To Tell the Truth - Science, Society and Controversy: Part 1

Jigsaw Reading Assignment

Read this and be ready to tell the rest of the group about it.
If you wish, you may read parts of the quotes (in italics) to the group.

Science is a part of society. It influences how the public thinks, but the public also influences science and even impacts what is considered fact. This is especially evident in areas of public scientific controversy: those areas in science that challenge the general public's basic beliefs.

Until hard evidence is produced to settle an issue, controversial debates in the realm of science can last a long time–some have lasted more than two thousand years. Sometimes it seems the controversy is over and done with...but then new evidence is discovered and the debate is renewed. The public's reaction can influence the outcome of these debates.

For instance, one past area of controversy was the debate about whether the Sun revolves around the Earth (the geocentric view) or the Earth revolves around the Sun (the heliocentric theory). Greek philosopher Aristotle (384-322 BCE.) supported the geocentric view, which was pretty much accepted by the public as fact for centuries to come.

It wasn't until 1543, nearly 2000 years later, that a scientist again effectively argued for the heliocentric theory. That scientist, Nicholai Copernicus, was understandably hesitant to publish his views, fearing ridicule from other scientists. As it turned out, he died just after the publication of his arguments, but he was right about how some of his colleagues would react. His version of heliocentric theory was still rejected by some scientists and philosophers of his day, as well as the general public. However, the heliocentric theory was defended once again in the seventeenth century by a few scientists, including Galileo Galilei.

Galilei was not content to just debate other scientists. He directly confronted religious critics who said the heliocentric theory contradicted certain Biblical passages. Galilei even confronted the Pope, and said the heliocentric theory was fact, not just a theory. As a result, Galilei ended up under house arrest in 1633. For some years after that, other scientists, such as René Descartes, feared to publish their own pro-heliocentric arguments. Descartes insisted that his pro-heliocentric writings only be published after his death.

Thus society clearly influenced the scientific debate on this topic. Social and political pressure discouraged some gifted scientists from sharing their true views. But new scientific instruments produced mounting evidence for the heliocentric theory, and within fifty years, both the religious community and the public accepted that the Earth revolves around the Sun.

In *The Witness*, though he may have not realized it, Eddie commented on another great controversy in science. He stated:

"I don't know what I thought a cat was. I guess I thought a cat was no more than an ambulatory organism, you know, and that's it. You know, it meowed, it had fur, it walked, and that was basically it. But then I found out it was more than that. The kitten actually had preferences--likes, dislikes. Tried to communicate to me what she wanted."

Do animals think or are they just ambulatory organisms whose behavior is governed by instinct alone? This question has been debated for more than 2000 years! Just as Aristotle debated what was at the center of the universe, the Earth or the Sun, he also debated whether or not animals have rational thought. Aristotle, while believing that animals have souls, nonetheless believed that animals did not have rational thought.

About 2000 years later, René Descartes (1596-1650) took this belief a few steps further.

561 words

To Tell the Truth: Science, Society and Controversy - Part 2

Jigsaw Reading Assignment

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René Descartes (1596-1650) was a philosopher, a lawyer, a mathematician, a physicist, a physiologist and perhaps the first meteorologist. Just as Eddie once considered a cat as "no more than an ambulatory organism," Descartes argued that animals are mere robots, incapable of thought. Breaking with the Greek philosophers of the past, Aristotle and Plato, he also said that animals have no soul. He went on to argue that although their organs might have sensations, animals' lack of rational thought made them incapable of feeling pain. No thought, no pain, was his logic. For part of his proof of animals' lack of capacity for thought, he argued that though animals can make noise and can imitate words and phrases, they don't express their ideas in language. Here is how he put it (translated from French):

"For it is highly deserving of remark, that there are no men so dull and stupid, not even idiots, as to be incapable of joining together different words, and thereby constructing a declaration by which to make their thoughts understood; and that on the other hand, there is no other animal, however perfect or happily circumstanced, which can do the like. Nor does this inability arise from want of organs: for we observe that magpies and parrots can utter words like ourselves, and are yet unable to speak as we do, that is, so as to show that they understand what they say; in place of which men born deaf and dumb, and thus not less, but rather more than the brutes, destitute of the organs which others use in speaking, are in the habit of spontaneously inventing certain signs by which they discover their thoughts to those who, being usually in their company, have leisure to learn their language. And this proves not only that the brutes have less reason than man, but that they have none at all: for we see that very little is required to enable a person to speak; and since a certain inequality of capacity is observable among animals of the same species, as well as among men, and since some are more capable of being instructed than others, it is incredible that the most perfect ape or parrot of its species, should not in this be equal to the most stupid infant of its kind or at least to one that was crack-brained, unless the soul of brutes were of a nature wholly different from ours."[1]

Today we know that some, if not all, of the great apes (such as gorillas, chimpanzees, orangutans, and bonobo) are capable of learning basic sign language, and that African Grey parrots can use words appropriately and demonstrate understanding of concepts such as size, color and shape. We also know a great deal about the vocalizations and body movements that animals use to communicate within their own species. For instance we know that bumble bees communicate to other bees (via a "dance") where food is located and how far away it is.

