

Neuroscience, Quantum Physics, and the Nature of Reality

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Announcer:

Greetings, and welcome to Mind Matters News. This week, you're just in time to join Bruce Gordon and our guest host, Michael Egnor, as we dive into quantum mechanics and the nature of reality, idealism, and how to interpret the findings of modern neuroscience. Enjoy.

Michael Egnor:

At its most fundamental level, is reality more like a mind, or is it more like a physical object? That question and questions like that are fundamental to our understanding of nature and our understanding of ourselves and our understanding of God. I have the unique privilege to interview today on Mind Matters News, Dr. Bruce Gordon.

Michael Egnor:

Dr. Gordon is associate professor of the history and philosophy of science at Houston Baptist University. And he's a senior fellow at the Center for Science and Culture at the Discovery Institute. Dr. Gordon is a dear friend and a brilliant man. And I hope to learn a great deal about what is at the fundamental root of nature. So, Dr. Gordon, welcome. And thank you for joining us.

Bruce Gordon:

Thank you. After that introduction, I feel like I should crawl down a hole and just leave things where they are because that was over the top. Thank you, Michael. And you have my utmost respect as well for you are, if anything, far more accomplished than I am.

Michael Egnor:

I've learned a lot. I should point out to our listeners that Dr. Gordon and I both attended a conference on philosophy of mind and on neuroscience about a year ago. And he opened my eyes to idealism and to what I think is a much deeper insight into the nature of reality. So, perhaps we should start, Dr. Gordon. What is idealism?

Bruce Gordon:

There are a lot of different varieties of idealism. And rather than go through a laundry list of its variations, let me just start with the kind of idealism that I would be an advocate of, which is an ontic theistic idealism. And what do I mean by that? Well, it's essentially a form of idealism that is probably most closely identified with the Anglican bishop, George Berkeley.

Bruce Gordon:

So, how would you define it? Basically, it's the idea that material substances as substantial entities do not exist and are not the cause of our perceptions. They do not mediate our experience of the world.

Bruce Gordon:

Rather, what constitutes what we would call the physical realm are ideas that exist solely in the mind of God who as an unlimited and uncreated immaterial being is the ultimate cause of the sensations and ideas that we as finite spiritual beings experience intersubjectively and subjectively as the material universe.

Bruce Gordon:

So, we are, in effect, living our lives in the mind of God. And he is a mediator of our experience and of our intersubjectivity rather than some neutral material realm that serves as a third thing between us and the mind of God, so to speak.

Michael Egnor:

How does idealism thus understood relate to Plato's theory of forms?

Bruce Gordon:

Well, you'd have to take a Neoplatonic or Augustinian spin on it. Plato thought that there was this realm of abstract particulars that was eternal and unchanging, a realm of forms participation in which gives identity to the objects of our experience and enables the recognition by our minds.

Bruce Gordon:

And he had all theory basically that involved preincarnate existence that feeds into that and a doctrine of reminiscence that we remember these forms, and that's how we recognize the objects.

Bruce Gordon:

But rather than that, I would prefer to look at it in an Augustinian vein so that the Platonic forms are not mind independent abstract particulars the way that Plato thought, but rather ideas in the mind of God that differentiate and give identity and order to the objects of our experience.

Bruce Gordon:

So, things are the kinds that they are because they fit the form of that thing in the mind of God. And that idea is communicated to us then. So, there's a confluence then of that Augustinian Neoplatonist idealism with Berkeley and immaterialist idealism.

Michael Egnor:

There are, I believe, other kinds of idealism, for example, idealism by German philosophers. And how does that differ from Berkeley in idealism?

Bruce Gordon:

Well, I would say, it depends on who you're talking about. But let's take Kant as the wellspring of all of this. So, Kant advocated an epistemic as opposed to ontic idealism. So, Kantian idealism is entirely compatible with the existence of inert material substances, even though they are inaccessible as things in themselves. So, for Kantian idealism, you've got a self that provides a transcendental unity of consciousness that proceeds and grounds all of our experience.

Bruce Gordon:

And our perception of reality then is governed by the innate structure of the human mind that has space and time as our priori modes of cognition and various categories of the understanding, quantity and quality in relation to modality, stuff like that, that give order to our experience, but it's structured that the mind itself, by its innate structuring, gives to our experience.

Bruce Gordon:

So, we never experience reality in itself which he called the noumenal world, but only reality is it appears to us, so phenomenological reality of phenomenal reality that is ordered by the innate structures of the human mind.

Bruce Gordon:

So, Kantian idealism and its descendants are in many ways an epistemic form of idealism, whether as the Berkeley and form of idealism is ontic. It's the denial that there is material substance and an embedding of reality in the mind of God such that it is finite spiritual beings experiencing the reality brought into existence by this unlimited, uncreated immaterial being.

Michael Egnor:

I've long been bothered by one aspect of Kant's metaphysics or one consequence of his metaphysics, and that his assertion is that we can never know reality in itself. But isn't that claim itself considered exempt from Kant's view that we can't know reality in itself? That is, if we can't know reality in itself, then how does he know that we can't...

Bruce Gordon:

Does he know that reality is unknowable?

Michael Egnor:

Right, right. It seems necessary to exclude his metaphysics from the reality that we can't know.

Bruce Gordon:

Well, he would have to maintain that he can know and examine from the inside, from the subjective structure of his own experience, I suppose, the innate structure of the human mind which interposes itself between the thing in itself and our apprehension of it.

Bruce Gordon:

So, if he himself is as inscrutable as the noumenal realm, then I suppose that the objection would apply. But there may be some wiggle room for Kant, I'm not sure, to say that he has direct access to the contents of it and structure of his own consciousness and can describe that.

Bruce Gordon:

But having described that, assuming that he's right about its structure, then he has this veil between himself and the noumenal realm, the realm of the things in themselves. He only has that phenomenal realm that is filtered through the structure of his own consciousness.

