Animals, Extraterrestrial Life and Anthropocentrism in the Seventeenth Century

Both the issue of early modern attitudes toward animals and the early modern debate on the possibility of the existence of extraterrestrial life have received ample attention in early modern scholarship. However, almost no attention has been given to possible connections between these two issues. Such a connection nevertheless exists, since the early modern debates of both these issues were closely linked to the development of an anthropocentric outlook in western culture, according to which man had a God-given right to make use of nature. While the specific term 'anthropocentrism' was not in common use at the time, early modern thought, as discussed below, presents distinct phenomena which answer to the definition of this concept in its modern sense, i.e. a world-view placing man and human interests above those of the rest of the natural world. In the present article we shall therefore not be concerned with a separate discussion of the debate on the possibility of existence of other worlds and creatures on the one hand, and the debate on the status of animals and the possibility of moral duties toward them on the other. Rather, we shall centre on various cases where they were discussed in the same context, or on cases when the same person expressed distinct views on both these issues. As we shall see, there were many such cases, and their study has a profound influence on the understanding of early modern anthropocentrism. In the following discussion the connection between these two issues will be considered as a distinct phenomenon, *sui generis* in the history of ideas. Suffice it to say here, by way of introduction, that the rise of empirical science, particularly modern astronomy, gave an added impetus to speculations and debates on the possibility of the existence of other worlds and creatures, perhaps even rational creatures. As for the debate regarding animals, it fell broadly into two camps: on the one hand the theriophiles, who apportioned various degrees of feeling and rationality to animals (although usually less than human beings), and occasionally inferred from this a need for consideration toward them; and on the other hand the antitheriophiles, who denied or belittled the capacity for feeling and rationality

in animals, and consequently also their right to moral consideration. Of particular importance in this context was the Cartesian theory of the 'beast-machine', which regarded animals as senseless automata. While Descartes himself remained rather agnostic toward this issue, certain of his followers developed more extreme variations of it, and the theory in general also bore the brunt of many theriophilic attacks.[1]

I

Before discussing the literature on extraterrestrial life, one should mention some examples of a somewhat related type of literature, the Utopian genre. Indeed, the supposition of 'another place' always contained a potential for anti-anthropocentric argumentation, and of discussions of animals, albeit this potential did not always materialize. In Thomas More's *Utopia* (1516) most people eat animals, but the slaughtering of livestock is done by slaves, and ordinary people are not allowed to become accustomed to the cutting up of animals, since it tends to destroy the natural feelings of humanity. Hunting and hawking are also left to the slave-butchers. Hunting is regarded as the vilest department of butchery, since a butcher kills animals to satisfy a need, whereas a hunter does so for pleasure, exemplifying a blood-lust not found in any but the most savage animals. Hunting is a cruel sport and a stupid pleasure which should arouse pity rather than amusement. The Utopians also refrain from religious sacrifice of animals, believing that God would not enjoy slaughter and bloodshed. Some of the Utopians believe that animals have an immortal soul, although inferior to man's, and they generally believe that man's reason and intelligence is superior to that of the animals. As a child More himself did not seem to exemplify kindness toward animals, and even excelled in the cruel custom of cock-throwing. But it was probably at a later date that he developed his affection for animals and habit of keeping pets.[2]

In Bishop Joseph Hall's *Another World and Yet the Same* (1605), an example of dystopian literature (the opposite of the Utopian genre, describing an imaginary bad place), a similar view of butchering is exemplified. Hall compares the home of an inquisitor to a butcher's stall. In Pamphagonia (the Land of Gluttons) butchers are among those that live as free men in the towns. The bones of animals serve as building materials and weapons, and animals are served whole and uncut to the table. The Pamphagonians do not keep dogs, cats, hawks, or any other carnivorous animals, so that they can keep even the tiniest morsels of food, and they even eat cheese full of worms. But at the same time they are also cannibals, thus implying the well-known view that cruelty or kindness toward animals entails a similar attitude toward human beings.[3]

Hall nevertheless did not object to the consumption of animals, only to their slaughter in excessive quantities. He also opposed the Pythagorean belief

in metempsychosis. And despite sharing a similar neo-stoic attitude, he nevertheless ridiculed Justus Lipsius's love of dogs. Thus, while he exemplified certain theriophilic views, he seems to have done this mainly as a vehicle for berating offensive human behaviour.[4]

A different attitude toward animal slaughter was exemplified in Johann Valentin Andreae's Utopian *Christianopolis* (1619), where there is nothing bestial about the area where this is performed, although the narrator observes that elsewhere men have been brutalized by the handling of such things as blood and flesh. In their anatomy laboratory the Christianopolitans dissect animals, and occasionally also human corpses. Andreae's inherent anthropocentrism is emphasized in his statement that 'God has ordained that all creatures should be of service to a Christian.' The narrator implicitly attacks the custom of keeping pets, although he does relate how the Christianopolitans strive to offer 'refreshment to living creatures.' For Andreae the practice of science was one of the things which distinguished man from beast, and indicated the spark of divinity within humanity. He had a fondness for astronomy, maintained a long correspondence with Johannes Kepler, and differentiated between astronomers and 'those who look up at the skies no more thoughtfully than a beast'. Although it is not clear whether he actually believed in other worlds and creatures, he wrote that the Christianopolitans were not 'upset by some new-found inhabitants of the stars'.[5]

In Francis Bacon's *New Atlantis* (published posthumously in 1627) the inhabitants eat animal flesh, and conduct experiments on animals, thus exemplifying their own and the author's interest in empirical science. The lack of sensitivity to animals is particularly exemplified by the practise of vivisection, which they pursue, 'continuing life in them [animals], though divers parts, which you account vital, be perished and taken forth'. Bacon supported vivisection, which was a speedily growing practice in the Europe of his time.[6]

A lack of consideration of animals is also evident in Tommaso Campanella's *The City of the Sun* (1602), where the inhabitants eat animal flesh, hunt, and practise military skills by targeting horses and elephants. However, they are not reckless in their handling of animals, and

> They were unwilling at first to slay animals, because it seemed cruel; but thinking afterward that it was also cruel to destroy herbs which have a share of sensitive feeling, they saw that they would perish from hunger unless they did an unjustifiable action for the sake of justifiable ones, and so now they all eat meat. Nevertheless, they do not kill willingly useful animals, such as oxen and horses.[7]

Campanella, in his *Defense of Galileo* (1622) also maintained the possibility of a plurality of worlds and creatures. This is the first instance in the present discussion where we see that there is no necessary connection between a belief in other worlds and creatures, and a straightforward theriophilic outlook. The significance of this will be discussed below.[8]

