

Panel Discussion

Monastic graduates on the panel

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Chris Impey: I have a methodological question for Rajesh. When you're talking about what it's like to be another animal, sentient say, the few experiments I'm aware of that attempt to communicate with dolphins, or even other apes, seem rather unimaginative—they essentially conduit a human mode or channel of communication. I was wondering if anyone is thinking more out of the box on how to do this?

Rajesh Kasturirangan: The answer is “yes,” but slowly. Primatologists are starting to look at more ecologically relevant tasks. If you look at tasks that were given 30 to 40 years ago, they tended to be cooperative, while a lot of research now suggests that competition is common between two monkeys. How to get them to do something that is relevant in a competitive situation is something that people are starting to think about. My own group is studying deception, and we are trying to think of ways to get Macaque monkeys to show behaviors that are deceptive in the wild, not in the laboratory or a captive setting. It's not easy; it's very hard to know for sure if you've gotten the behavior.

Geshe Jangchup Choeden: Rajesh, your idea of a mind-scope is quite interesting. In Buddhist monastics studies, specifically when we study Buddhist ethics, there is considerable debate about shape shifting and what happens, for example, if a monk happens to transform himself into the form of a tiger. Is it an offense against the ethical code if that monk kills another human being while in the form of a tiger? The general answer is that if the monk retains his sense of identity as a monk—rather than assuming the identity of the tiger—it is an offence against the code. If he takes on the identity of the tiger then no offence has been committed. If we elevate our consciousness, I think it could be highly possible to transform ourselves into a tiger. Shape shifting is not specific to Buddhism; it is quite a common concept in other traditions. If we manage to shift our shape, it could be possible to do the kind of study you are taking about. Creating a machine, however, could be quite challenging.

Rajesh Kasturirangan: I didn't mean to imply that mind-scopes are tomorrow's technology. However, it's not clear how plastic our minds are, that is to say, and ask, are there intrinsic limits? Can we become a monkey? Can we become a tiger? Can we become octopi? Can we become bacteria? Where does it stop? We don't even know how to approach the question. Scientifically, I don't mean that a machine will enable you to do it but people are getting better and better at using brain patterns to figure out what you are thinking. Just in the last year, experiments were done which roughly get into the ballpark category of what you are thinking. If you are thinking about games, using brain patterns, computers are able to figure out, roughly speaking, that you are thinking about games. It may not be cricket, or this cricket game versus that cricket game, but it might not be very far in the future, at least when it comes to human beings, that we can enter into human minds using human thought. If that can happen with other human beings, it can happen with other species too. I think that once the technology progresses we will start seeing some very interesting developments. If we are in a technological world where everybody is hooked into a machine that constantly gets inputs from other humans'

experiences too, who knows what kind of consciousness we may develop as a result.

David Presti (Moderator): Several of the questions from the audience relate to your presentation, referring to the idea of trying to get some sense of another animal's experience. For example, by putting a camera on a bird, and collecting the information as the bird flew around, would that be sufficient to give us a window into the bird's experience, other than a very narrow visual representation? Another audience member asked a related question: Is there a way we can get around interpreting whatever we find in terms of our own mental constructs since we are the ones ultimately doing the analysis?

Rajesh Kasturirangan: Because the experiment hasn't been done, I have no way of saying what is going to happen. But let's start with something less drastic. Say I put a camera and a microphone on Bryce and I receive his visual input and auditory input. Am I hearing and seeing what Bryce is hearing and seeing and not what is in my auditory and visual environment? I bet after a while I would have a much better sense of what Bryce is about than I have right now. That's my prediction. This is an easy experiment to carry out with people, but with other species it is going to be hard. My general rule of thumb: the physical body and molecular machinery we clearly now know to be continuous across species. We know, it was pointed out this morning, that we are 47 percent yeast. If that is the continuity in the biochemistry, the genetic structure, why shouldn't there be a similar level of continuity on the subjective side? It's a very strange assumption that we think that we are similar to other creatures in their physicality, but somehow draw a sharp distinction when it comes to our subjectivity.

Monastic Graduate: You seem to be saying that when we pay more attention to the objective world, it compels us to look inside the subjective world. When you talk about the subjective world, do you mean only the brain or do you have another entity to which you are referring?

Rajesh Kasturirangan: I am not really talking about either the brain or the body, but in terms of phenomenology. For example, we know that color is tied to wavelength. Red is a longer wavelength than blue, and therefore we perceive red and blue differently. What is also true, is that color is a subjective experience, and in many ways independent of the objective qualities. In this room, if you see people, and the light is very different from the outside, and even the spectrum of light is probably different from the outside, yet what is maroon here, will be maroon outside. What's interesting about subjectivity is the correlation between what might be the subjective variables of how you perceive color and how you see shape, and the objective correlates, like wavelength, mass, and density. A lot of interesting work in the cognitive sciences has gone into understanding that relationship.