Michael Egnor:

Yes. But one of the things that has always bothered me about skeptical metaphysical perspectives like Kant's, and of course there are many others that are much more radical, is that to be really consistent, you have to hold your own viewpoint as the exception to your skepticism. And it seems to me cheating. So, if Kant is right, then Kant has no way to know that he's right.

Bruce Gordon:

Sure. If his self is as inscrutable as the noumenal realm that this [inaudible 00:09:14] supposedly filters, then that's absolutely correct.

Michael Egnor:

A number of philosophers in the early modern time and some today have proposed panpsychism and cosmopsychism. What are they and how do they relate to idealism?

Bruce Gordon:

Well, incidentally, cosmopsychism would be a type of panpsychism. But panpsychism is basically the view that consciousness is fundamental to nature and permeates nature. It's present in everything but to varying degrees, okay? And usually, you encounter it as one form or another of what might be called constituted panpsychism.

Bruce Gordon:

So, what is that? It's the idea that the consciousness that we would intuitively associate with human beings and other animals isn't fundamental. But it's grounded in something that is more fundamental that permeates nature itself and is a property of nature itself.

Bruce Gordon:

And there are two versions of this. There's a bottom-up version, which is usually called something like micropsychism, and a top-down version, which is the cosmopsychism or cosmos psychist version that you refer to in your question.

Bruce Gordon:

So, micropsychists think that old facts about human consciousness are grounded, and consciousness involving facts at the level of microphysics. So that, the macro phenomenal truths of our experience are grounded in microphenomenal truths.

Bruce Gordon:

When we think of atoms as combining to give rise to physical objects, we have instead psychic atoms of one form or another that combined to yield more complex forms of consciousness. And of course, that gives rise to a seemingly intractable combination problem, right?

Bruce Gordon:

How do you get a coherent macroscopic experience out of fundamental physical... well, how do the experiences of fundamental entities, say their subatomic particles or whatever, combine to yield human conscious experience?

Bruce Gordon:

Now, coming at it from the other direction, from the top down, you've got something like cosmopsychism. And it would say that all facts about consciousness in general and about human consciousness in particular are grounded in facts about consciousness that concern the universe as a whole.

Bruce Gordon:

So, the universe itself is conscious. And somehow our individual consciousnesses within the universe are manifestations or particularizations of this universal consciousness that's gotten separated off and seems to be unto itself but is not. It's really a manifestation of the universe's consciousness as a whole. So, that's cosmopsychism.

Michael Egnor:

To backtrack a little bit, I think it's actually an utterly fascinating question is, when we make the assertion that the fundamental reality of the universe is mental rather than physical, what is mental? We have a sense of what physical things are. They have extension in space. They're heavy. They have inertia, things like that. But what is a mental thing? And can we define mental things except by what they're not?

Bruce Gordon:

Well, of course, a panpsychist would deny this. But I would say the distinction between mental things and physical things is that, for mental things, there is something that it's like to be that thing. Whereas for physical things, there's nothing that it's like to be that thing from the inside, so to speak.

Bruce Gordon:

Of course, the panpsychist says that there's something to be like everything right down to the most fundamental constituents of reality that we would, from a different philosophical perspective, regard as entirely impersonal.

Michael Egnor:

Right, right. So, in the sense, mental things have first-person experience rather than third person. Franz Brentano, a philosopher in the 19th century felt that the hallmark of mental things was that they're intentional, that is that they are directed towards things.

Michael Egnor:

Whereas, things that are physical aren't about anything. They don't have any point to them. Number one, do you think that's a reasonable way of defining mental things? And is there an application of that idea to idealism?

Bruce Gordon:

Well, certainly, intentionality is a hallmark of the mental. It's a hallmark of what it means to be conscious, that mental states are states that are about something and directed toward that which they are about. In idealism, particularly an ontic theistic idealism or a theistic ontic idealism, all of reality is of course about something and is given purpose and meaning in the mind of God.

Bruce Gordon:

And when we are, as human beings, in sympathy with that and in accordance with that, we are understanding reality in that context that has been imbued with divine meaning, and we understand it from that perspective. So, yes, I think intentionality is integrally bound up in idealism.

Bruce Gordon:

There's something that reality is about. There is a purpose that is given to reality by the divine mind. And that makes reality itself directional and intentional in respect of God's purposes.

Michael Egnor:

It has been proposed and I have a lot of sympathy for this proposition that the intentionality that's characteristic of mental states is found by analogy and teleology in nature, in a sense that teleology is nature's intentionality, which I think fits beautifully in the idealistic way of understanding the natural world because a mind points to goals. It points to purposes and meanings. And we find that nature is just suffused with purposes and meanings. Do you think that's a useful perspective?

Bruce Gordon:

I absolutely think that's a useful perspective. In fact, I think it's pretty much the way things are that the teleology that we observe in nature, the directedness that we observe in nature, the sort of things that, if you like and I suspect that you do, constituted the insights that we're part of Thomas's fifth way.

Bruce Gordon:

The argument from design, the idea that nature is directed toward a goal and the nomological or law-like structure of nature that constrains the behavior of things which has no internal explanation must either be taken as which seems very strange and is deeply problematic from the standpoint of the principle of sufficient reason to take it as a brute fact.

Bruce Gordon:

Rather, this is something that has been imposed as a structure on reality by the divine mind is discernible. It's mathematically describable. We discover it as we analyze our experience. All of this points to the teleological structure of nature, which is a manifestation of divine intentionality. So, intentionality in the form of teleology absolutely pervades the structure of the universe.

Michael Egnor:

It's almost as if our minds were created in the image of the creator of the universe.

Bruce Gordon:

It's almost like that, Mike, isn't it?

Michael Egnor:

Yes, right. What is the most fascinating discovery of modern science? We each have our opinion and my opinion is a discovery that my guest, Bruce Gordon, can tell us quite a bit about.