II

A conjunction of both a belief in extraterrestrial life and a theriophilic philosophical position was evident already in the views of Plutarch, one of the most important figures in the history of both ideas, as was well-attested by his influence on their debate in early modern times. In his works *Whether Land or Sea Animals are Cleverer*, *On the Eating of Flesh*, and *Beasts are Rational*, he propounded a distinctly theriophilic philosophy, maintained that animals had intelligence and reason, and opposed the consumption of animal flesh as a luxury connected with cruelty toward animals. While he probably mitigated his theriophily in later years, his influence on early modern theriophiles was considerable. At the same time, in his *Concerning the Face which Appears in the Orb of the Moon*, he wrote of the possibility that there might exist other creatures on the moon. A similar pattern of juxtaposition of a belief in extraterrestrial life with theriophilic views appeared in the thought of quite a few early modern thinkers, although this was far from an absolutely consistent phenomenon.[9]

The rise of the new astronomy from the time of Copernicus onward gave an added impetus to conjectures regarding other worlds and creatures, in a more scientific tone than in earlier eras. Galileo Galilei was sceptical, to say the least, regarding the possibility of life on other planets or on the moon. But in his scientific discoveries, such as those described in *The Sidereal Messenger* (1610), a work which in any event did not directly address this issue, he influenced, among others, Kepler, who was more inclined to such speculation.[10]

In Kepler's *Dream* (1609; published posthumously with additional footnotes in 1634) the author exemplified a clear anti-anthropocentric basis, in the very assumption that there were other creatures in the universe. Indeed, following the Copernican revolution, the earth's status as the centre of the universe was increasingly challenged, and gradually various intellectuals began also to infer from this a relative decline in the status of man as the centre of God's creation. Kepler, who was not absolutely certain that life on the moon was scientifically viable, utilized a literary ploy to assume as much, and described lunar creatures adapted to their environment. As human beings believed that the stars moved around them, so too did the lunarians believe from their point of view that they were at the centre of planetary motion. While Kepler in this work was primarily interested in describing astronomical phenomena from the point of view of the moon, this anti-anthropocentric element, while only a minor and implicit feature of the discussion, was nevertheless important in itself, and evinced a continuously widening gap between the medieval and the early modern, primarily seventeenth-century, view of man, in light of the gradual rise of empirical science and astronomy.[11]

In his *Conversation with Galileo's Sidereal Messenger* (1610) Kepler continued his assumptions of extraterrestrial life, mainly on the moon, and consequently with the anti-anthropocentric suppositions this implied. Again

he conjectured regarding the type of inhabitants that the lunar environment would create, assuming life existed there. Kepler however did not regard space as infinite, and retained the centrality of the solar system, basing this on the claim that the sun's light was stronger than that of the rest of the stars. He was fully aware of the anti-anthropocentric implications of the new astronomy, writing:

> Well, then, someone may say, if there are globes in the heaven similar to our earth, do we vie with them over who occupies the better portion of the universe? For if their globes are nobler, we are not the noblest of rational creatures. Then how can all things be for man's sake? How can we be the masters of God's handiwork?

Kepler continued and wrote that it was 'difficult to unravel this knot', and that it would not be advisable to expatiate at length on this subject, but nevertheless he made a conscious effort to deny such implications, and retain elements of the geocentric and anthropocentric cosmology based on scientific reasoning. He claimed that there was no use for an unlimited number of worlds unless they differed one from the other. This implied a hierarchy of stars and planets, which Kepler tried to explain with the help of his theory of planetary motion in the solar system as derived from the five regular solids of Euclidian geometry. The solar system was at 'the very bosom of the world', and the sun was 'the heart of the universe', and revealed the force of God more than any other globe. But after the sun the earth was the most noble globe, at the very centre of the principal globes in the solar system, and thus the most appropriate as an abode for man, 'the primary rational creature, the noblest of the (corporeal) creatures'. Kepler thus inferred an astronomical parallel to the theory of the Great Chain of Being, which was well-known in the early modern era, and which placed man at the head of the natural world, and inferior only to the angels and God.[12]

Kepler's attempt to retain an anthropocentric standpoint was not singular among early modern scientists and intellectuals. The most important instance of this from our point of view was Descartes, who will be discussed further below. In fact, such an anthropocentric viewpoint was evident already in Nicholas of Cusa's *On Learned Ignorance* (1440), one of the most influential works regarding the supposition of extraterrestrial worlds and life, which preceded the Copernican revolution by about a century. According to Cusa the universe was finite but unbounded, and neither the earth nor any other planet were the centre of the world (although he retained at least a modicum of a geocentric view). His reasoning for this was mainly metaphysical, since he claimed that the centre and circumference of the world were only in God. The sensation of being at the centre was relative to the position of the observer.[13]

Cusa conjectured that there was life on every other star. But he retained a basic anthropocentrism, at least as regards the terrestrial creatures. He claimed that while the individuals of each species of living creatures differed

from each other, they shared a specific nature. Thus all dogs participated in a basic canine nature, but each one was unique in being more or less perfectly canine. However, a dog and a man differed essentially, and thus also in their degree of participation in the Divinity. Cusa extemporized a variation of the theory of the Great Chain of Being, and in a metaphysical line of reasoning placed man at the intermediate point between the sensible and intellectual natures, describing him as a microcosm enclosing all things, and as the nature with whom God would unite, and nature and the universe attain a supreme gradation. All this led to a theological discussion of Christ as the only person capable of fully realizing this human potential, and who owing to his union with God was both human and divine. Of the genus animal, man was the supreme species, the perfection of other animals, and contained not only a sensible, but also an intellectual element, which could be fully realized only by Christ.[14]

Cusa tried to combine this view with his assertion that there were creatures on other stars, and claimed that there could not be a more perfect nature among the intellectual natures than the terrestrial one. While this is not absolutely clear from the text, it seems that he was not claiming that other creatures in other worlds were inferior to man, but rather simply different from him; they had simply no comparative relationship with human beings. Men were not able to comprehend the nature of extraterrestrial beings, just as here on earth members of one species could not comprehend beyond a very rudimentary level the thought of the members of other species. All they could do was conjecture that the solar inhabitants were more brilliant, those of the moon more moonlike etc. We thus see that Cusa made a particular effort to neutralize the anti-anthropocentric potentiality of conjecturing extraterrestrial intelligent life, by retaining man's privileged position in the Great Chain of Being.[15]

This pattern, reconciling a belief in extraterrestrial life with a mitigation of its anti-anthropocentric implications, continued long after Cusa. In Pierre Borel's treatise in favour of a plurality of worlds (1657) the author also tried to relieve the tension between the findings of empirical science and the doctrines of traditional religious dogma. He provided a variety of arguments for belief in a plurality of worlds and creatures, and denied the claim that the infinite heavenly bodies were created for the earth and its inhabitants. Indeed, he conjectured that there might be extraterrestrial inhabitants superior to man, since on earth Satan was quite strong. But again we encounter here an anthropocentric argument based on the theory of the Great Chain of Being: if there were plants and animals on the stars, they must also contain people of some sort, since just as plants were meant for the use of animals, so the latter were meant for the use of man, who 'rules the Stars, as well as the Earth and Sea, the whole World is made for him'. Thus Borel expounded anti-anthropocentric argumentation without completely relinquishing an anthropocentric viewpoint.[16]

