

Consciousness: Introduction

Science and religion intersect on many levels, moral, ethical, and political. In these podcasts I will be primarily interested on the way science impacts on Judea-Christian theology. We might talk about the intelligent design movement, about sociobiology, and about the way in which modern cosmology challenges and enriches our sense of place in the universe. In the next few podcasts, however, I would like to talk about human consciousness. The issue here is not so much what science can tell us, which is a lot, but what, for profound reasons, it can't. It seems impossible to understand consciousness in purely physical terms, which suggests that there is a dimension to reality over, above, and beyond the purely physical. Perhaps you believe this already, but I want to come upon this hypothesis, not necessarily from some faith tradition, but from the point of view of hard-nosed science. I used the word hypothesis advisedly; this subject is nothing if not controversial. But that's what we academics like.

People sometimes ask me how I as a scientist can have anything do to with religion. Are not the two in a state of perpetual conflict? In fact, has not science somehow proved religion wrong? It seems that being a man of science and a man of faith is an act of deep hypocrisy. It's a fair point; I would like to answer it first before we get to the content of these lectures.

I sense two different attitudes toward religion and the supernatural in the scientific community. First, one might say that science by definition does not deal with the supernatural. That is not to say that there is or is not a supernatural dimension to reality, just that if there is, science has nothing to do with it. Suppose I have some data that don't make sense. I might say that my graduate student screwed up or that I am on the verge of a great new discovery and need further funding. These are very scientific things to say and scientists say them all the time. What I must not say is that the data are infected by evil spirits. They may actually be so infected, and after going without sleep for 48 hours I may even have seen them flitting around the particle accelerator. It's just that when I offer this as an explanation I'm not doing science. This is sort of an informal pact that scientists have worked out with the rest of society. After all, what we call science

was once called natural theology. It was with the rise of professional scientific societies at the beginning of the 19th century that scientists felt the need to distance themselves from religion. The creation of the universe is good example. What came before the big bang? There are a number of very speculative theories – after all, we don't have much to go on – so why not just give up and say that God created it all? Maybe He did, but as scientists, we are committed to exploring as far as we can without making that assumption. Or to put it another way – if God did create the universe – how? This is my point of view at any rate and it seems very reasonable.

The second point of view is that the supernatural simply does not exist. To that extent, all religion is wrong. The laws of physics are closed and complete. One way of stating this is that everything in the universe can be explained in principle starting with the laws of physics. A slightly weaker statement is that once the laws of physics are in place, the universe follows of logical necessity even if we cannot necessarily explain how this happens. As the philosophers like to put it, the universe is supervenient on the laws of physics. (I should explain in passing that the word “supervenience” means roughly that the properties of a higher-level system are determined by some lower-level system. This is intuitively clear but it seems almost impossible to formulate a rigorous definition.) There are somewhat different versions of this basic position variously called materialism, naturalism, or physicalism. For our purposes, we don't have to make a distinction. The important point is that these are not things that science proves. If someone tells you that science has proved that there is no God, don't take anything else he says seriously. You might say these are statements of faith. Still there is a lot of evidence in their favor. All the progress that science has made has been predicated on just this hypothesis. Not only that, the history of science and theology is littered with failed attempts to prove the existence of God by appealing to something that at the time, science was unable to explain. Newton, for example, thought that God had to intervene constantly to keep the planets in stable orbits. A century later Laplace was able to show that the planets could take care of themselves. People used to believe that God created all animal species in their present form (some people still do believe this), but genetic mutation

together with natural selection provide a complete scientific explanation. These are called God-of-the-gaps arguments, claiming that some gap in our scientific knowledge proves the existence of God. Part of the appeal of materialism is that no one wants to be caught making a God-of-the-gaps argument.

I suppose there is a third point of view. Let's call it don't-have-a-clue materialism. Most scientists haven't given these issues any thought and would prefer not to. Perhaps this is just my chauvinism but I sense that this attitude is less common in physics than it is say in the life sciences. For example, each year the Templeton Foundation awards a prize of 1.1 million pounds to a living person who "has made an exceptional contribution to affirming life's spiritual dimension, whether through insight, discovery, or practical works." The winners from the last 15 years include Martin Rees, Bernard d'Espagnat, Michael Heller, John Barrow, Charles Townes, George Ellis and John Polkinghorne, all distinguished physicists.

That brings me to the subject of human consciousness. As a physicist, I am tempted to say that the laws of physics are complete and closed, that the universe is supervenient on the laws of physics, but there is a problem. There seems to be at least one thing in the universe that is not supervenient and that's consciousness. If that is true, it means there is another dimension to reality, one that we are all intimately familiar with but which is invisible to science. This is an especially relevant subject to discuss in church because our consciousness is the arena for our encounters with God. Incidentally – I said *if* it is true that consciousness is not supervenient on the laws of physics. This is still a disputed subject in philosophy, but I hope to show later that at least all the attempts I am aware of to show how consciousness might supervene on the material world suffer from various logical flaws.