Michael Egnor:

When I was in college, I was a biochemistry major and I took some courses in quantum mechanics. And it was noted in the course that when you look at the most fundamental properties of subatomic

particles, matter seems to disappear. That is that the reality of the subatomic particles is that their mathematical concepts.

Michael Egnor:

And that utterly fascinated me that basic structure reality is an idea which fits very nicely with idealism. So, Dr. Gordon is an expert on idealism and on the philosophy of science. And I wanted to ask him, what do you think about all this?

Bruce Gordon:

Well, certainly, my own path to idealism was paved by my reflections on the metaphysics of quantum physics. So, I'm deeply sympathetic to the questions that you're raising. Maybe, we should do a little exploring of some of the phenomena of quantum physics that seem to point in this direction.

Bruce Gordon:

So, of course, quantum physics is a highly mathematical theory that describes the nature of reality at the atomic and subatomic level. And the mathematical descriptions of quantum physics have a variety of experimentally confirmed consequences that, I would say, preclude the possibility of a world of mind independent material substances that's governed by efficient material causation.

Bruce Gordon:

That's not the way that the world is constituted. Although that has been the way and is the way that we tend to think of it because we still live in a reality that seems very much to be described by classical Newtonian kinds of mathematical descriptions. However, at the most fundamental level, that's not the case.

Bruce Gordon:

So, let's take a look at or talk about maybe some interesting quantum experiments that point toward the mind dependent character of reality. So, one of the standard ways of talking about quantum physics, and of course quantum physics itself and the interpretation of it particularly has been a cottage industry throughout the 20th century and on to the present in the 21st century.

Bruce Gordon:

And there are a variety of different perspectives that have been offered. We have standard Copenhagenism. We've got the many-worlds interpretation. We got de Broglie-Bohm hidden variable theory. We've got quantum logic. We've got Ghirardi-Rimini-Weber's spontaneous collapse theory, and on and on.

Bruce Gordon:

But I would say that fundamentally in the background, we've got, with all due respect to the de Broglie-Bohm theorists and other hidden variable advocates, a situation in which reality at the quantum level does not exist until it is observed.

Bruce Gordon:

So, what sort of indications do we have of that? I think one of the most fascinating ones is what in the literature is referred to as the quantum eraser experiment, or delayed-choice quantum eraser

experiments. What this experiment is set up to do is to measure this inherent duality in quantum physics as well, wave-particle duality.

Bruce Gordon:

When you're not observing reality, it seems to behave in accordance with the Schrodinger wave equation and various relativistic expressions of that and on into quantum field theory. But when you are observing it, it seems to take on a more particulate character.

Bruce Gordon:

So, what does the delayed-choice quantum eraser experiment do? Well, it tries to measure which path a particle would have taken after interference in the wave function itself has been created, that is inconsistent with that particle behavior. So, you've got a splitter of some sort that's it's going to divide the quantum wave function and send it along to different paths.

Bruce Gordon:

And then, you're going to make a measurement along one of the paths to see what's happening. And that interference can be turned off or on by choosing whether or not to look at which path the interference has taken or which path the particle has taken after the interference already exists.

Bruce Gordon:

Now, if you don't look, you get an interference phenomenon at the end. If you do look, the wave function instantaneously collapses, and you detect the particle along that pathway. So, choosing to look erases the wave function interference that already exists and gives the system a particle history.

Bruce Gordon:

This experiment has been performed under what would be called Einstein locality conditions. In other words, no signal could have passed, subject to the limiting velocity of the speed of light between the components of the system to cause the effect that you're observing.

Bruce Gordon:

So, it's a non-local collapse of the wave function that instantaneously gives a particle position to the measurement after a phenomena that is inconsistent with that has already been created.

Bruce Gordon:

So, the very fact that we can make a causally disconnected choice of whether wave or particle phenomena are manifested in a quantum system essentially shows that there is no measurement independent and causally connected substantial material reality at the microphysical level that's there. It is created by the measurement itself.

Michael Egnor:

What counts as a measurement?

Bruce Gordon:

Now, that is a deep question. So, what can count as a measurement is any sort of interaction that would localize the wave function and yield a determinant local result. And that could involve a conscious observer or it might not involve a conscious observer.

Michael Egnor:

What sort of measurement wouldn't involve a conscious observer? And does it matter how much you pay attention? If I'm a little preoccupied, do I not get much interference, but maybe a [crosstalk 00:24:47]? Because it really implies that, number one, there is an actual something that is observation and it's an on or off thing. It's yes or no. There's no in between. And what is that?

Bruce Gordon:

So, this is going to take us into certain metaphysical interpretations of what's going on. Now, on a standard Copenhagen view, you would have a collapse of the wave function to a localized result on, say, a many-worlds interpretation, which I'm not that sympathetic with ontologically, but I do see a role in terms of deriving idealistic conclusions and embedding them in a context in which the universal wave function becomes a manifestation of divine omniscience.

Bruce Gordon:

But that could take us a little bit farther afield than we probably want to go immediately at least. So, another thing that happens, another way of describing what's going on, is to think of it in terms of wave interference and a whole bunch of different quantum systems and their wave functions interacting.

Bruce Gordon:

Now, if you think about waves in water, you have phenomena of constructive or destructive interference. So, if you think about a typical transverse wave in the water moving through the medium of the water, it has a crest and a trough. And if it meets another wave, say, of the same size coming from the other direction, then where the crests meet, the amplitude of the wave, the height of the wave, if you like is, is doubled if the waves are initially the same size.

Bruce Gordon:

But where a crest meets a trough, they cancel out and you observe calm water, even though that calmness is an artifact of the waves passing through each other and aggressed meeting a trough.

Bruce Gordon:

Now, when quantum systems decoheres, they call it in this way, when the wave functions cancel each other out in terms of destructive interference effects, you get the perception of a calm reality, even though there, it's really just quantum waves moving through each other that generate that appearance.

