Philosophy of Science – The Very Short Introductions Podcast – Ep 54

Rebecca Parker 00:07
Welcome back to the Very Short Introductions podcast. From public health to Buddhist ethics, soft matter to classics, and art history to globalization, we'll showcase a concise and original introduction to a wide range of subjects, for wherever your curiosity may take you. So here is today's very short introduction.

Samir Okasha 00:26
Hello, my name is Samir Okasha. I'm Professor of Philosophy of Science at the University of Bristol, where I've worked since 2003, and I'm a fellow of the British Academy. The title of my very short introduction is Philosophy of Science: A Very Short Introduction. The topic of the book is the academic discipline known as philosophy of science, which is a sub branch of contemporary philosophy and asks philosophical questions about how science works, about the types of reasoning that scientists use, about the logic of scientific explanation, and about how much confidence we should rationally have in the conclusions that scientists reach, and why. I first became interested in this subject through my own studies in science and social science, and where I was always one of those kids who would annoy the teachers in that I would continually ask questions such as, "What does it mean? How do you know that? Isn't that just a theory? Is gravity a real thing?" Questions of that sort, which very naturally drew me to philosophy. And then in my academic studies at philosophy, I became drawn to this rich intersection of philosophy and natural and social science, an intersection that has a rich history, and is intimately bound up with the study of logic and reasoning, which is another core part of philosophy.

Samir Okasha 01:57
So that was my personal route into this discipline. I'd like to touch on a few of the key aspects of the discipline of the philosophy of science that are covered in my book that I think everybody should know about. The first concern is the nature of scientific inference. So if you think very abstractly about how science works, and you wanted to give a sort of simple one sentence summary of how the scientific method works, then the answer will be something like this. You know, scientists make observations, they perform experiments, and then they arrive at general theories about how the world works. Now, a key point to notice here is that the observations and experiments that scientists do, are, of necessity, finite in number, and limited to certain specific circumstances and regions of space time. And yet they arrive at general theories that describe what goes on, for example, a long, long time ago, a very small spatial scales that we can't directly observe at the subatomic scale, for example.

Samir Okasha 03:10
They arrive at conclusions about things that go on and the did go on, and distant regions of the universe at enormous spatial removed from where we are. So on the basis of these limited number of observations and experiments, it seems that scientists are able to arrive at rather general conclusions about how the world works. That's true of pretty much every branch of science and social science that

one considers. And the question that arises is how it's possible for such a mode of inference to be reliable. The crucial point to notice here is that pretty much all scientific inference is ultimately what we call inductive, which is to say it involves reasoning from some premises to a conclusion that goes beyond the premises. So that's to say that the premises do not literally guarantee the truth of the conclusion. As for example, they do when we reason mathematically, when we where we use deductive reasoning.

Samir Okasha 04:15
Now, the central role of induction in science is sometimes obscured by the way we talk. So you might read a sentence in a newspaper, for example, that says scientists have found experimental proof that genetically modified maize is safe for humans to eat. Now, what that means, that statement, is something like this: the scientists have tested the GM maize on lots and lots of different humans in different circumstances, found that none of them have come to any harm, and so have concluded that it's safe to eat. Now, strictly speaking, we should probably say that the scientists have found extremely good evidence for the statement that the maize is safe for humans to eat, not that they have proved it, because in the strict sense of the word proof, in the sense, for example, in which we say, "we can prove by Pythagoras's theorem," it's never really possible to prove the truth of a scientific conclusion from observations or experiments given that the conclusion is typically general, and the observations and the experiments are specific and finite in number. And this is one of the central problems in the philosophy of science, to reconcile the fact that scientific reasoning or scientific inference is inevitably inductive, takes us to conclusions that go beyond what the data say, with the fact that the best bits of modern science seem to be incredibly certain.