In several sections of his book of 1672 Otto von Guericke expounded a belief in the possibility of a plurality of worlds and creatures. He postulated that each fixed star constituted a separate world system. There were innumerable worlds, though not infinite ones. The earth was not the centre of the world; it looked from the other planets just as they looked from it. He asserted that because of the conditions and cold there, life on the moon would at best be of a lower order than on earth. Other possible creatures on other planets would however have to be different from man, both because of divine omnipotence and because there existed a principle of variety in nature. By the same token extraterrestrial creatures would differ one from the other, some would be more noble and excellent, and consequently it was probable there existed rational creatures on other planets. But it would be difficult to guess their precise nature. He also quoted Descartes regarding the caution not to limit our world, and not to believe that everything was created solely for us. While Guericke did not deal in any detail with the anti-anthropocentric implications of such suppositions, we can surmise from his attitude toward animals that he probably retained a belief in the superiority of man, at least on earth. We can infer this from the fact that he conducted experiments of suffocating animals in his invention, the air pump (which subsequently continued to serve for this purpose in the hands of many scientists). He conducted such experiments on fish, and also on a sparrow which died in the process. His descriptions of these experiments lack the kind of moral qualms that other contemporary vivisectors expressed at times. Guericke may have got the idea of experimenting on animals from his student days at the university of Leiden, which was one of the main European centres of such activity in the seventeenth century.[17]

Particularly perplexing in a similar context are the views expressed in Christiaan Huygens's book usually known by the title of *Cosmotheoros* (published posthumously 1698), which was one of the most important and comprehensive seventeenth-century advocacies of the plurality of other worlds and creatures. For Huygens, denying the possibility of extraterrestrial creatures endowed with reason was irreligious, as was the notion that everything was created for man. This was connected to several views of animals expressed in the book. Animals were endowed with reason, although inferior to human reason; nonetheless, animals such as birds lived with greater happiness than man, with all his wisdom, was capable of. Huygens's theriophilic viewpoint was manifested unequivocally when he attacked the beast-machine theory as an 'absurd and cruel' opinion.[18]

The fact that Huygens discussed both the theory of plurality of worlds and creatures, and his theriophilic views, in the same book, points to the conceptual contiguity between these two issues in early modern thought, particularly as regards the notion of anthropocentrism. But if at first glance Huygens's own views seem fairly straightforward, things are complicated once one discovers that he practised vivisection. Like Guericke, he was a student at Leiden

university, where he may have initially encountered this practice, and like him he performed vivisections mainly with the air pump, and described them in a dry and unemotional tone. While he performed these experiments many years before writing the *Cosmotheoros*, there is no way of knowing whether he did not already hold theriophilic views in his youth, a thing which was nevertheless quite possible. We thus come to the understanding that even for a theriophile like Huygens anti-anthropocentrism was acceptable only as long as it did not clash with human needs, of which scientific study was for him a prime example. This type of qualified anthropocentrism, albeit usually more mitigated, was the province of most early modern theriophiles, who while developing a sensitivity toward animals did not, in most cases, deduce from this any denial of the basic superiority of human beings.[19]

III

The ambiguity inherent in Huygens's attitude toward animals was not always as radical among other early modern theriophiles who also believed in a plurality of worlds and creatures. One of the most important among these was Giordano Bruno, who became one of the chief advocates of the theory of extraterrestrial worlds and life. This belief was based on his vision of an infinite universe, which held a central place in his philosophy. Again with Bruno one encounters the claim that the earth is not at the centre of the universe, and that the feeling of being at the centre is relative to the point of view. There must also exist other suns, since our one cannot possibly provide light and heat to the whole universe. On other worlds there exist other creatures, perhaps even superior to man. Bruno expanded his view of an infinite world in his book *On the Infinite Universe and Worlds* (1584).[20]

Bruno's cosmology was connected also with his view of animals. He postulated the existence of an infinite World Soul in which the individual souls were continuous with the soul of the universe. Thus everything, even the smallest being, shares in the primal spiritual substance of the universe. Each animal considers things from its point of view and regards its own species as the centre and measure of all things, just as human beings do. Bruno believed that the soul was immortal, and he was fascinated by the doctrine of metempsychosis. While he did not deny that man was ultimately superior to the animals, his extrapolation of this view was predominantly theriophilic in tone. Animals might possess reason, but they lacked the capacity to express it. There was a kind of reason that pervaded everything, and even plants might have a type of soul. Animals had at least some kind of cognitive power, even if it was designated as instinct rather than reason. The human soul did not differ from that of other living beings, and every living organism contained the same 'corporal matter' and the same 'spiritual matter'. Indeed, 'Among horses, elephants and dogs there are single individuals which appear

to have almost the understanding of men'. But it was the particular 'physical constitution' of each species that ordained its relationship with nature, and the behaviour according to physical characteristics determined the differences between animals. It was thus the very physical constitution of man that enabled only him to attain divinity. His superiority was not merely physical, but stemmed from the integration of his intelligence and physical ability, particularly his ability to use his hands. These enabled him to transcend nature, and the more he became active the more he moved from the status of animal to that of divine being. In this manner humanity overcame its bestial condition in the transition from nature to culture, and attained a domination of nature. But this was a potential for action which not all men realized, and others remained in a bestial condition; thus in a dynamic world each person was the master of his own fate. The world was full of variety, large and small, strong and weak. But each part was important in itself, and there was a need for justice and law and protection of the weak.[21]

In the seventeenth century there were other believers in the plurality of worlds and creatures who expressed theriophilic views. One of these was Bernard Le Bovier, sieur de Fontenelle, a mild theriophile whose work *Conversations on the Plurality of Worlds* (1686) became one of the most popular and influential works on the subject for many years.[22]

Another theriophile who believed in extraterrestrial life was Henry More, who in his *Democritus Platonissans* (1646) postulated an infinity of possible worlds with a variety of plants, animals and people. Imagining this variety of life and phenomena he wrote how 'In this huge endlesse heap o'rewhelmed, drownd, / Choak'd, stifled, lo! I lie, breathlesse, even quite confound.' He wrote of the creation and death of stars, and of a cyclical pattern of creation and destruction of life in the universe from which the earth too was not exempt. At the same time he perceived at least some reason and soul in the animals, and objected to the beast-machine theory.[23]