Bruce Gordon:

So, the substantiality then that you observe or the calmness that you observe around you in quantum description can be regarded as a phenomenon of decoherence. It's really the cancellation due to destructive interference of all of these quantum systems interacting with each other, such that reality appears calm, but underneath, there's nothing substantial. It's just the wave functions interfering with each other.

Michael Egnor:

The metaphysical implications of this of course are fascinating and profound. But there's also just an empiric reality that we have to take into account. Say, for example, that I'm a physicist who is looking at a quantum system and I'm actually looking at the oscilloscope or whatever our modern instrument is when it's happening, everybody would say, "Well, that's an observation, for sure."

Michael Egnor:

Let's say that I'm not in the room, and I'm just taping it. But I plan to look at it later. Is that an observation? And if I change my mind and decide not to look at it, does that change the system?

Michael Egnor:

So, all those things, I'm fascinated by what we mean by an observation because in reality, observation is a continuum. I mean, I could be watching something and then my mind wanders, I'm thinking about lunch. Does that make the system go back into indeterminacy, and then it becomes determined again when I focus on?

Bruce Gordon:

Not necessarily if you've got decoherence happening in the quantum metaphysics of the world around you. So, how do we bring this into relationship with idealist? In fact, I was going to talk about some other experiments to further massage people's intuitions with respect to the nature of the reality that undergirds these sorts of phenomena. Let me talk about at least a couple more. And then, we'll come back to the question of what's going on when we're not looking.

Michael Egnor:

Right, right. Is the moon there if no one's looking at it?

Bruce Gordon:

David Mermin has assisted Cornell and phrase things that way. So, another phenomenon that's really quite fascinating is phenomenon of non-localized ability of individual particles.

Bruce Gordon:

So, in quantum mechanical description, if you make some physically reasonable assumptions about individual particles, I mean, there are a couple of other ones as well, but most notably that the particle and individual particle can't be two places at once.

Bruce Gordon:

And furthermore, that it can't serve as an infinite source of energy so that you can't run the power needs of New York City on a single electron from here to eternity. Right?

Bruce Gordon:

If you make those two physically very reasonable assumptions, then in the quantum mechanical formalism, you can demonstrate that the particle in question has zero probability of existing in any bounded region of space no matter how large. And you can close various loopholes in that to make it a rock-solid result.

Bruce Gordon:

So, what does that mean? It means that unobserved quanta don't exist anywhere in space and thus have no existence apart from being observed. And interestingly enough, there have been experiments conducted that would support the quantum formalism.

Bruce Gordon:

What does that mean then? It means that as far as microscopic material individuals are concerned, while particle talk may have pragmatic utility with respect to the measurement results that we observe and with respect to, say, macroscopic appearances, it has no basis in unobserved mind independent reality. So, that's just another example that would lead in the same direction as the quantum eraser experiment that I talked about.

Bruce Gordon:

Here's another one that's absolutely fascinating. And it's been dubbed the Quantum Cheshire Cat phenomenon. You may recall from the story of Alice in Wonderland that Alice observes this grinning Cheshire cat that then disappears leaving only it's a grin. And Alice remarks that she's often seen a cat without a grin, but never a grin without a cat. And in essence, that's what's going on here.

Bruce Gordon:

Because certain experiments, in particular, one using a neutron interferometer, have separated the properties of neutrons from any substrate. So, microphysical properties don't necessarily require a substrate.

Bruce Gordon:

What did the experiment do? Well, it set the position of neutrons along one path and their spins along a separate path. So, it's like sending a top along one path and the fact that it was spinning along a separate path or the redness of an object along one path, and the location of that object along another path. Microphysical properties then can be separated from any idea of a substrate. They can be abstract properties through space.

Bruce Gordon:

So, what do you get then? It would seem that under appropriate experimental conditions, quantum systems are decomposable into disembodied properties, a collection of Cheshire cat grins, if you will. So, how is it that an abstract property could exist without any sort of substrate? Well, it can't.

Bruce Gordon:

And of course, being a good Neo-Aristotelian yourself, you would see properties as mental abstractions from particulars. Not existing in and of themselves, but only in the objects.

Michael Egnor:

But the property could exist in a mind.

Bruce Gordon:

Yes, that's exactly where I'm headed. There is no physical substrate, but the property has to inhere in something, so it's inhering in the mind that precedes it. Ultimately, there is no physical substrate that

undergirds that property. So, in a way, you could look at the quantum mechanical properties as abstract particular properties, tropes, even. But the tropes have to inhere in something. And what they inhere in is a mental substance, not a physical one.

Michael Egnor:

It's absolutely fascinating. What's particularly fascinating, as you point out, is how a deep look at the peculiarities at the counter intuitive aspects of the quantum world suggests that only an idealistic or an idealist metaphysics could make sense of all this, that materialist or perhaps even dualist metaphysical perspectives fail at the quantum level, but the idealist perspective doesn't. That's very interesting.

Bruce Gordon:

I would agree with that way of phrasing things. I'm not sure that you do entirely. I'm pretty sure you have some reservations about it. But yeah, that's pretty much where I'm at.

Michael Egnor:

And I must say, no, I really do feel that way. What I'm fascinated with is, particularly in neuroscience, there are aspects of the hylomorphic perspective of Aristotle and St. Thomas that really do seem to make sense of empirical scientific results in very nice ways. And I would love to see some consilience between idealism and Aristotelian metaphysics. But idealism as a theory of physics to me is the only one that seems to me to be viable.

Bruce Gordon:

And I'm inclined to agree with you. I mean, one of the things that we didn't talk about is the possibility of macroscopic superpositions as well, having what would classically be impossible, systems in superpositions of the position observable, systems in superposition. Well, of course, there are examples of this under special laboratory conditions. You put large organic molecules and then put into superposition.