I will mostly be dealing with human consciousness but that raises an important question: what about animals? Are animals conscious? The octopus makes an interesting example; Loren Eiseley called octopuses "the wisest of the cephalopods." If this remark fascinates you be sure to read "The Soul of an Octopus: A Surprising Exploration into the World of Consciousness," by Sy

Montgomery. The author finds them smart, charming, and affectionate, to say nothing of ambidextrous; but the word cephalopod as I am sure you have guessed, comes from a Greek word meaning “head-feet.” It refers to a class of marine animals including the squid and cuttlefish. You might say that the octopus has its head in its feet and in fact, two thirds of an octopus’s neurons are in its arms. They have acute eyesight but I imagine that much of their perception of reality comes from their sense of touch. So if they are conscious as Loren Eiseley and Sy Montgomery would claim, what is it like to be an octopus? Bats are another interesting case. Bats also have good eyesight but they navigate through the total darkness of caves using echolocation. Their feats of navigation are quite remarkable; a mother bat can find her infants among a million other screaming bats. As the philosopher Thomas Nagel famously asked, what is it like to be a bat? I’ll rephrase these questions for dramatic effect. What is like to see with your ears? What is it like to think with your feet? I would like to say that they shed light on the phenomenon of human consciousness, but in fact, they shed darkness. They show how profoundly mysterious consciousness really is.

For the time being however, I would like to concentrate on one particular consciousness – yours. For this, I need you to indulge me in a little exercise. Sit down somewhere comfortable, close your eyes, and turn on all your powers of memory and imagination. Think of your earliest childhood memory. I have a clear memory of standing up in a crib; I must have been three years old. Now think about growing up; summon up special memories that have the warm glow of retrospection. Think about your hopes, dreams, fears and ambitions. Remember the most embarrassing thing that ever happened to you, and then think of that moment when you first met the person who was destined to be your beloved life’s partner. Have you ever had a religious experience? Have you ever felt the approach of God? If not the approach, then perhaps the approach of the approach? Hold that thought. Now open your eyes and think about your brain. It consists of three pounds of grey meat wrinkled like an old apple. When working at peak efficiency it consumes about twelve watts of power, as much as a dim lightbulb. Just meat -- thinking meat, caring meat, loving meat, and if there is any prospect of eternal life, it must somehow start here. You see – we have a

problem. The philosopher David Chalmers calls this the Hard Problem and adds that there is nothing we know more intimately than conscious experience, but nothing that is harder to explain. What we would like to explain is this, how do neural-biological processes in the brain produce consciousness? This is called the Mind-Body Problem. The intellectual abyss separating the two is called the Explanatory Gap. The problem might be so difficult in fact that, as one philosopher put it, nothing worth reading has been written on it.

The first modern philosopher to think seriously about the mind-body problem was the 17th century Frenchman Rene Descartes. He is called the father of modern philosophy; much of subsequent Western philosophy is a response to his writings. He was also a mathematician and a scientist. His contributions to mathematics are quite remarkable. He is responsible of course for the Cartesian coordinate system. He is credited as the father of analytic geometry. He also seems to be the first person to develop the idea of symbolic logic. He had a profound influence on Newton. For one thing, he introduced the idea of independent variables, which are essential in calculus.

In fact, Descartes was such a remarkable person that it is fun to tell stories about him. For example, on the night of Nov. 10, 1619, Descartes locked himself in a room with a heater to escape the chill. While in the room he had three visions. Upon emerging the next morning, he had among other things, invented analytic geometry. The best story of all however concerns his daughter. Descartes never married, but he had a daughter out of wedlock named Francine. He apparently had great affection for her. He is reported to have said that her death from scarlet fever was the greatest sorrow of his life. In order to appreciate the story you also need to know that Descartes was fascinated by automatons, i.e. mechanical figures run by clockwork that looked human and could mimic some human behavior. Today we would probably call them robots.

Late in his life Descartes traveled to Sweden to act as a tutor to Queen Christina. Crossing the North Sea in a sailing vessel was hazardous in the extreme, and during the trip, the ship was buffeted by high winds. Descartes had told other passengers that he was traveling with Francine but no one had seen her. Some

sailors took advantage of the general alarm to sneak into Descartes' rooms to see what they could make of his daughter. They saw nothing but a large wooden box. Upon opening the box, the figure of a young woman stood up and walked toward them. The superstitious sailors assumed that this was the work of witchcraft and cast the figure overboard. Of course, not all this story can be documented!

Incidentally, Descartes was possibly assassinated and is now interred in the Abbey of Saint-Germain-des-Prés in Paris, but his skull and one finger are missing. There is a long story here, which I don't have time to tell you. There has been an entire book written on the subject. See "Descartes' Bones: A Skeletal History of the Conflict between Faith and Reason" by Russell Shorto.