René Descartes, while a brilliant scientist, was limited by the ideas and available methods of scientific investigation of his era. He only recognized an inability on the part of animals to use the sort of language he could easily understand. He felt that proved animals don't have ideas. He confidently argued that a dog yelping when hurt was a mere robotic function without consciousness or thought behind it.

566 words

[1] Descartes, René. *Discourse on Method*. Vol. XXXIV, Part 1. The Harvard Classics. New York: P.F. Collier & Son, 1909–14; Bartleby.com, 2001. 29 Nov. 2001 <http://www.bartleby.com/34/1/5.html>.

To Tell the Truth: Science, Society and Controversy - Part 3

Jigsaw Reading Assignment

Read this and be ready to tell the rest of the group about it.
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"There is no prejudice to which we are all more accustomed than the belief that dumb animals think,"[2] stated René Descartes (1596-1650), translated from French. ("Dumb" as used here means incapable of speech.) He also wrote: "*...my opinion is not so much cruel to animals as indulgent to human beings...since it absolves them from the suspicion of crime when they eat or kill animals*."[3]

Many scientists and philosophers have disagreed over the years with René Descartes' ideas about animals...that they are mere machines who don't think and don't feel pain...and argued against his ideas. John Ray (1627 -1705), an English naturalist who was the first to propose the idea of species, is said to have proven that Descartes' ideas were wrong in 1693, via his book *Synopsis of Quadrupeds and Snakes*.[4] He established the class of mammals, which humans belong to with other animals.

The debate was continued by other well-known figures, such as Francois Marie Arouet (pen name Voltaire, 1694-1778). Voltaire was a great French writer and philosopher, imprisoned at times for his controversial writings. When Voltaire was forced into exile for criticizing the French government, his estate, called "Ferney," became the intellectual center of Europe. All sorts of topics were discussed and written about at Ferney, including scientific claims.

One of Voltaire's sayings was "*Those who can make you believe absurdities can make you commit atrocities.*"[5] He certainly believed Descartes' ideas about animals were absurdities, and that atrocities were being committed against animals as a result. Those atrocities included dissection of living animals without anesthesia. In one of his major works, *Philosophical Dictionary*, he wrote (translated from French):

"*Is it because I speak to you, that you judge that I have feeling, memory, ideas? Well, I do not speak to you; you see me going home looking disconsolate, seeking a paper anxiously, opening the desk where I*

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[2] Kadetsky, Elizabeth. "Seeking the Animal Soul." Science and Spirit 2001: 3. 29 Nov. 2001 <http://www.science-spirit.org/articles/seeking_03.html>.

[3] Burnham, Douglas , and James Fieser. The Internet Encyclopedia of Philosophy. Ed. James Fieser, Ph.D., General Editor and Bradley Dowden, Ph.D., Assistant General Editor. The Internet Encyclopedia of Philosophy (nonprofit org.), 2001. 29 Nov. 2001 <http://www.utm.edu/research/iep/d/descarte.htm>.

[4] Lee, David. Marks in the Evolution of Western Thinking About Nature. Sciencetimeline.net. 29 Nov. 2001 <http://www.sciencetimeline.net/1651.htm>.

[5] Lucidcafe. Lucid Interactive. 29 Nov. 2001 <http://www2.lucidcafe.com/lucidcafe/library/95nov/voltaire.html>.

remember having shut it, finding it, reading it joyfully. You judge that I have experienced the feeling of distress and that of pleasure, that I have memory and understanding.

Bring the same judgment to bear on this dog which has lost its master, which has sought him on every road with sorrowful cries, which enters the house agitated, uneasy, which goes down the stairs, up the stairs, from room to room, which at last finds in his study the master it loves, and which shows him its joy by its cries of delight, by its leaps, by its caresses.