Bruce Gordon:

But in the context of superconductivity, you've got something called SQUIDs. And we're not talking about the cephalopods here. We're talking about superconducting quantum interference devices.

Bruce Gordon:

In that context, on a macroscopic level, currents have been put into superposition so that you've got, for example, billions of electrons moving clockwise around a superconducting ring superimposed on similarly billions of electrons moving anti-clockwise. So, the two are put into superposition that way.

Bruce Gordon:

Still, what what's going on there? You can't have substantial objects in superposition that way if they're materially substantial. But they can be superimposed as a projection on our mental environment without any difficulty.

Bruce Gordon:

It's like a projection on the screen of our consciousness of two incompatible classical states that cannot be substantial materially, but can be superimposed mentally. And we are standing as an observer

outside that superposition observing it. We are not in superposition ourselves, which I think, in a way, speaks towards something that can be said in response to the many-worlds interpretation.

Bruce Gordon:

But nonetheless, that's just an added element of the peculiarity of the quantum world as it creeps up or percolate up into our experiential reality. And we can make it percolate up into our experiential reality under special laboratory conditions, which is why we haven't noticed it in previous centuries.

Bruce Gordon:

And it's taken modern technology and exploration of reality at its most fundamental level that the modern technology is made possible to reveal this aspect of the nature of the world and the nature of reality to us.

Michael Egnor:

Although, I must say that Heisenberg, who was a philosophically rather sophisticated physicist, commented that the phenomenon of quantum collapse was pre-staged in many ways by Aristotle's notion of the reduction of potency to act. That is that reality can exist in potential states, but actuality is a single state.

Michael Egnor:

And Heisenberg was quite impressed with the notion that Aristotle had a deeper insight into these dynamics. And that insight was lost with Newtonian physics. So, maybe science is just rediscovering Aristotle.

Bruce Gordon:

And I'm sympathetic to the idea of potentiality inhering in superposed states and then expressing itself through decoherence, or if you like, wavefunction collapse depending on how you're describing it, as actuality. So, yes, but what's going on underneath the surface of the actuality of its decoherence is essentially destructive interference of potentiality.

Michael Egnor:

Right. One other thing I'll just quickly mention that absolutely fascinated me was that St. Thomas, extending Aristotle's psychology, pointed out that in order to understand or to perceive an object in the external environment, our intellect or our senses must grasp its form. And the grasping of the form is the process of understanding.

Michael Egnor:

But St. Thomas pointed out that in order to grasp the form, it must be reduced from potency to act in order to grasp it. It must become actual and not merely potential, which to me sounds just like the observer effect in quantum mechanics, that is to observe something, our mind must make it actual to grasp its form.

Bruce Gordon:

Yes, one has to render it as a concrete particular for the purpose of grasping it and understanding it. I don't disagree. And there is that confluence of ideas that you're describing. I'm sympathetic to looking at it that way.

Michael Egnor:

You could even ask, how could an observer, a scientist, understand the quantum system if the quantum system were not reduced from potentiality to actuality? How can you understand something that's only potential if there is no actuality to it?

Bruce Gordon:

Right. And it is the interaction, if you like, of potentiality and actuality in the peculiarly quantum mechanical way that gave rise to the science.

Michael Egnor:

Sure, sure. It has been said that philosophy of mind has been the most active discipline of philosophy over the past century or so. And neuroscience certainly has been among the most active disciplines in biology. And our question really is, how can we understand modern results of neuroscience from a philosophical perspective? What does neuroscience mean?

Michael Egnor:

Roger Scruton, who's one of my favorite authors, famously described modern neuroscience as a massive collection of answers with no memory of the questions. And so, what I'd like to talk with you about is, what are the questions that are being answered by neuroscientists. To understand the mind, what do you think is the most satisfactory metaphysical perspective?

Bruce Gordon:

Well, it's no secret given your introduction that I'm an idealist and so that I'm going to lean in that direction for saying that immaterial consciousness really needs to be understood as the bedrock of reality. We know it firsthand, subjectively, from our first-person perspective. And its integrated unity in our experience is a fundamental datum.

Bruce Gordon:

It's a starting point from which we can move to an examination of the world and really an examination of our neurophysiology in an attempt to understand how that affects our experience of consciousness.

Bruce Gordon:

It's commonly thought that an idealist ontology, which would take consciousness as primary and understand material reality in phenomenological terms, would place consciousness beyond the possibility of scientific study. And I really don't see things that way at all.

Bruce Gordon:

In fact, the access that we have to the brain is through phenomenological examination. And it's very clear that the structure and function of the phenomenological brain constrains and channels our consciousness and capacity for experience of things.

Bruce Gordon:

But I don't see that fact as standing in the way of recognizing that consciousness does not arise from the material but is something different than the material. And then, it provides the basis on which we try to understand what the material world really is, whether it's substantial and were in dualistic view, or whether it's merely phenomenological.

Bruce Gordon:

And really, as I said at the beginning, immaterial consciousness is a bedrock of reality. Not ours, of course, because most of reality is given to us. We don't create it by our own consciousness. We experience it through our consciousness. So, there has to be a more fundamental consciousness than that is the bedrock of reality. And of course, that's the ultimate direction that theistic ontic idealism is headed in.

Bruce Gordon:

God provides that ontological ground as the one who imparts structure to reality. And of course, that structure is constitutive of our experience. So, that God is the very cause, if you like, of the phenomenological reality of our experience.

Bruce Gordon:

And we can explore them, the world that he's given to us, including how our experience of our phenomenological experience of our bodies is affected by what's going on as we examine the neurophenomenology of the brain.

Michael Egnor:

As we've talked about, I have enormous sympathy for the idealist perspective on things. But particularly in physics, I think it's a compelling framework. My own perspective has been Thomas-Aristotelian. And from the Thomas-Aristotelian perspective, I think there's also a great deal of sympathy for the idealist way. I mean, people have said Aristotle was Platonus of sorts. I mean, he didn't completely break for Plato.