In general, the tendency toward anti-theriophily was particularly predominant among scientists and philosophers, while theriophilic sentiments were usually more popular among the general educated early modern public, particularly as these were voiced by poets and other literary figures. In various letters from *The Turkish Spy* (1684–94), a work probably begun by the Italian Giovanni P. Marana and continued by a host of anonymous English writers, the protagonist, Mahmut, presented both a support for the doctrine of a plurality of worlds, and an unequivocal and consistent anti-anthropocentric denial of the beast-machine theory, despite being influenced by Descartes. Commenting on the supposition that the moon and other planets were habitable like the earth, he wrote that 'For my part to speak freely I could wish it were true; it is a sociable doctrine'. He agreed that man was superior to the animals in soul and reason, but man also had defects, and the animals excelled him physically and by their senses. In a typical theriophilic manner he gave examples of animal sagacity and morality, but also noted that animals too could behave badly,

just like people. Mahmut believed that animals had souls. He was a vegetarian, tender-hearted in his attitude toward animals, and tried to abstain from injuring them. He compared the killing and consumption of animals to cannibalism, and located the root of injustice toward animals in the false supposition that they lacked reason. His anti-anthropocentrism was evident when he wrote:

> The Christians seem to have too proud an opinion of themselves and set a greater value on human nature than suits with reason. They assert that all things were made for man and style him lord of his fellow creatures, as if God had given him an absolute dominion over the rest of His works, especially over the animal generations; and that all the birds of the air, beasts of the earth and fish of the sea were created only to serve his appetite and other necessities of life.[24]

Another important example of the coupling of theriophily with a belief in the plurality of worlds and creatures was exemplified by Margaret Cavendish, the Duchess of Newcastle. For her, 'in Mankind, the best of Atoms be', and 'There's none like Man; for like the Gods is he: / Then let the World his Slave and Vassal be.' Man was superior to the animals in such things as his capacity to walk upright and to commemorate others with fame. At times she also mentioned uncensoriously things such as meat eating, hunting and baiting.[25]

Nevertheless, in most cases Cavendish exemplified a much more benign attitude toward animals, at times even extremely theriophilic. She may have been influenced in this by her husband, William Cavendish, the Duke of Newcastle, who opposed the beast-machine theory. She wrote that animals might be capable of cruelty, but men were more cruel. Animals might be capable of imagination and speculation, but we cannot verify this because we do not discourse with them. 'Beasts have Life, and Sense, and Passions strong, / Yet cruel Man doth kill, and do them wrong.' 'Man doth think himself so Gentle, Mild; / When, of all Creatures, he's most Cruel, Wild.' And as the swallow exclaimed in another poem, 'O Man! O Man! If we should serve you so, / You would, against us, your great Curses Throw.' Cavendish seems to have held an anti-mechanistic world-view, and believed that all nature might be endowed with reason and a soul; and she did not hesitate to draw from this the need for more gentle treatment of the animals.[26]

At the same time she believed in the possibility of existence of other worlds and creatures, for even though our sun was at the centre of the planets, 'Who knows but those Starrs we see by Night, / Are Suns, which to some other Worlds give Light?' If there existed infinite matter, there also existed infinite worlds. And if there existed infinite worlds, these must also have infinite centres. Our globe might be one circle among many, one within the other, and not necessarily the outermost one. Life might exist in a tiny thing, a twopence or a needle, and if so then so too might understanding exist there. And indeed, in the poem 'A World in an Ear-ring' Cavendish described a solar system with life, loves etc., all within an earring.[27]

But probably the most striking seventeenth-century example of belief in extraterrestrial worlds coupled with theriophilic philosophy was found in Cyrano de Bergerac's *Voyages to the Moon and the Sun* (published posthumously 1656–62). The very outline of the protagonist's adventures, visiting worlds and inhabitants on the moon and sun, presupposed that extraterrestrial life existed. But what makes these works relevant for the present discussion is that throughout these adventures Cyrano presents us with unmistakably forthright theriophilic statements. He satirically ridicules human pride, conduct and beliefs, and attacks anthropocentrism and the beast-machine theory. In his views on animals he was influenced by Michel de Montaigne and Pierre Gassendi, although he was much more of a theriophile than the latter of these two.[28]

On the moon and sun both animals and plants have souls and feel pain, although the tone of the satire on sensitive plants is at times such that it is difficult to know if Cyrano is completely serious. His views on animals, however, seem unmistakable. On the moon the hero finds himself in an 'upside-down world' situation in which he is treated as a pet; when he learns the native language this gives rise to arguments about whether he possesses reason or not. In another satirical inversion, this time regarding the plurality of worlds theory, he is prosecuted by the lunarians for maintaining that the earth is not a moon but rather *vice versa*, but on acknowledging his mistake is acquitted and accepted as a 'man'. Particularly important from a theriophilic point of view are the adventures of the hero in a land of birds on the sun, especially the upside-down world satire of the animal trials common in medieval and early modern Europe, when he is prosecuted for the various wrongs committed by humanity against animals, and for the fact that human beings lack the reason that birds possess. He is blamed for the wilful wrongs man commits against animals – that he unprovokedly kills them, eats them unnecessarily, and from the point of view of the birds, 'the most cowardly of all, that he debauches the natural disposition of hawks, falcons and vultures, by teaching them to massacre their kind, to feed upon their like or to deliver us into his hands'. He is about to be executed, but is saved at the last minute by the appearance of a parrot on whose behalf he had once claimed that birds have reason, and had freed from its cage.[29]

Cyrano thus presents us with the ultimate example of how theriophilic views and a belief in the plurality of worlds and creatures can appear contiguously and reinforce a common anti-anthropocentrism. However, as we saw above, this was not always the case, and those holding one view did not always hold the other.[30]

The most prominent example of this, and the most pertinent for the present discussion, in view of his profound influence on both anti-theriophilic argumentation and the growing conjectures regarding a plurality of worlds, was Descartes himself. As noted above, he was rather agnostic about his views on animals, and in fact he was also agnostic in his views on a plurality

of worlds and creatures. His conjectures on this issue were based mainly on his vortex theory, which had an important influence on the seventeenth-century extraterrestrial debate. But he and others of his followers preferred not to emphasize this aspect of his cosmology, for theological reasons and because this cosmology was already fraught with problems. However, Descartes's influence was such that he was occasionally credited with breaking the Aristotelian world-view.[31]

In this respect his position implied an anti-anthropocentric viewpoint, but this pertained only to worldly matters, while man was expected to attend to things beyond the material world. The anti-anthropocentric implications of his extraterrestrial conjectures can be surmised from his letter to Hector Pierre Chanut of 6 June 1647. Descartes's scepticism on the plurality of worlds issue was connected here to the claim that the world and its boundaries were indefinite. It was not possible to answer definitely the question whether there existed other intelligent creatures on other worlds, although in our world man had a special place as the principal element in God's creation. Nevertheless, a difficulty arose after people had believed for so long that man was superior to other creatures, a superiority that was threatened by such new doctrines. But each creature had its own advantages, and in any event a plurality of worlds and creatures served as a reason to praise the immensity of God's creation. And here Descartes, in a manner reminiscent of the Great Chain of Being theory, recalled that the lowliest of angels was superior to man.[32]

While he does not state this directly, the implications of Descrates's utterances are, that any anti-anthropocentric conclusions which might be inferred from his views on this issue are not relevant to or contradictory of his views on animals. As far as he and various other advocates of the plurality of worlds and creatures theory were concerned, there might exist other intelligent creatures in the universe, perhaps even superior to man, but here on earth man's supremacy over the animals remained uncontested. In other words, on earth the anthropocentric *Weltanschauung* remained untouched, whereas anything beyond the earth remained undefined as far as men were able to know.