Monastic Graduate: Are you suggesting that bacteria, small microorganisms, are the objective world and that human beings are less objective? If so, how do you distinguish between the objective world and the subjective world?

Rajesh Kasturirangan: I did not mean that we are on the subjective side, and bacteria are on the objective side. Though interestingly enough, Descartes, from whom a lot of these distinctions come, put human beings on one side and all other creatures on the other side. This is his distinction, not mine, and his distinction was based on language.

David Presti (Moderator): A number of the questions from the audience immediately went to consciousness, and the evolution of consciousness in the Universe. Some of the questions ask specifically for definitions of consciousness, and it is important to be clear about this if there is going to be any kind of coherent dialogue. You offered one definition in your talk Rajesh, but the way I define consciousness, which is an operational definition that allows us to have a conversation where everyone agrees that we are talking about the same thing, is simply, awareness—an experiential awareness of being in relation to everything else. What is it like to be me is my consciousness? This

definition does not presuppose any kind of connection with brain function or even necessarily with life. We don't know as scientists how to measure consciousness, but we have a sensory perception centric position on it. We assume that in order to have consciousness, you have to have a nervous system, you have to have a brain, you have to have some kind of complexity. Whereas I'm completely open to a tree being conscious, or bacteria, or maybe even a rock, because I don't know what it's like to experience being a rock. I would like to hear what you all think about that as a working definition of consciousness.

Chris Impey: I absolutely agree that you have to have something concrete, that you have to start somewhere with a definition. A good definition begs a series of questions. If that definition means a sense of self that in turn means a sense of separation from others, and that in turn implies you have to have a relationship with self and multiple others—because there is only one self and there are multiple others—it seems if you follow that logic, and put those pieces together, you define a landscape, where it might be harder to argue that a tree has that attribute. A dog probably does, and a mouse probably does, but I don't know. My question then is what are the connotations? You can put a foundation stone in place that people can see and agree on for definition, but almost any foundation stone you can imagine has connotations or implications, and they are interesting too.

Geshe Jangchup Choeden: The Buddhist study of mind and consciousness incorporates these ideas. Generally, however, we don't accept the idea that a tree or a bush or a rock has consciousness because they don't meet our definition of consciousness. If, however, they did have that sense of self, the kind of substance that does have that clarity, that function of knowing, then we would have to accept that they were conscious because they satisfied the requirements of the definition. This accords with Buddhist logic.

David Presti (Moderator): Of course, we are very limited in our knowledge of how to assess experience in anything other than ourselves.

Chris Impey: Do we need to, or must we, assume that an entity that has a sense of self is a biological organism only? In other words can there be other manifestations of the physical self that are not based on biology or DNA, the conventional things we have been talking about for the most part.

Rajesh Kasturirangan: I want to interject here, because I don't think biologists think that way. When physicists do, it is what in physics might be called universality. What are the properties of having a self or having consciousness, or any other properties for that matter, that one agrees are part of the definition? Maybe it does not depend on the micro-level substrate upon which it is built. It is possible that there are other kinds of entities whose biochemistry is different, but which have enough of those micro-level features, and as was said, if it agrees with the definition, it is consciousness, it has self. But I still don't think we have good ways of assessing what those building blocks would be.

Chris Impey: A simplistic example of why it seems worth posing the question is that when I think of my sense of self, it is not rooted nor interwoven with any singular sense of synapsis operating or electrochemical pathways in my brain, or the fact that I have carbon bonds at the base of the whole pyramid. None of the other levels of it are manifest to me in my selfness.

Rajesh Kasturirangan: Let me throw out a provocative idea: maybe we should not try to define consciousness at all. It's a little bit like trying to define matter in physics. Physicists don't spend that much time trying to define what is matter, and then ask is a light particle really matter or not? These are no longer productive questions in physics. And instead, because the mathematics has driven the subject so much, if something obeys the same kinds of mathematical principles that another thing does, you just club them into the same category. Partly, biology is not as mathematized a subject as physics. But as we develop more formal accounts of how biological organisms work, we might find that we give up a lot of naive categories, like what is life and consciousness, and move towards more technical categories. My understanding of

the Buddhist theories of consciousness, and experience, is that those are very technical terms, with very precise meanings. This is not the way we are using the term consciousness in this more informal setting here.

Monastic Graduate: In the Buddhist tradition there is mention of a billion world systems. In one of the science classes we attended with the physicists there was mention of the hundreds of millions of planets where life might exist. When I learned of the similarities between Buddhism and science in terms of the vastness of our Universe and how life can be possible I was really surprised and it prompted this question. Do scientists have any problem with accepting the hypothesis that the first cell, or the first life on Earth, came from another planet?