Michael Egnor:

One of the things that made me a total missed was in neuroscience, we see a very clear distinction between the dependence of different aspects of the mind on the brain. Perceptions, sensation, memory, emotion, very clearly depend on the brain in almost total way.

Michael Egnor:

That is that if someone cuts my optic nerves, I will not be able to see. Period. There's no way of if, ands or but. Somebody gives me a shot of adrenaline. I will feel anxious or fearful or excited. No ifs, ands, or buts. That's just what happens.

Michael Egnor:

And on the other hand, there are aspects of the mind that don't seem to be nearly as tightly yoked to brain function, particularly the intellect and the will. And as an example of that, one can consider phrenology which was a science of reading the bumps on the skull back in the 19th century and early 20th century. And it was a little crazy, but it wasn't as crazy as we think it was.

Michael Egnor:

They didn't have any radiology. So, they couldn't actually see the brain. They didn't have CAT scans. So, the bumps on the skull was about the best they could do. And it was known at that time that certain functions like movement of the limbs, or sensations or vision, was observed by specific regions of the brain.

Michael Egnor:

So, the phrenologist just made the assumption that everything was observed by a specific region of the brain. So, mercy or justice, or all sorts of personality traits were also in the brain in certain locations. And that failed. Of course, that's not the case.

Michael Egnor:

So, I can point to the little group of neurons that make my thumb move, but I can't point to any group of neurons that makes me able to do square roots. There's a difference between the intellect and, as it turns out, the will and the other properties of the mind in the neuroscientific world. And the difference is striking.

Michael Egnor:

Wilder Penfield, who was one of the pioneers in epilepsy surgery, asked a question, I'm paraphrasing, many years ago. He asked, why are there no intellectual seizures? Seizures can have practically any content you want to think of.

Michael Egnor:

I mean, you can have movement. You can lose consciousness. You can have emotions. You can have sensations. You can even have thinking about concrete objects, forced thinking it's called, but you never have calculus seizures. You never have a seizure where you have to take second derivatives, whether you want to or not. You also never have morality seizures. You never have seizures where you compulsively recite the 10 commandments.

Michael Egnor:

And Penfield says, "Why not? Why aren't there intellectual seizures if the brain is the source of the intellect?" And of course, Aristotle and St. Thomas, thousands of years ago, said, "The intellect is not material. It doesn't come from the body. It's a separate thing, whereas sensations and perceptions do."

Michael Egnor:

And I was amazed at how neuroscience backs that up. And that is actually probably the main reason that I'm a Thomist is that Thomism is so beautifully described modern neuroscience. But I wanted to get your perspective on that perspective.

Bruce Gordon:

Well, there's a lot about that that seems absolutely right to me. Of course, I think you would also admit that intellectual capacity can be and is affected by what happens to the brain.

Michael Egnor:

Without question.

Bruce Gordon:

So, you can shut down intellectual capacities by doing certain things to the brain. But at the same time, yeah, there are no intellectual seizures as Penfield remarked.

Michael Egnor:

What you might say is that the functioning of the brain is necessary for intellectual activity, but not sufficient for it. Whereas, it is necessary and sufficient for perception, sensation, memory, emotion, things like that.

Bruce Gordon:

Well, it is necessary and sufficient in the embodied state, which points to some of my reservations about going full on Thomas about the nature of the human person in that regard.

Bruce Gordon:

I do think there is evidence from near-death experiences and out of body experiences in which you've got veridical perception of the environment while the body is in an unconscious state or even dead and provide indications and of course near-death experiences in the blind as well where perception is restored apart from the body.

Bruce Gordon:

So that, we're not observing a situation in which we've got a merely rational soul that survives death, but a soul, all of the capacities of which are restored and perhaps even heightened in terms of the vividness of their experience. This is what we're seeing from the anecdotal near-death experience literature.

Michael Egnor:

My understanding of the near-death literature is, as you've said, that the perceptual powers in that state are very much heightened. And not only heightened, but they're different. An example would be a woman named Pam Reynolds. She underwent aneurysm surgery in Phoenix with Dr. Robert Spetzler who is a very famous and aneurysm surgeon.

Michael Egnor:

Her heart was stopped deliberately. She was put on cardiopulmonary bypass, so they could stop the blood flow to her brain for about 30 minutes while they fix the aneurysms after they had cooled her body down, so she wouldn't have brain damage. And during this process, she reported being aware of what was going on in the operating room, even to the point of reading the serial numbers on the instruments.

Michael Egnor:

And she said that she went up to the ceiling, and which a lot of people described when they've had experiences with near death that they'll pop up to the ceiling. But of course, from the ceiling, you couldn't read the numbers on the instruments with normal vision because they're tiny.

Michael Egnor:

So, it's a different kind of perception. So, I don't think that near-death experiences contradict the Aristotelian Thomistic understanding of the mind. It simply says that the substituent soul has a different kind of perception, which of course St Thomas would say, "Yeah, sure, angels which are separated minds have a perception." It's just different from what we have.

Bruce Gordon:

Well, that brings me to some questions about Thomistic hylomorphic dualist position with respect to the constitution of the human person. And I mean, I'm sympathetic to duality of structure and content, if you like, in an idealist phenomenology.

Bruce Gordon:

But when it comes to understanding the constitution of the human person, I mean, if we go back to Aristotle, and we can regard Thomas's baptizing Aristotle and injecting an element of Plato in there through Augustine to try to preserve a Christian metaphysics of the human person because it's not possible in straightforward Aristotelian metaphysics.

Bruce Gordon:

The soul doesn't exist apart from the body in Aristotelian metaphysics. It's the form of the body. And it is that form matter holomorphic composite that constitutes the human person. So, human beings then don't possess an immortal soul.