Barbarians seize this dog, which in friendship surpasses man so prodigiously; they nail it on a table, and they dissect it alive in order to show the mesenteric veins. You discover in it all the same organs of feeling that are in yourself. Answer me, machinist, has nature arranged all the means of feeling in this animal, so that it may not feel? has it nerves in order to be impassible? Do not suppose this impertinent contradiction in nature."[6]

Nonetheless, despite arguments and facts presented by impressive thinkers such as John Ray and Voltaire, René Descartes' ideas continued to be influential and were further developed by those who followed in his footsteps. Thinking based on the foundation laid by Descartes is often blamed, at least in part, for our society's continuing tolerance of inhumane, painful animal experimentation and atrocities such as the trapping and electrocution of animals for fur, as described by Eddie.

561 words

[6] Voltaire. The Philosophical Dictionary. 1752. Trans. H. I. Woolf. New York: Knopf, 1924. Hanover Historical Texts Project, Hanover College Department of History. 29 Nov. 2001 <http://history.hanover.edu/texts/voltaire/volanima.htm>.

To Tell the Truth: Science, Society and Controversy - Part 4

Jigsaw Reading Assignment

Read this and be ready to tell the rest of the group about it.
If you wish, you may read parts of the quotes (in italics) to the group.

Today, there is much evidence that humans and non-human animals have more in common than once thought. Perhaps the most famous researcher in this arena is Dr. Jane Goodall.

In October 1960, scientist Jane Goodall had been observing chimpanzees in the wild for just a few months when she saw something remarkable. She observed a chimpanzee pick a blade of grass and carefully trim the edges. Then the chimpanzee, referred to by Goodall as David Graybeard, put the blade of grass into a termite hole, left it there briefly and then pulled it out. The blade of grass was covered with termites, which he then ate. David Graybeard had made a tool: a termite fishing pole.

This discovery shocked the scientific world! The ability to make tools was commonly referenced at the time as the single trait that set humans apart from other animals.

After Goodall's discovery of wild chimpanzees using tools, scientists had to change their definition of what it means to be human, or consider chimpanzees as a type of human.

Why did it take scientists so long to discover this tool-making ability? Until the mid-twentieth century, watching what animals do in the wild was not recognized as a specialized field of science. Prior to that time, just a few important scientists, such as Charles Darwin, did field observations. *Ethology*--- studying animals in their natural habitat, rather than in a laboratory setting--is a relatively new field.

Konrad Lorenz, Karl von Frisch and Niko Tinbergen shared a Nobel prize in 1973 for their work which led to the founding of ethology. Most of their pioneering work occurred between 1930 and 1950. They understood that putting an animal in a laboratory situation changes the animal's behavior.

"Concluding that a particular behavior pattern is not present among a certain animal species is, in principle, inadmissible when this is based only on observations of caged animals." wrote Lorenz in *The Foundations of Ethology.*

These ethologists felt that to truly understand animals, we must observe them in their natural habitat. Dr. Jane Goodall agreed.

Dr. Jane Goodall did not just discover tool-making ability in chimpanzees; her research shook the scientific world in other ways. She was the first prominent scientist to give names to the animals she was observing in the wild. She noted their individual personalities, studying the chimpanzees as individuals as well as a species. Her advisor at Cambridge University told her that naming the animals was a "major mistake" and that they should be assigned numbers. Jane refused. She also refused to replace the names with numbers when the Annals of the New York Academy of Sciences said they would not publish her work unless she did so. (They ended up publishing her work with the names.)

Dr. Goodall was accused of "anthropomorphizing" the chimpanzees she studied...attributing human personalities and traits to chimpanzees. Her response was that chimpanzees are so much like us, it is logical to assume that when they act like us, they are thinking and feeling like us. She documented "awe" in chimpanzees, for example, when they spontaneously dance at the sight of a waterfall and then sit and gaze at the water. Dr. Goodall believes this sense of awe is much like the emotions that led early humans to religion.[7]

In a 1998 interview for National Geographic, Dr. Goodall stated:

" *The chimpanzee, perhaps more than any other living being, has served to blur the line that we once thought so sharp between humans on the one hand and the rest of the animal kingdom on the other. I hope this will lead to a new respect, not only for the chimpanzees and all the other great apes, but for all the other amazing non-human beings with which we share the planet*."[8]

627 words with ethology quote, 592 without

[7] Jane Goodall: Reason for Hope. Narrated by Harrison Ford. Twin Cities Public Television. KTCA, Saint Paul. Fall 2001. Transcript. 29 Nov. 2001 <http://www.ktca.org/goodall/clips.html>.

[8] Westenberg, Kerri. Interview with Jane Goodall. National Geographic. 22 Dec. 2001 <http://www.nationalgeographic.com/faces/goodall/interview.html>.