Descartes held that there were two kinds of "substance," mind and body. For obvious reasons this point of view is called dualism. The mind could exist outside the body and had no physical properties such as mass and location; it can think the body cannot. The mind can control the body, but the body can also control the mind as for example when one does something out of passion. The two interact through the pineal gland, which, he suggested, is the seat of the soul. Man is born with inherent knowledge that comes from a higher power. Leaving aside the pineal gland (we know a lot more about physiology than Descartes did) this seems like just common sense. Our consciousness does seem separate from our body. If you didn't know that thinking goes on inside your head, you could just as well believe that consciousness was located in your spleen or liver. Put another way, consciousness just doesn't seem to have any definite physical location. On the other hand, if you have ever done something out of passion that you later regretted, you might feel that your body, not your rational mind, made you do it. Dualism also interfaces easily with Christianity. Mind is not only the seat of consciousness it is also the seat of the soul. God and the other heavenly powers are of the same "substance" as mind, and so, for example, silent prayer makes perfect sense. Dualism also solves a problem that we will grapple with at the end of this series, namely the possibility of free will. We can think and decide things in our minds safely beyond the reach of any sort of physical determinism.

For all its advantages dualism famously suffers from a problem that the pineal gland doesn't really fix, namely how do mind and body interact? The philosopher Colin McGinn has summed it up nicely: there's the "zombie problem" and the "ghost problem." The zombie problem is that we can coherently imagine subtracting your mind from your body. What is left looks exactly like you. It walks and talks and in all other ways seems like a real human being but it has no consciousness. You can talk to it and it will reply, but there is no one home. It will not look like the zombies you may have seen in the movies; this is a top-shelf zombie. It looks like a human being but it's not human. Even if we don't go all the way "imagining" away the mind substance, we could still imagine that the consciousness exists but it doesn't have any effect on the body. It is sort of an accidental and useless appendage. This is a school of philosophy called *epiphenomenalism*. There is an oft-quoted metaphor to make this clear. Think of a rainbow over a waterfall. The rainbow arises from the waterfall but it has no effect on the waterfall. It is in no way necessary for the waterfall to fall. So it is with consciousness, it's just floating out there. This leads to the problem of qualia. We will meet this term again; it is really the central issue in understanding consciousness. Suppose I see something red. I say, "I am seeing red." The natural assumption is that I said that because I am having the experience of seeing red; but my zombie look-alike says, "I am seeing red," and he has no experience at all! In his case, his red photoreceptors pick up some photons and relay the signal to the lateral geniculate cortex. From there it goes to the primary visual cortex, and after considerable processing something is sent to his speech centers whereupon his mouth and vocal chords move in such a way as to make the sounds, "I am seeing red," come out of his mouth. He is in fact an automaton running on very sophisticated neurological clockwork. If that explanation is sufficient to explain his behavior, why should my behavior be any different? This seems wrong. We would like to believe that our conscious thought influences our behavior, but dualism seems to imply that it has no effect whatsoever.

The ghost problem is the converse of the zombie problem. If the body can be detached from the mind then the mind can be detached from the body, so disembodied minds become a real possibility. This is fraught with problems.

Where did your mind come from in the first place? Where is it now? How does it interact with other minds? Can it move through walls? Does it? The ghosts in horror stories can interact with the physical world or else we would not have much of a story. Our disembodied minds can't.

For all these reasons, dualism has become a bad word in philosophy. No one wants to be called a dualist. If you want to insult a philosopher you might borrow a line from Shakespeare and call him an elvish-mark'd, abortive, rooting hog, but if you really want to insult him call him a Cartesian dualist. The other main option is monism. This comes in many different varieties but the basic idea is that there is no consciousness apart from the brain. Mind and brain are just one thing. I am going to argue in the course of these talks that monism of whatever variety is also logically untenable. Eventually I will get around to telling you how I think one should resolve the dilemma.

Before we get to that, we must acknowledge that Descartes has left us with two problems that we should deal with immediately. The first has to do with vision. We know that the lens of the eye focuses an image on the retina, but then what? How is it that I know what I'm looking at. Descartes implies that the image is then projected on a kind of screen inside the brain. Then someone or something must be looking at it. The philosopher Daniel Dennett has called this the Cartesian theatre. I am sure that you have spotted the problem. There must be a little man in your brain, a homunculus, but how does he see? I will spend the next lecture on this problem. The answer is, not to put too fine a point on it, that the image is projected on some twenty different screens and we still don't know who is watching!

The second problem gets back to the matter of automatons. Descartes dualism was inspired by his love of automata. The body to his way of thinking was, like our zombie look-alike, a kind of machine. That is still a viable position though today we would put it a bit differently. We would say that the brain is a kind of computer. The neurons constitute the hardware, our thoughts are the calculations, our memory is like a hard drive, and the whole thing runs on a kind of operating system. We might go so far as to say that we in principle we could

build a computer that was conscious in the same way we are. My third lecture will deal with that possibility.