Chris Impey: It's a remarkable coincidence. The Buddhist number of world systems, one billion, is quite a particular number, and the hundred million number I gave in the Milky Way was just for Earth-like planets, habitable Earth-like planets. In our Solar System, to take the nearest example, if you're asking how many places might have life in any manner, not advanced life, it's about 10 or 12. There are 10 or 12 moons in the outer Solar System that are likely to have water under a rocky surface, kept liquid by pressure. They have energy, carbon and water. Use a factor of 10 and you get a billion habitable spots in the Milky Way. So, as in many things, the Buddhists got there first, and got it right. Or we both got it wrong.

For the preceding question, it's very interesting—the speculation about life elsewhere, habitable worlds in the vastness of the Universe, is old. Lucretius was the first to speculate that there might be many habited worlds, and he was countered by Aristotle, whose weight in philosophy became stronger, so the Earth became the center of the Universe, the only place with creatures. Thomas Carlisle has the great quote about possible worlds with life: “If they be inhabited, what a scope for folly, if they be uninhabited, what a waste of space.”

My question for the Buddhist tradition about the concept of life in the Universe is this: If it turns out through long tedious experimentation that most of these other habitable worlds don't have any life, and especially advanced creatures like us, would that be a surprise? Is that anticipated? Is there any resonance in Buddhism with the scarcity or abundance of life, of intelligent life, given the vastness of the Universe, which is clearly part of traditional thinking?

Geshe Jangchup Choeden: According to traditional Buddhist scholarship there are lots of possibilities for life within the billion world systems. Some sutras say that in specific world systems, there are specific buddhas and specific teachings. From this point of view, philosophically, Buddhists accept that there is the possibility of other intelligent life. If this is proved wrong, Buddhists scholars will provide a new interpretation of the sutras. This is a common approach in the Buddhist tradition: if something is proved wrong, new interpretations are provided, even of teachings that have been accepted by great scholars for over 2,000 years. In general, Buddhism will adapt its teachings when new empirical evidence is found. From the Buddhist point of view, life is always there. In the vast Universe, there is no shortage of life. But we have no proof, no scientific proof.

Chris Impey: I do have a follow-up question. One of the things that struck me about what you said was that in the Buddhist way of thinking, both life and consciousness are recycled, endless, eternal. I don't mean to imply that this is a point of distinction or deviation from Western science, but it is a very interesting idea to express because the Big Bang cosmology posits an origin and a time when there was no life, because the physical conditions didn't permit it, and life exists now in the Universe where once it did not, and by extension consciousness exists in the Universe now where once it did not. My question is what does that imply about evolution, the evolution of thinking, or the evolution about ways of being, if you cannot place yourself in a timeline, in a situation of evolving? Not that everything has to get better, or different, or more complex, or anything in particular, but if time is not really a dimension, of either life or consciousness in the

Universe, however we want to think about it, what does that mean? I don't understand that.

Geshe Jangchup Choeden: There may be an infinite world system incorporating the billion world systems and the Universe that we are talking about. But there could be another universe, and another, and another. If the Big Bang is the beginning point for the Universe, what is the beginning point for other possible universes? If there are multiple universes, there are multiverses and there are more possibilities for life. If there are more possibilities for life, there are more possibilities for consciousness. From that point of view, there is no beginning point for life and consciousness. But there is a possibility for the end of life and consciousness in Buddhism, but that is different, that is presented philosophically in Buddhism.

Monastic Graduate: This question is for Rajesh. My understanding of your presentation is that the objective world, what you see in the objective world, does not really exist as you see it, but that consciousness, the subjective world, is real. Do you mean that, or something else?

Rajesh Kasturirangan: I mean something else. The argument is that you never really get to the world, the objective world, as it is. It's always filtered through your sensory nervous system. We say you don't perceive wavelength, you perceive color. Which is to say, even if the color is a representation of what's there in the outside world, it's still a product of your nervous system, and not just what is in the world. On the other hand, it's not subjective; you're not inventing it. When I see flowers out there, it's not that my consciousness is inventing the flowers, but it is representing them in a way that is driven by my nervous system. There is a difference between consciousness being a full creator of the objective world and being the presenter of the objective world in a way that is conditioned by your own biology and history and so on.

Chris Impey: A question for David in relation to the definition of consciousness, or way of thinking about consciousness, that you gave a little earlier. Does that definition necessarily connote memory? A sense of self that is placed in an instant doesn't seem to me to be a sense of self, because you have to have a relationship between entities and events, and that implies some relationship in time, typically. Is it wrong to suggest that memory is a necessary attribute of consciousness?