Samir Okasha 05:36
And it would not seem sensible to damp them simply on the grounds that the mode of reasoning that was used to arrive at them was inductive. But that is something of a, of a puzzle or a paradox, given that inductive reasoning does not guarantee that the conclusion is true. It's possible in principle for inductive reasoning to take us from true premises to a false conclusion. So how could it be that scientific reasoning is essentially inductive and character, and yet the conclusions that scientists reach seem to be so reliable that we rely on them all the time, in everyday life, whenever you go in a car, whenever you go on a plane, whenever you use a gas stove, whenever you cross a bridge? You're relying on technological developments that are the fruit of modern science, and that we repose incredible confidence in. Now how can that be given that the reasoning that led scientists to the theories that we use to build the bridge, to design the gas stove, to make the airplane fly, are general and were arrived at by inductive reasoning? That I think of as one of the very central questions in the philosophy of science.

Samir Okasha 06:51
The second question I would like to broach is the question of scientific objectivity, and the role of values in science, by which I mean moral and political values. One popular conception of science is the following. It says that the job of science is to discover what the world is like. And what we do with that knowledge is a different matter. It is a matter of perhaps for public policy, or something like that. So think of climate change, a natural thing to think about is this. Look, there's the question of whether or not manmade induced climate change is happening. And there's then the further question of, if it is,

what we should do about it. The formal question is a question for the climate change scientists. The latter question is a question for the policymakers. So on this view of the matter, there's a sort of division of labor between the activity of science which is to find out about the world and then the practical question of what to do with that knowledge. This is a very natural view, and ties in with the idea that science is, in a sense, value free, that it concerns itself with the realm of fact, with the realm of what is the case, not with the realm of value, the realm of what should be the case. And that very natural thought itself ties in with a broader philosophical idea associated with the 18th century philosopher David Hume, which says that there's a logical gap between "is" and "ought," so statements about what is the case can never tell us anything about what ought to be the case, Hume argued.

Samir Okasha 08:32
Now, I want to pose the question of whether this simple division of labor between science and policymaking is correct. Or is it on the other hand, rather naive? Opponents of the idea in question that I've just sketched that says, "look, the job of science is just to discover the facts," argue that it's naive, because science and scientific discovery is value laden in various ways, some of which are more subtle than others. So one example that comes to mind is the early history of eugenics, which was, obviously, a highly, is today a highly disreputable idea and field, but was intimately linked to the discipline of genetics in the late 19th and early 20th century. So think, for example of what the Victorian scientists, from about 1880s onwards, argued in relation to the affliction that they call "feeble mindedness," which we would now think of most likely as mental illness of some sort or other. This Victorian scientists argued quite forcefully for the sterilization of the feeble minded. Now, suppose someone said, applying what I just sketched a moment ago, that they were they were mistaken in doing that, that's, you know, they strayed into the realm of public policy. Their job should just have been to study the facts.

Samir Okasha 10:03
Now, to my mind, that would not really get to the heart of what was wrong with their view. Suppose they had just studied the "facts," as we say, in scare quotes, and just focused on understanding this circle condition of feeble mindedness and studying its inheritance through family, lines of descent, and so on, while leaving the question of whether the feeble minded should be forcibly prevented from breeding or not, to the policymakers. That still wouldn't be good enough, as I see it, because the problem is that they were using an inherently flawed category. The very scientific or purportedly scientific category of feeble mindedness that they use isn't a real category at all, there is no such thing. So we see them that the very category that they use to try and describe the world was itself a value laden category and reflected social and political assumptions and values of the time, and is a very category that we would reject today.

Samir Okasha 11:06
So it's not so simple as saying, "Look, science should just describe the facts, the policymakers should then decide what to do," because the very categories that scientists use to try and describe, in scare quotes, "the objective facts," may themselves be contaminated or laden with social and political values. So that I think is one reason why we should be skeptical of the simple idea that the realm of science is that of objective fact; what to do with those facts is a question for policy. The intertwining of fact and value is sometimes quite pervasive and subtle. So my time is up. I hope what I've discussed has sparked your interest in the philosophy of science. I'd like to end by emphasizing that whether you've

studied a lot of science, just a bit of science, or no science at all, the questions that philosophy of science raises are nonetheless very fascinating, mostly relatively accessible, and the perennial questions that everybody who's concerned with science, whether a scientist themselves or not, should engage with and will gain from thinking about Thank you.

Rebecca Parker 12:23
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