In this respect one is reminded that theriophilic literature was concerned in many instances more with chastising human beings than with attitudes toward animals *per se*. In a similar fashion various early modern thinkers who supported the theory of a plurality of worlds made an effort to harmonize it with religious doctrine; and religious sentiments almost always, even if only implicitly, gave rise to exhortations for people to improve their ways, and so forth. The investigation of natural phenomena was gradually becoming more rationalized and devoid of religious connotations, but in many instances it still had such connotations in the minds of seventeenth-century people. Thus it becomes obvious that the anti-anthropocentric implications of both the theriophilic debate and the debate on the plurality of worlds and creatures, by and large served, in varying degrees, an anthropocentric end: to make man better

his ways and/or glorify the Divine Creator by attaining a better understanding of His works. Hence, anthropocentric thought was so deeply ingrained in early modern culture that even anti-anthropocentric arguments were in many cases anthropocentrically motivated in this way. In this sense, early modern anti-anthropocentrism might itself be said to have been anthropocentric.[33]

IV

Immanuel Kant, in discussing the *a priori* cognition of objects, claimed that our cognition should not conform to objects but rather *vice versa*, that objects, or the experience of them, must conform to our cognition. He thus attempted to search for rules in the observer rather than the phenomena being observed. He compared this to the Copernican revolution, since Copernicus had made a similar reversal when he had assumed that instead of the observer being at rest and the stars moving, one should assume that the stars were at rest and the observer in motion. To continue Kant's terminology, one might speak of a kind of intermediate 'Copernican revolution' in between Copernicus's original revolution and Kant's cognitive one: at first geocentric cosmology was jolted; then the secure place of man as the supreme physical creature in the world was questioned both by the theory of existence of extraterrestrial intelligent life, and by theriophilic philosophy; and finally people were asked to forsake their accustomed mode of thought and to look primarily within themselves if they were to understand the surrounding world. This gradual centripetal convergence in modes of perception, which continually diminished the stability of the traditional view of the world, and increasingly confronted early modern man with the feeling that for better or worse he was master of his own fate, can be seen as part of the growing tendency toward empiricism, rationalism, and ultimately the secularization of western culture. Of course this process was a gradual and relative one; on the one hand signs of empiricism were evident even during the Middle Ages, and on the other hand religious elements were still important in the early modern era. But in general a relative secular outlook was gradually becoming evident in early modern culture, particularly from the seventeenth century. And even if many of the intellectuals who contributed to this development would have disagreed with its secularizing outcome, it was nevertheless implicit in their own thought.[34]

The question this poses for us is: if this process induced a decline, even a limited and gradual one, in the influence of religious perceptions of the world, why did it not have a similar effect on the anthropocentric bias of western thought, itself stemming in large part from the traditional religious cosmology? If one is to avoid tautological or teleological reasoning, the best explanation one can give seems to be that anthropocentrism was even more emphatically embedded in western culture than religious thought *per se*. To such an extent, indeed, that as traditional religious modes of thought gradually declined in

importance, so anthropocentric thought continuously adapted itself to the growing rational and empirical intellectual climate. The result was not a decline of anthropocentrism, but rather its metamorphosis from a religious to an empirical-secular type. From the point of view of the animals this meant, if anything, that anthropocentrism had attained an even more potent form, which did not need any longer a divine justification, but rather saw in man himself the lord and master of the world around him. Indeed, in this matter we still seem to be the direct heirs of our early modern predecessors.[35]

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Notes

1 The division of views of animals into theriophilic and anti-theriophilic is of course very generalized, but nevertheless necessary, since a discussion of finer distinctions between these two basic views is beyond the scope of the present article. For discussions of early modern attitudes toward animals see George Boas, *The Happy Beast in French Thought of the Seventeenth Century* (New York, 1966); Peter Harrison, 'The Virtues of Animals in Seventeenth-Century Thought', *Journal of the History of Ideas*, 59 (1998), 463–84; Dix Harwood, *Love for Animals and How it Developed in Great Britain* (New York, 1928); Hester Hastings, *Man and Beast in French Thought of the Eighteenth Century* (Baltimore, 1936); J. S. Spink, *French Free-Thought from Gassendi to Voltaire* (New York, 1960), pp. 226–37; and Keith Thomas, *Man and the Natural World: Changing Attitudes in England 1500–1800* (Harmondsworth, 1984). For the history of the Cartesian view of animals see Leonora Cohen Rosenfield, *From Beast-Machine to Man-Machine: Animal Soul in French Letters from Descartes to La Mettrie* (New York, 1968). For René Descartes' own views of the issue see John Cottingham, 'A Brute to the Brutes? Descartes' Treatment of Animals', in *René Descartes, Critical Assessments*, IV, ed. Georges J. D. Moyal (London and New York, 1991), 323–31; and Peter Harrison, 'Descartes on Animals', *The Philosophical Quarterly*, 42 (1992), 219–27. For the biblically-rooted anthropocentric view of man as the steward of nature see J. J. Finkelstein, *The Ox that Gored* (Philadelphia, 1981), pp. 7, 8, 39, 52; Anita Guerrini, 'The Ethics of Animal Experimentation in Seventeenth-Century England', *Journal of the History of Ideas*, 50 (1989), 391–407, esp. p. 396; and Lynn White Jr., 'The Historical Roots of our Ecological Crisis', *Science*, 155 (10 March 1967), 1203–7. For the connection between the extraterrestrial life debate and anthropocentrism see Paolo Rossi, 'Nobility of Man and Plurality of Worlds', trans. Arthur Brickmann, in *Science, Medicine and Society in the Renaissance: Essays to Honor Walter Pagel*, ed. Allen G. Debus, 2 vols (London, 1972), II, 131–62. The main study of the early modern debate over other worlds and creatures is Steven J. Dick, *Plurality of Worlds: The Origins of the Extraterrestrial Life Debate from Democritus to Kant* (Cambridge, 1982). For brevity's sake I have kept most general references to this issue below to the main relevant sections in this book; but see also David M. Knight, 'Uniformity and Diversity of Nature in Seventeenth-Century Treatises on Plurality of Worlds', *Organon*, 4 (1967), 61–8; Grant McColley, 'The