David Presti (Moderator): I would not make memory a requirement for my definition of awareness or consciousness. Even in human memory research, there is the case of the patient known by the initials H.M., who died last year. H.M. had been studied for 50 years by neuroscientists for his very anomalous memory. He had full awareness of what was happening moment by moment. When he was in his 20s he had surgery to treat a seizure disorder, and in the surgery they removed parts of his brain in the temple lobe area, and as result he had a particular kind of memory impairment where he couldn't remember anything that happened to him for longer than a minute or so. He had full awareness of everything that was happening, and then one minute later, he would remember nothing. There were researchers who had worked with him for decades, whom he had met hundreds of times, and every time he met them he had no knowledge of ever having met them before. Yet he was fully present when he was present. So I see no contradiction between having full awareness in the moment, even if that moment is only a nano second, and that fully satisfying the definition of consciousness or awareness in the operational away.

Rajesh Kasturirangan: One can imagine a momentary self, something that just arises now, something that is aware of the world now, and then disappears. While the memories and other capacities might help us integrate those moments, I don't see it as a logical necessity. But are there creatures that are aware, as David mentioned, but that do not have any memory? H.M. is an anomaly because something happened to him. Whether there is actually a fully functional creature that has no memory, but some kind of awareness, I don't know.

David Presti (Moderator): The kinds of consciousness or awareness that different beings could have would be very different. It's important to not get locked into the way we experience our consciousness. If a plant has consciousness, it would be vastly different, and even more different than that between humans and bats.

Rajesh Kasturirangan: Isn't that a problem for understanding consciousness? It seems that the one thing that we are almost designed to view from our perspective, unlike planets or quarks, might be that for anything to be conscious, it might need to be like us. That's Nagel's point: to understand another being's consciousness you have to be able to transplant it into our frame somehow.

Geshe Jangchup Choeden: Technically, in Buddhism, the existence of consciousness covers a vast space. The consciousness that we experience at present is a very limited and distinct form of consciousness and at a very coarse level. As we refine our consciousness, it may enter different levels. In Buddhism, it is possible that people are born into a different realm, where, for example, in the whole life term they only have two occasions of remembering or feeling: I'm born here, I'm dying here. The rest of life, that gap period, they have no feeling, awareness, functioning of mind, knowing. In that stage, we have to accept that consciousness does exist. So consciousness, technically, according to Buddhism, has different layers to it. The layer we are using at present is a very coarse external layer. I think there is something science can learn from Buddhism in this field, but there are also some things that simply might not lend themselves to scientific investigation. As long as consciousness exists, according to Buddhism, life should be there. There is the possibility of the existence of life without the involvement of even the tiniest consciousness. How can we search for that? There does not seem to be much possibility of doing so. It's very difficult to study these things with machines, unless you look into yourself. But if scientists look into themselves, it's very difficult for other scientists to prove it. It's a very difficult to undertake a scientific study in this field.

Rajesh Kasturirangan: Doesn't that problem arise when a student reports to a teacher, "I had this kind of refined experience." How does the teacher authenticate that experience?

Geshe Jangchup Choeden: This is a spiritual matter. When the teacher teaches the student how to do certain practices, the student gains some experience and then reports back to the teacher. The teacher can tell from the student's description and explanation of their experience what level the student has reached and can provide guidance.

David Presti (Moderator): Isn't it the case within the contemplative traditions, like Buddhism, that there is some consistency of the definition of experience? That is the value of the scientific aspect of the contemplative sciences, that Buddha was able to very precisely develop technology to look into the mind, and have that verified by others when they also went there. That's exactly what mind science needs, a technology that is reliable and empirically replicable across people when you do the practice.

Rajesh Kasturirangan: I want to push that further, because His Holiness mentioned this earlier today. The Buddha himself says don't believe what I say, but do it yourself, and accept it only if you have the same experience. But how do you know when you have had the same experience as the Buddha? How does one know within the tradition what the mark of having had the same experience as another person is?

Geshe Jangchup Choeden: When you apply spiritual values in your life, gradually, it changes your life. You feel it. If you observe in the right way, in the right direction, you feel it. But it takes time. It isn't that you do research for a couple of years and come out with a huge book, and say, "This is my finding." It won't come in that way. It takes decades, 25 years; you need to spend a lifetime. In the end you will feel that your life is enriched by living in accordance with those spiritual values. We should not look forward to making every scientist

spiritual, for that is rather impractical. But if scientists really want to understand the mind, they should start looking within themselves and observe their own feelings, their own perceptions, their own different mental formations, and then try to compare them with the text. Where do they stand? Do they meet the definitions given in the text? They should study in that way, and they will come to realize if it makes sense, or not.