

The Physics of a Miracle

The Post-Resurrection Body of Jesus from the Perspective of Quantum Theory

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It has often been noted that Christianity is more orthodox than orthoprax, being concerned primarily with a doctrine of faith, and secondarily with the practice of rituals. This might seem to generally emphasize the spiritual over the physical, but Christianity does nonetheless place a clear importance on the concept of the physical body. The most obvious example, of course, is the historical existence of Jesus and the death and resurrection of His body. In this essay I wish to focus on one particular aspect of the Resurrection. More specifically, I wish to investigate the fact that Jesus was not recognized even by His own disciples only a few days after His crucifixion.

There are at least three passages that refer to this lack of recognition explicitly. The first is Luke 24:13-32, which recounts the two disciples' encounter on the road to Emmaus...

“While they were talking and discussing, Jesus himself came near and went with them, but their eyes were kept from recognizing him”

The second passage is John 20:11-18, which describes Mary Magdalene's encounter with Jesus in the tomb...

“When she had said this, she turned around and saw Jesus standing there, but she did not know that it was Jesus.”

The third passage is John 21:1-14, which describes the encounter of seven disciples with Jesus at the Sea of Tiberias...

“Just after daybreak, Jesus stood on the beach; but the disciples did not know that it was Jesus.”

For the sake of brevity, I will refer to this difference in the appearance of Jesus, and the resulting lack of recognition by Mary and the disciples, as the “post-resurrection transfiguration” of Jesus. This of course is not to be confused with the Transfiguration of Jesus, in which Peter, James and John see Jesus in dazzling white clothes talking with Elijah and Moses. The small risk is worth taking because, as we will see shortly, the word “transfiguration” most accurately describes the phenomenon that we want to discuss. Moreover, some biblical

scholarship interprets the pre-resurrection Transfiguration as a kind of pre-figuration of the resurrected body of Jesus. It is therefore appropriate to associate the two miracles via the same terminology.¹

What is important to note is the physicality of this difference in appearance. It is not merely a spiritual transformation, or a psychological transference, but a physical transfiguration. And yet no one understands this to mean that Jesus “disguised” Himself by changing His physical features. The disciples did not fail to recognize Jesus because he was taller or had a different nose. There is no mention in the Gospels of Jesus’ features changing at all, only that the people looking at Him did not recognize Him. When they do finally recognize Him, there is no mention of His features changing back to their original form. It is rather something Jesus does or says that effectively opens their eyes.

The assumption, then, is that Jesus’ basic physical features remain the same. It is not a new body regenerated from Heaven, but the same body resurrected from the grave. The clearest demonstration of this is John 20:27, in which Jesus invites Thomas to touch the wounds from His crucifixion, as proof that it really is Jesus’ body. How is it, then, that Jesus was not recognized even by the people who knew Him best? How could His body be the same, down to His wounds, yet different to the point of being unrecognizable?

In fact, this notion of a physical object “embodying” more than one set of observable features, even conflicting features, exists in the physical sciences. More specifically, it is a central feature of Quantum Theory. This key tenet of modern physics states that physical, material reality is fundamentally probabilistic. That is, it is described mathematically by a probability distribution, called the “wavefunction,” which represents a range of possible states in which the object or system can exist. Classical physics understands any physical object as having discrete properties that can be represented with single numbers: 10 meters in front of me, 55 miles per hour, 25 degrees centigrade... By contrast, when one calculates the wavefunction for an object, one obtains a range of numbers, with associated probabilities of existence. For example, if we use quantum mechanics to calculate the position of a subatomic particle, the answer will not be simply “here” or “there,” but something like, “there is a 50% probability of it being here, and a 50% probability of it being there.” But these are not merely states in which the object *may* or *may not* exist. The wavefunction is not used to calculate where something *isn’t*, but rather where something *is*. These two possibilities (or probabilities) define where the particle actually is at a particular moment in time. In other words, these multiple positions make up the complete position state (the wavefunction) of the particle. Similarly, the state of any physical object or system is comprised of multiple states and their corresponding probabilities.

¹ My thanks to James Williams for bringing this interesting detail to my attention.

It is only when an observation or measurement is made that the wavefunction “collapses” to a single observable state. Because a person cannot observe a probabilistic state – he/she cannot see an object in more than one physical state at the same time – the system suddenly stops being probabilistic when it comes in contact with an observer. The state to which the system collapses is completely arbitrary. Rather than being a function of causal and predictable laws of nature, the observed state of a system is strictly a matter of chance (i.e. probability). One can therefore never be certain as to which state a system will collapse, and this is expressed mathematically by Heisenberg’s Uncertainty Principle. It is important to understand that this uncertainty is not due to any limitations in measurement technology or in the imagination of the observer. It is a reflection of the probabilistic nature of physical reality. It is essentially a property of the observability of nature, and is ultimately the defining characteristic of quantum theory. The more uncertainty there is in a particular system, the more it is considered “quantum mechanical.” Consequently, if two separate measurements are made on a particular physical system, even under absolutely identical conditions, the observable results may be completely different.