Seventeenth-Century Doctrine of a Plurality of Worlds', *Annals of Science*, 1 (1936), 385–430; Milton K. Munitz, 'One Universe or Many?', in *Roots of Scientific Thought, a Cultural Perspective*, eds Philip P. Wiener and Aaron Noland (New York, 1957), pp. 593–617; and Marjorie Hope Nicolson, *Voyages to the Moon* (New York, 1948). Of general importance to the issue of early modern astronomy and its intellectual implications, including regarding anthropocentrism, are Ernst Cassirer, *The Individual and the Cosmos in Renaissance Philosophy*, trans. Mario Domandi (New York and Evanston, 1964), e.g. p. 189; and Alexandre Koyré, *From the Closed World to the Infinite Universe* (Baltimore and London, 1994), e.g. pp. 43–4. None of the above-cited studies establishes any serious connection between the debate of other worlds and creatures and that of the status of animals.

2 Thomas More, *Utopia*, trans. Paul Turner (Harmondsworth, 1965), pp. 47, 71, 80–1, 95, 110, 120–3, 126, 141–2, 145, 153. Also Harwood, *Love for Animals*, pp. 36, 40–1, 59, 74.

3 *Another World and Yet the Same: Bishop Joseph Hall's Mundus Alter et Idem*, trans. John Millar Wands (New Haven and London, 1981), pp. xxxv–xxxvi, xxxix–xli, 25–31. For other references to cannibalism, obviously as a sign of barbarity, see pp. xliii–xliv, 40, 54, 84–5. For the view that attitudes toward animals influence attitudes toward people see Hastings, *Man and Beast*, pp. 242–3; John Passmore, 'The Treatment of Animals', *Journal of the History of Ideas*, 36 (1975), 195–218, esp. pp. 200–1; and Immanuel Kant, *Lectures on Ethics*, trans. L. Infield (New York, 1963), pp. 239–41.

4 Hall, *Another World*, pp. xxix, xlvi, 28, 36, 76, 85, 104, 146–7, 166, 172, 182–3. For other sections relevant to animals, although due to Hall's intricate allegories not always easily decipherable as explicit statements about animals, see pp. 35, 71–3, 81, 91, 186–7. For Lipsius's love of dogs, and for various interpretations of his attitude toward animals, see Mark Morford, *Stoics and Neostoics: Rubens and the Circle of Lipsius* (Princeton, 1991), p. 4; Susan Koslow, *Frans Snyders* (Antwerpen, 1995), pp. 256–7; and Harrison, 'Virtues of Animals', p. 474 (note 48). Lipsius did not oppose the slaughter of animals; see his *A Discourse of Constancy*, trans. R. G. (London, 1654), pp. 90–4, 103. Theriophily served in many cases as a literary device more concerned with human chastisement than with animals *per se*, although the latter usually also received at least minimal attention; see Boas, *Happy Beast*, pp. 1–2 and *passim*. For a typical example of such literature, originally published in 1549, see John Baptist Gelli, *Circe*, trans. H. Layng (London, 1744). For my own part I believe that the term 'theriophily' should denote first and foremost attitudes toward animals in themselves, and only secondly a literary device, and I use the term accordingly in the present discussion.

5 J. V. Andreae, *Christianopolis*, trans. Edward H. Thompson (Dordrecht, 1999), pp. 13–14, 24–5, 58, 85, 88–90, 94, 110–11, 114, 126, 128–9, 166–7, 174, 182, 191, 211–12, 214–17, 236–7, 239–41, 269, 375. For other interesting points see also pp. 3, 4, 29–49, 115, 189, 213, 221, 233, 309.

6 Francis Bacon, 'New Atlantis', in Henry Morley, *Ideal Commonwealths* (New York and London, 1901), pp. 101–37, esp. pp. 130–3. See also Andreas-Holger Maehle and Ulrich Tröhler, 'Animal Experimentation from Antiquity to the End of the Eighteenth Century: Attitudes and Arguments', in *Vivisection in Historical Perspective*, ed. Nicolaas A. Rupke (London and New York, 1987), pp. 14–47, esp. p. 19.

7 Thomas Campanella, 'The City of the Sun', in Morley, *Ideal Commonwealths*, pp. 139–79, esp. pp. 152, 160–1, 164, 168 (for the quotation), 169.

8 Thomas Campanella, *A Defence of Galileo the Mathematician from Florence*, trans. Richard J. Blackwell (Notre Dame and London, 1994), esp. pp. 44–5, 50, 57, 58–60, 84, 88–90, 96, 106–7, 109–13, 120–2. Also Dick, *Plurality of Worlds*, pp. 90–3; and Andreae, *Christianopolis*, p. 166 (note 375).

9 Plutarch, 'Concerning the Face which Appears in the Orb of the Moon', 'Whether Land or Sea Animals are Cleverer', 'Beasts are Rational', and 'On the Eating of Flesh', in *Plutarch's Moralia*, vol. *XII*, trans. Harold Cherniss and William C. Helmbold (London and Cambridge, Mass., 1968), 1–223, 309–486, 487–533, 535–79 respectively, esp. pp. 156–81, 195–223, 312–13, 319–55 (347–9 and 351–5 for his mitigated theriophily in later years), 377–89, 405, 467–9, 477–9, 525, 531, 541–51, 557–9, 565–79. Also Arthur O. Lovejoy and George Boas, *Primitivism and Related Ideas in Antiquity* (Baltimore and London, 1997), pp. 389–420, esp. pp. 403–20; James E. Gill, 'Theriophily in Antiquity: A Supplementary Account', *Journal of the History of Ideas*, 30 (1969), 401–12, esp. pp. 408–12; and Dick, *Plurality of Worlds*, pp. 20–2.

10 Galileo Galilei, *Sidereus Nuncius or the Sidereal Messenger*, trans. Albert van Helden (Chicago and London, 1989); and Dick, *Plurality of Worlds*, pp. 86, 96–7, 208 (note 93). For the scientific basis of the belief in a plurality of worlds see Marjorie Nicolson, 'The Telescope and Imagination', *Modern Philology*, 32 (1935), 233–60.

11 John Lear, *Kepler's Dream with the Full Text and Notes of Somnium, Sive Astronomia Lunaris, Joannis Kepleri*, trans. Patricia Frueh Kirkwood (Berkeley and Los Angeles, 1965), esp. pp. 66, 70–1, 130–3, 135–7, 154–7, 165–82.