Bruce Gordon:

The form departs and the body dies, and that's the end of the individual. Of course, Aquinas said, "No, that's not what happens. We know that's not what happens in the Christian understanding of the human person."

Bruce Gordon:

So, he has to regard the Aristotelian form as substantial in some way. He has to Platonize it, so it survives the dissolution of the body. But nonetheless, correct me if I'm wrong, he emphasizes the substantial unity of the human person as an integrated form matter composite.

Michael Egnor:

Yes. And I think he put the immortal power of the soul, so to speak, in the fact that the soul had intellect and will, that the human soul in it and intellect and will. So, it would not cease to exist when the matter of the body became disorganized because it was never completely. It wasn't from the matter of the body, whereas the soul of an animal that didn't have an intellect and will would cease to exist when the matter of the animal became disorganized.

Bruce Gordon:

That was his view. And I don't see it as necessarily following. Just because you've got a sensate soul doesn't mean that you haven't got a memory and a sense of being that would allow the persistence of the soul independent of the body. I don't see sensate souls as necessarily being dissolved with the dissolution of the body. I don't think that follows as a necessary consequence.

Bruce Gordon:

What I'm more concerned about though with the Thomistic hylomorphic dualism is in the embodied state, right? It is the composite that is the person that thinks that that is the entity that is whole. I'm trying to get it, the idea that the thinking subject in the Thomistic dualist case is the hylomorphic fusion of the soul and the body. But in the disembodied state, it's just the soul.

Bruce Gordon:

So, it would seem that Thomas's metaphysics isn't really hylomorphic and Aristotelian. It's a good portion of the way to being a form of substance dualism in which the soul is the true expression of the person that it can exist independently of the body.

Michael Egnor:

Yes, I think that's always been a tricky aspect of Thomistic dualism is the immortality of the soul that it's a subsistent form. But, of course, St. Thomas and Aristotle would say that the form and matter of the body are not substances in and of themselves. They're principles of intelligibility and principles of individuation.

Michael Egnor:

So that, the notion that they're separate substances, I think St. Thomas would say that the human soul can exist apart from the body, but that's not its natural state. That's not the way it was created or meant to exist. And I guess it would be a substance in that capacity. But normally, it's not a substance. It's a principle of the body itself. Matter and form is the substance in the living human being. There's a little tap dancing going on there.

Bruce Gordon:

Some tap dancing that I don't find terribly convincing.

Michael Egnor:

Right. Maybe, if I danced faster, it would be. Yes, I would agree. But the difficulty with idealism in this context is that, first of all, it's enormously powerful and beautiful way of looking at things. And I think that it is basically true. But there is a granularity to the Thomistic view that to me comports beautifully with neuroscience in ways that idealism... it's almost too vague.

Michael Egnor:

As I said, idealism doesn't speak to Penfield's question, why are there no intellectual seizures? And Thomism speaks to it eloquently. That's what gets me as a practicing scientist, at least a biologist, as opposed to a physicist. Aristotle and St. Thomas have a lot more to say to me than Plato does.

Bruce Gordon:

Or Berkeley.

Michael Egnor:

Or Berkeley, yes.

Bruce Gordon:

Well, perhaps, I don't find the idea that the intellect in particular is less tied to the body than the senses particularly a reason to embrace a Thomistic hylomorphism as over against idealism. I think, certainly, there's an interesting correspondence in the domestic case. I don't see it as something that lacks sense from an idealist perspective either because consciousness is integrally tied to the senses in the embodied state, whereas, the rational processing need not be.

Bruce Gordon:

What I find puzzling in the Thomistic sense is the perpetuation and heightening of the sensory capacity apart from the body in near-death experiences when I don't think that's what Thomas would have expected. I think he would have expected the rational intellect to descend into sensory darkness.

Michael Egnor:

Well, I don't know. I mean, certainly, St. Thomas wrote and thought a great deal about angelic intellects, angelic minds. And angels are perfectly capable of perceiving things. They perceive in a much, much higher level than we do. But they perceive differently. They have a different way of knowing.

Michael Egnor:

St. Thomas never spoke about near-death experiences that I know of. But my suspicion is that he would say that in the near-death state that the human mind is acting more like an angelic mind because it's disembodied.

Michael Egnor:

The other perspective on this that I think is very, very interesting is that one may say that of course when a person reports what he experienced in a near-death experience, he's always doing the reporting from an embodied state.

Michael Egnor:

He's looking back on what happened and trying to explain it using language that makes sense as an embodied person. And maybe that language describes as perceptual an actual experience that was not perceptual in a purely materialistic way. That's the most sense you can make of it.

Bruce Gordon:

Perhaps, it points to the fact that finite beings must experience things from a finite perspective which implies a locational one, in a way. And I see this as fitting well with an idealist conception of what goes on, such the death is not so much a separation of the soul from the body, so much as a change of perceptual environment in which the initial embodied state is left behind.

Bruce Gordon:

And there's another state of consciousness that persists, but the thing that is consciousness remains constant throughout. And in fact, if you want to take it to a full-blown Christian metaphysics, you've got an experiential environment 1.0, 2.0 and 3.0. That would be associated with the initial experience of this world, then death. I wouldn't necessarily want to describe death as a disembodied state. Maybe it's an utterly bodied state, and then the resurrected state.

Bruce Gordon:

So, anyway, I think there's a seamlessness of the metaphysics of the subject in idealism that's easy to understand. That is certainly very difficult if you're a physicalist. And if you're dualist, it involves other puzzling aspects that we haven't gotten into.

Michael Egnor:

Another example that I think is really fascinating of the salience of the Thomistic view of psychology is the work of Roger Sperry. Sperry was a neuroscientist who studied split brain surgery patients. These are patients who had epilepsy and whose corpus callosum, which is the fiber bundle that connects the two hemispheres of the brain, were severed to control the epilepsy.