To Tell the Truth: Science, Society and Controversy - Part 5

Jigsaw Reading Assignment

Read this and be ready to tell the rest of the group about it.
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Dr. Jane Goodall, with her long-time continuing field studies of chimpanzees, challenges the public's thinking…a modern day example of science influencing society. It is Dr. Goodall's expertise that allows her to speak out for chimpanzees and raise issues that challenge current cultural values and perceptions:

"*Chimpanzees suffer in captivity, as they are exploited in entertainment, dressed up as pets, dragged around as photographers' props, and imprisoned, in the name of science, in tiny, barren steel cages. I am haunted by dull, blank eyes staring out onto a world that offers them no hope. The least I can do is speak out for them. They cannot speak for themselves*."[9]

and

"*How should we relate to beings who look into mirrors and see themselves as individuals, who mourn companions and may die of grief, who have a consciousness of 'self?' Don't they deserve to be treated with the same sort of consideration we accord to other highly sensitive beings: ourselves?*"[10]

At the same time, the public continues to also influence science. The support of the public has provided Jane Goodall with the opportunity to widely share her findings and continue her work. In addition, the great admiration worldwide for Dr. Jane Goodall and her work surely is helping to guide science towards replacing laboratory studies with ethological (field) studies, and has heightened public interest in the cognitive abilities of animals.

Field studies focusing on animals' cognitive abilities comprise what is now known as *cognitive ethology*, founded a little more than 20 years ago. Through such studies, scientists have discovered other toolmakers besides chimpanzees. For instance, the crow not only makes twigs into grub catching hooks and stiff leaves into foraging rakes (and in a very precise way), but also carries these tools from one site to another for reuse.

Dr. Gavin Hunt, who has studied crows and their "tool kits" for many years, has seen this tool-making ability in crows more than 50 times in the wild. He states the crows' making of tools has three features that have never before been observed in non-human toolmakers: "*a high degree of standardization, distinctly discrete tool types with definite imposition of form in tool*

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[9] The Primates Home Page. 29 Nov. 2001 <http://www.geocities.com/willc7/index.html>.

[10] Goodall, Jane . "Prepared Statement of Dr. Jane Goodall." Oversight Hearing for the Subcommittee on Health & Environment concerning Biomedical Research: Protecting Surplus Chimpanzees. Rayburn Office House Building, Washington, DC. 18 May 2000. The House Committee on Congress. 29 Nov. 2001 < http://com-notes.house.gov/cchear/hearings106.nsf/a317d879d32c08c2852567d300539946/621bd223d1749c07852568e2007f5b07?OpenDocument>

shaping, and the use of hooks. These features only first appeared in the stone and bone tool-using cultures of early humans after the Lower Paleolithic [c. 2 Million - 100000 BC], *which indicates that crows have achieved a considerable technical capability in their tool manufacture and use*."[11] He found that the tool making is at least partly a learned craft, with tools being made a little differently by groups of crows in different locations.[12]

In fact, some believe that in terms of ability to adapt and exploit a wide range of resources and habitats, the crow is more like humans than any other animal.[13]

Cognitive ethology explores all aspects of animal intelligence, not just tool-making ability. It is, as you may have guessed, a controversial field...as the debate about animals, what they are thinking and how to prove it continues.

Individuals like Eddie are part of the debate...helping to shape public opinion about animals. In fact, Eddie's education of the public about fur trapping may ultimately very directly impact science in its practical applications, since leghold traps are still used by some biologists. In 2000, for example, wildlife biologists and others in the US Dept. of Agriculture/Wildlife Services killed more than 12,000 animals caught in leghold traps, as part of the US predator control program.[14]

Already in 88 countries[15], society has spoken and banned the use of leghold traps, often times including its use by wildlife biologists[16]. Science and society...always interrelated, always in changing dialogue! (607 words)

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[11] Do Crows Make and Use Tools? The Center for International Earth Science Information Network. 29 Nov. 2001 <http://www.gcrio.org/ASPEN/epnews/winter97/crow.html>.

[12] "Tool-Making." Corvi Chronicle Spring 1996. American Society of Crows and Ravens. 29 Nov. 2001 <http://www.ascaronline.org/corvi02.html>.

[13] Ibid.
and
Davies, Gareth Huw. Bird Brains. PBS: The Life of Birds. 29 Nov. 2001 <http://www.pbs.org/lifeofbirds/brain/index.html>.

[14] Fox, Camilla H., Animal Protection Institute. "Leghold Trap Bans." 17 Dec. 2001.

[15] Animal Protection Institute. Animal Protection Institute-88 Countries That Have Banned the Leghold Trap. 31 Mar. 1997. 19 Dec. 2001 <http://www.api4animals.org/doc.asp?ID=387>.

[16] Fox, Camilla H., Animal Protection Institute. "Leghold Trap Bans." 14 Dec. 2001.