12 *Kepler's Conversation with Galileo's Sidereal Messenger*, trans. Edward Rosen (New York and London, 1965), esp. pp. 11, 26–30, 34–47 (43 for the quotation), 127–9 (note 300), 143 (note 371), 144 (note 379), 148 (note 399), and *passim*; Dick, *Plurality of Worlds*, pp. 69–90, 177–80; and Arthur O. Lovejoy, *The Great Chain of Being* (New York, 1960).

13 Jasper Hopkins, *Nicholas of Cusa on Learned Ignorance: A Translation and an Appraisal of De Docta Ignorantia* (Minneapolis, 1981), esp. pp. 16–18, 27–30, 89–90, 96–112, 173–7.

14 *Ibid.*, pp. 23–4, 26, 29–43, 77–9, 87–90, 94–102, 108–9, 125–31, 134–9, 144.

15 *Ibid.*, pp. 119–21. For Cusa see also Dick, *Plurality of Worlds*, pp. 40–2.

16 Peter Borell [sic], *A New Treatise, Proving a Multiplicity of Worlds*, trans. D. Sashott (London, 1658), pp. 31–6, 138–41, 190–2 (191 for the quotation), and *passim*; Marie-Rose Carré, 'A Man between Two Worlds: Pierre Borel and His *Discours nouveau prouvant la pluralité des mondes* of 1657', *Isis*, 65 (1974), 322–35; and Dick, *Plurality of Worlds*, pp. 117–20.

17 Otto von Guericke, *The New (So-Called) Magdeburg Experiments of Otto von Guericke*, trans. Margaret Glover Foley Ames (Dordrecht, 1994), pp. xxiii, 77–81, 143 (the animal experiments), 282–3, 327–8, 335–41, 364–87; and Dick, *Plurality of Worlds*, p. 116. For Leiden as a vivisection centre see G. A. Lindeboom, 'Dog and Frog: Physiological Experiments at Leiden during the Seventeenth Century', in *Leiden University in the Seventeenth Century: An Exchange of Learning*, eds Th. H. Lunsingh Scheurleer and G. H. M. P. Meyjes (Leiden, 1975), pp. 279–93. For the occasional qualms of vivisectors, who nevertheless usually

continued their experiments and regarded animals as necessary victims of science, see Maehle and Tröhler, 'Animal Experimentation', pp. 20–1, 23, 27; Guerrini, 'Ethics of Animal Experimentation', pp. 395–8, 400–2, 406; Harwood, *Love for Animals*, pp. 98–114; Thomas, *Man and the Natural World*, p. 174; and Wallace Shugg, 'Humanitarian Attitudes in the Early Animal Experiments of the Royal Society', *Annals of Science*, 24 (1968), 227–38.

18 Christianus Huygens, *The Celestial Worlds Discover'd: Or, Conjectures Concerning the Inhabitants, Plants and Productions of the Worlds in the Planets*, trans. anon. (London, 1698), esp. pp. 56–62; Jean Seidengart, 'Les théories cosmologiques de Christiaan Huygens', in *Huygens et la France, table ronde du Centre National de la Recherche Scientifique, Paris 27–29 mars 1979* (Paris, 1982), pp. 209–22; David Knight, 'Celestial Worlds Discover'd', *The Durham University Journal*, 58, n. s. 27 (1965), 23–9; and Dick, *Plurality of Worlds*, pp. 126–35, 186–7.

19 For Huygens's descriptions of vivisections see Christiaan Huygens, *Œuvres Complètes*, 22 vols (The Hague, 1888–1950), III, 395, 397; IV, 8; XVII, 312; XIX, 207, 211. For a fuller discussion of Huygens see my article 'Christiaan Huygens's Attitude toward Animals', *Journal of the History of Ideas*, 61 (2000), 415–32. On the nature of seventeenth-century theriophily see Boas, *Happy Beast*, *passim*.

20 Dorothea Waley Singer, *Giordano Bruno, his Life and Thought with Annotated Translation of his Work on the Infinite Universe and Worlds* (New York, 1950), esp. pp. 43, 50–61, 95, 97–8, 102–15, 181–8, 280, 305–6, 323, 225–378; and Dick, *Plurality of Worlds*, pp. 63–9.

21 Singer, *Giordano Bruno*, pp. 59–61, 78–9, 86–92, 97–8, 100, 118, 120–5 (esp. 123), 128; Nuccio Ordine, *Giordano Bruno and the Philosophy of the Ass*, trans. Henryk Barański and Arielle Saiber (New Haven and London, 1996), pp. 35–42, 48–50, 55, 65–7, 82–3, 85–7, 89–95, 102–3, 141, 147, 164–5, 167–73, 218 (note 1), 225; and Evelyn M. Cesaresco, *The Place of Animals in Human Thought* (London and Leipzig, 1909), p. 353 (for the quotation).

22 Bernard le Bovier de Fontenelle, *Conversations on the Plurality of Worlds*, trans. H. A. Hargreaves (Berkeley, 1990); Rosenfield, *Beast-Machine to Man-Machine*, pp. 69–70, 126–7; and Dick, *Plurality of Worlds*, pp. 123–9, 134–40.

23 Henry More, *Democritus Platonissans* (Cambridge, 1646; reprint Los Angeles, 1968), 'The Argument', pp. 6–9 (p. 9 for the quotation), 13, 20, 24–7; 'A Particular Interpretation appertaining to the three last books of the Platonick Song of the Soul': s.v. 'Reason' and 'Soul'; Leonora D. Cohen, 'Descartes and Henry More on the Beast-Machine – a Translation of Their Correspondence Pertaining to Animal Automatism', *Annals of Science*, 1 (1936), 48–61; and Dick, *Plurality of Worlds*, pp. 50–3, 59–60, 117–18.

24 Giovanni P. Marana, *Letters Writ by a Turkish Spy*, selected and ed. Arthur J. Weitzman (London, 1970), pp. viii–xv, xix, 48–51 (vol. II, book I, letter XXVI – on the plurality of worlds and creatures; for first quotation see p. 50), 51–3 (II, I, XXVII – opposition to the beast-machine; note the contiguity with the former letter, as if the author implied a connection between the two issues), 89–93 (IV, III, I – on the plurality of worlds including influence of Descartes), 93–6 (IV, III, IV – on animals; for second quotation see p. 93), 97–100 (IV, IV, III – on animals), 194–7 (VII, III, VIII – on animals). For the relative predominance of theriophily in literary circles see Harrison, 'Virtues of Animals', 482–3; and Hastings, *Man and Beast*, *passim*.