Michael Egnor:

And he studied these people in great detail and won the Nobel Prize for his work. And he found that there was a perceptual splitting that often occurred, where, for example, the right hemisphere would perceive the visual field on the left side of the visual field, and vice versa for the left hemisphere. And the right arm was controlled by the left hemisphere, right arm controlled by the right opposite hemisphere, and so on.

Michael Egnor:

There are all fascinating but very subtle perceptual changes that went on, and he didn't comment much on this. But if you look at his work, he didn't find there was any splitting of the intellect or of the will, which goes along again with Penfield's observation about no intellectual seizures.

Michael Egnor:

And from a domestic standpoint, Sperry's results are very understandable. The material brain was cut. So, you're going to have sensations and perceptions and things like that are also cut and can be divided. But you can't divide the intellect and will in the same way.

Bruce Gordon:

What about the memory?

Michael Egnor:

Sperry didn't look at memory. Penfield looked at memory. Penfield found that when he stimulated the brain, he could easily stimulate memories. He had thousands of memories that he stimulated.

Michael Egnor:

And curiously, although I think there is some debate about this within the Aristotelian-Thomistic world, memory is considered part of the sensitive soul, part of the material soul, not part of the intellectual, rational soul. So, the memory is very easily elicited. And seizures can involve memories.

Michael Egnor:

And people would argue that when you remember something abstract, you can say, "Well, I remember calculus." Doesn't that mean that calculus must be sensitive. And people would argue that remembering calculus is simply knowing it. It's not the same thing as memory like remembering your grandmother's face, remembering the smell of apple pie, something like that, which is a different thing.

Bruce Gordon:

Our identity and our sense of self is intimately bound up not just with rational memory or knowledge but with sensory memory as well.

Michael Egnor:

Sure, absolutely.

Bruce Gordon:

And certainly, that is something that we would carry with us presumably through death in a near-death experience or a permanent death experience. And I'm just wondering in that respect, and I'm coming back to a theme that I mentioned earlier, Thomas would seem to think that animals do not ever survive death.

Bruce Gordon:

Their sensate souls are so integrally bound up with their bodies, that the dissolution of the body means the end of them. And again, I don't see that necessarily as following, metaphysically speaking from-

Michael Egnor:

The way I would understand it is that if one understands the soul as the substantial form of the body, the soul is essentially an organizational principle. And when the matter of the body is disorganized, then the organizational principles is gone.

Michael Egnor:

Whereas, there are aspects of the human soul that are not linked to matter in the same way that are not organizational principles of matter. And the human soul thereby is capable of surviving the disorganization of the body.

Michael Egnor:

I see it as a matter of organization, disorganization, that when you disorganize an animal, there's nothing left. Where, you disorganize a human, and you have the intellect and will, which were not part of the bodies organization to start with. So, they aren't lost when you disorganized the body.

Bruce Gordon:

Well, I think that difference... would you say the human soul then in Thomistic perception is a rational, substantial, formal soul?

Michael Egnor:

Yes.

Bruce Gordon:

Of course, this is getting back to, the form is the principle of the organization of the body, and the combination and forming the substance. Apart from human beings then, there has to be this rational substance that is part of humanity, but you see as not being part, in any respect or at least Thomas didn't, of lower animals.

Michael Egnor:

Correct. I think a nice way that I think of is true to what Aristotle and St. Thomas felt was that animals cannot think of things that are not concrete, that animals can only think of things that are perceptions. But they can't think without perceptions.

Michael Egnor:

Humans can think without perception. So, I can think of the square root of negative one as a concept, but there is no object in the world that is the square root of negative one.

Michael Egnor:

A very good example is my dog loves his dog biscuits. It's all he thinks about. He wants more dog biscuits. He loves them, but he never thinks about nutrition because nutrition is abstract. And I think that was the big distinction that animals must have concrete objects to think about. Humans can think without concrete objects.

Bruce Gordon:

And I would still say, the grounds for concluding that there is no substantial animal soul, while I understand the domestic reasoning and the constraints that are placed upon it, don't seem definitive to me. And of course, if one is not a hylomorphic dualist of a domestic variety but rather a substance dualist or an idealist, of course none of those conclusions follow.

Michael Egnor:

True. I believe that St. Thomas believe it. Certainly, modern Thomas have said, I think St. Thomas himself believed it, that if God chose, he could recreate the animal soul. So, if you want to be with your distinct copy in heaven, you could if God is willing to do you a favor. There's no reason why the animal can't be recreated. However, the soul is lost at the disintegration of the body in the animal.

Bruce Gordon:

You wind up with the same sorts of questions that physicalists who are Christians and see us as being reconstituted at the resurrection but not existing in between. You wind up the problems of gappy existence. In this case, for animals.

Michael Egnor:

Sure. And I do agree with you. There's a paucity of rigor in this. It doesn't have the kind of rigor we'd like to see. But the Thomas view is that due to the rational abstract nature of the human soul, there is a power in the soul that tends to make it immortal in a way that an animal soul lacks.

Bruce Gordon:

And I understand that's what's being said, yes.

Michael Egnor:

So, anyway, for me, that's a lot of the appeal of Thomism is that I see it remarkably corresponding to neuroscience. It did take my breath away, the idea that St. Thomas presaged, what Penfield found and what life had found or what Sperry found, what the phrenologists ultimately found. All of that was said a thousand years ago.

Michael Egnor:

Well, Bruce, it's been a privilege. It's been fascinating to talk with you. I'd love to do this again. We've opened up avenues, each of which could take up many, many podcasts. So, thank you very much for speaking with us.

Bruce Gordon:

You're quite welcome. And I'm happy to continue the conversation when we have opportunity to do so.

Michael Egnor:

I'd love to do so. Thank you so much. And to our listeners, thank you for listening to Mind Matters News.

Announcer:

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