity for sentience as both a

rationale and a threshold criterion for establishing animal rights. When philosopher Paola Cavalieri (2016) posed the question, “are human rights *human*?”, it became clear that some of the fundamental rights traditionally limited to humans under the pretence of being “human rights” could—and should—be applicable to animals as well. The United Nations *Universal Declaration of Human Rights* dates back to 1948, but there is no equivalent universal animal rights declaration. Instead, a limited number of nations chose to recognise certain animals as sentient, providing varying degrees of moral, legal and political welfare protection. Nevertheless, an animal’s moral and legal status remained largely dependent on where they were located geographically and culturally, compounded by what philosopher Ani Satz (2009) described as the “interest-convergence” principle—that is, certain animals are protected only when human and animal interests align. Exploitation of many animals profits humanity economically and socially, thus creating divergent interests. This is made abundantly clear in countries where companion animals take on a social, familial role with more rights and protection than a farmed animal whose value lies in their economic position as a consumable commodity.

Animal activism movements based on assertions that sentience determined an organism’s status as a moral subject and that the subjective experiences, including pleasure and pain, of sentient animals should be respected, paved the way for theories of interspecies justice. Sentience became the baseline upon which animals qualified for inviolable rights. When analysing the moral rights of animals, researchers Sue Donaldson and Will Kymlicka (2014) argued that animals were “selves” in their own right, capable of distinctive subjective experiences within their personal lives and worlds and these required protection as an inviolable right. They made the logical argument that humans were not assigned degrees of