25 [Margaret Cavendish] The Duchess of Newcastle, *Poems, or, Several Fancies in Verse: with the Animal Parliament, in Prose* (London, 1668), pp. 24–5 ('What Atoms make Vegetables, Minerals, and Animals', including first quotation), 133–4 ('A Discourse of Man's Pride, or seeming Prerogative', including second quotation), 141–8 ('A Moral Discourse of Man and Beast'); *idem*, *The Worlds Olio* (London, 1671), pp. 4, 267, 278; and *idem*, *The Blazing World and Other Writings*, ed. Kate Lilley (Harmondsworth, 1994), pp. 74, 83, 117, 156, 170).

26 *Ibid.*, pp. 176–7; *idem*, *Poems*, pp. 84–6 ('A Dialogue betwixt Man and Nature', including first quotation), 158–62 ('The Hunting of the Hare', including second quotation), 102–9 ('A Dialogue betwixt Birds', including third quotation), and also 96–102 ('A Dialogue between an Oak, and a Man'), 135–6 ('Of Humility'), 149–50 ('Of the Ant'), 151 ('Of the Knowledge of Beasts'), 152 ('Of Fish' and 'Of Birds'), 153 ('Earth's Complaint'), 162–7 ('The Hunting of a Stagg'); *idem*, *Worlds Olio*, pp. 271–8, 279–80; Sylvia Bowerbank, 'The Spider's Delight: Margaret Cavendish and the "Female Imagination"', *ELR*, 14 (1984), 392–408, esp. pp. 399–400; Eve Keller, 'Producing Petty Gods: Margaret Cavendish's Critique of Experimental Science', *ELH*, 64 (1997), 447–71; and for Cavendish's husband see Betsy Bowden, 'Before the Houyhnhnms: Rational Horses in the Late Seventeenth Century', *Notes and Queries*, no. 237, n.s. 39 (1992), 38–40.

27 Newcastle, *Worlds Olio*, pp. 330–1, 334; *idem*, pp. 47 ('Of Starrs', including quotation), 50 ('If Infinite Worlds, there must be Infinite Centers'), 51 ('Of Infinite Matter'), 63–4 ('Of many Worlds in this World'), 64–6 ('A World in an Ear-ring'), 66–7 ('It is hard to believe, that there may be other Worlds in this World'; despite the title, the tone of this poem suggests the opposite), 68 ('Several Worlds in several Circles'), 153 ('Earth's Complaint'); and Dick, *Plurality of Worlds*, p. 199 (note 18).

28 Montaigne also believed in a plurality of worlds; see *ibid.*, pp. 46–7. For his theriophily see his 'An Apology for Raymond Sebond', in Michel de Montaigne, *The Complete Essays*, trans. M. A. Screech (Harmondsworth, 1993), pp. 489–683; and Boas, *Happy Beast*, pp. 3–9 and *passim*. Gassendi opposed the plurality-of-worlds theory on theological grounds; see Dick, *Plurality of Worlds*, pp. 47–8, 53–60, esp. p. 59. For Gassendi's opposition to the beast-machine theory see the remarks in his 'Fifth Set of Objections' to Descartes's *Meditations* in *The Philosophical Works of Descartes*, trans. Elizabeth S. Haldane and G. R. T. Ross, 2 vols (Cambridge, 1967), II, 144–6 (for Descartes' reply see pp. 211–12). For his views on animals see Rosenfield, *Beast-Machine to Man-Machine*, pp. 10–11, 13, 25, 110–14, 143, 157, 159, 175–6, 188, 271–2; and Boas, *Happy Beast*, pp. 91, 132–5. For Cyrano see *ibid.*, pp. 142–5; Dick, *Plurality of Worlds*, p. 120; Spink, *French Free-Thought*, pp. 48–66; Rosenfield, *Beast-Machine to Man-Machine*, pp. 114–18; Anthony M. Beichmann, 'Cyrano de Bergerac and the Beast-Machine', *Romance Notes*, 10 (1968), 109–13; Erica Harth, *Cyrano de Bergerac and the Polemics of Modernity* (New York and London, 1970), 159–98; and Patricia M. Harry, *The Universe of Cyrano de Bergerac (1619–1655)*, 2 vols (unpublished Ph.D. dissertation, University of London, 1974), I, 179–240, II, 509–11.

29 Cyrano de Bergerac, *Voyages to the Moon and the Sun*, trans. Richard Aldington (London and New York, n.d.), pp. 81–117, 127–30, 237–80 (p. 254 for the quotation). For animal trials see Finkelstein, *The Ox that Gored*, pp. 61, 64–73; E. P. Evans, *The Criminal Prosecution and Capital Punishment of Animals* (London

and Boston, 1988); Esther Cohen, *The Crossroads of Justice, Law and Culture in Late Medieval France* (Leiden, 1993), pp. 100–33; and *idem*, 'Law, Folklore and Animal Lore', *Past and Present*, no. 110 (1986), 6–37. For the upside-down world genre see David Kunzle, 'World Upside Down: The Iconography of a European Broadsheet Type', in *The Reversible World, Symbolic Inversion in Art and Society*, ed. Barbara A. Babcock (Ithaca and London, 1978), pp. 39–90.

30 I have given examples primarily of those who supported the plurality of worlds theory but were anti-theriophilic to some extent. But the opposite could also occur, as in the case of Marin Mersenne, who while not denying the possibility of a plurality of worlds, was sceptical regarding it; see Dick, *Plurality of Worlds*, pp. 93–5. At the same time he opposed the Cartesian assertion that animals were devoid of souls; see Huygens, *Œuvres Complètes*, I, 21.

31 Dick, *Plurality of Worlds*, pp. 106–41.

32 *Œuvres de Descartes*, eds Charles Adam and Paul Tannery, 11 vols (Paris, 1974), V, 50–8.

33 The various efforts to conform the theory of plurality of worlds and creatures with religious doctrine can be gathered from Dick, *Plurality of Worlds*, *passim*.

34 Immanuel Kant, *Critique of Pure Reason*, trans. Paul Guyer and Allen W. Wood (Cambridge, 1998), pp. 110–13; and see also the remarks in Lovejoy, *Great Chain of Being*, pp. 187–90. Kant himself advocated a plurality of worlds and creatures; see Dick, *Plurality of Worlds*, pp. 159, 165–75. He was not a theriophile, and when he endorsed good treatment of animals, this was in fact based mainly on the anthropocentric assumption that cruelty toward animals led to similar behaviour toward human beings. See Kant, *Lectures on Ethics*, pp. 239–41; and for his philosophical view of animals see also Steve Naragon, 'Kant on Descartes and the Brutes', *Kant-Studien*, 81 (1990), 1–23.

35 This raises the question of what precisely constitutes a theriophile. Modern historiography has tended to designate as theriophiles many people who still retained a basic notion of human superiority, and even occasionally justified killing animals for reasons such as obtaining meat. But if one were to designate as theriophilic only those who draw from their philosophical speculations specific moral obligations toward animals, one would be left with many fewer theriophilic figures in both the past and in modern times.

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