One can begin to see the parallel between this probabilistic description of nature and the nature of Jesus’ post-resurrection transfiguration, and it is tempting to try to use the former to help us understand the latter. The question of how Jesus can generate two different appearances from the same body seems to be answered in a way by Quantum Theory, which describes how the same object embodies multiple states and, therefore, the capacity for different observations. Unfortunately, this analogy is doomed to fall short for two fundamental reasons. Firstly, the conditions in which Jesus is observed by Mary Magdalene and His disciples are not what physicists would call “quantum mechanical.” The probabilistic nature of physical reality only manifests itself at the level of elementary particles – subatomic or nuclear particles which are inherently difficult to measure. On a macroscopic scale, such as the scale of a human body, the probabilistic qualities of nature (defined by the level of “uncertainty” in the system) become trivially small. The classical laws of physics still work on this larger scale because the quantum mechanical effects can, for all intents and purposes, be neglected.

The second reason standard Quantum Theory cannot help us to understand the post-resurrection transfiguration of Jesus is because of the way it understands probability. As noted above, the collapse of the wavefunction is completely arbitrary, independent of any causal relations. Therefore, a probabilistic world is essentially a random world. Many physicists, including some of the founding fathers of Quantum Theory, found this implication of the theory especially disturbing. Similarly, we should be very hesitant to apply this idea to the transfiguration of Jesus. While we can only say so much about this post-resurrection miracle, we have no reason to suspect that it was either random or arbitrary.

So it would seem after all that Quantum Theory, as understood by most physicists today, has little to contribute to such theological investigations. However, there does exist another interpretation of Quantum Theory that may prove to be more useful for our purposes, precisely because it redefines the concepts of probability and uncertainty.

At the 2009 COV&R conference in London, I introduced the concept of “triangular observation,” and used it to formulate what could be called a mimetic understanding of quantum mechanics.² It hinges primarily on the recognition that science (both classical and modern) has always assumed a direct linear connection between an observer and an object of observation. Any physical object or system is considered to have an inherent “observability” or “measurability” – it has physical properties that we as observers act on directly in the process of measurement. Scholars of Mimetic Theory will recognize this description immediately if we simply replace the word “observation” with the word “desire.” The classical model of human desire is a linear relationship between the desiring subject and the object of desire, which is thought of as having a certain “desirability.” Mimetic Theory redefines the structure of desire as a triangular relationship between subject, object and model. In precisely the same way, the hypothesis of triangular observation redefines the structure of observation as a triangular relationship between observer, object and model. Like desire, observation always requires a model. Moreover, we are not describing a mere analogy between observation and desire. In both cases the terms “model” and “subject/observer” refer to subjective human beings, so that the triangular structure of observation is a mimetic relation in the fully Girardian sense.

Like traditional Quantum Theory, we can still speak of probability and uncertainty. But these no longer refer to an inherent randomness in nature. They are rather the result of the ambiguity inherent in any mimetic human relationship. As two or more people become mimetically engaged in Girard’s double-bind, in which each becomes the other’s double, the situation tends toward a state of undifferentiation. Beyond a certain level of mimesis, how can one tell who is the subject and who is the model? There is an “uncertainty” imbedded within the relationship. But unlike Heisenberg’s uncertainty or the collapse of the wavefunction, this aspect of the relationship is not arbitrary or discontinuous. It flows directly from the logic of mimetic “interdividuality” between the subject and the model. As in traditional quantum theory, this uncertainty determines the degree to which a system is considered quantum mechanical. The more intense the mimetic relation between the observer and the model, the greater the uncertainty in the triangular structure of observation, and the less classical the results of that observation may be.

² Pablo Bandera, “The Anthropology of Observation: The Conceptual Framework for a Mimetic Understanding of Quantum Theory,” Conference of the Colloquium on Violence and Religion, London, 2009.

This also assumes that the term “observer” refers to a subjective human person. Traditional Quantum Theory already distinguishes itself from classical physics in claiming that the state of a physical system is somehow a function of the observer that collapses the wavefunction. Triangular observation suggests that this only makes sense if that observer has the quality of self-awareness, or more correctly transcendence. The observer must be capable of observing himself within the situation, in relation to the object of observation. This is the unique quality of human beings.

The result of all this is a sort of entanglement at an ontological level between human subjectivity and physical objectivity. More specifically, triangular observation suggests that, while the laws of physics are generally consistent, the way these laws manifest themselves in nature is different in the presence of human subjectivity. The birth of humanity in the world effectively opened up new possibilities for nature that did not exist before. One can think of it as a new dimension – the dimension of human subjectivity – in which the laws of physics can operate, so that the same laws produce new behaviors in nature. We call these strange new behaviors “modern physics” because we only discovered them about 100 years ago. But they share their origins with those of the human race. When humanity was born, so was quantum mechanics.

We therefore have an understanding of Quantum Theory that is also, to some degree, an understanding of the human. In order to see how this might fit into our discussion of the post-resurrection transfiguration of Jesus, we need to go back to theology – a theology informed by mimetic anthropology.

The relationship of Jesus to the Father can be understood as an example of perfect mimesis, or perfect positive mimesis, otherwise known as love. The Father is the perfect model for the Son, who gives Himself willingly and completely to the Father. However, unlike most human relationships, in which mimetic desire leads to rivalry, undifferentiation and uncertainty, the relationship between Jesus and the Father is perfectly clear. It is mimetic to the point where the Son and the Father are “of the same substance,” beyond even the most extreme consequences of undifferentiation. And yet there is never any confusion as to who is the subject and who is the model.

Paradoxically, this sharing of the same substance is strengthened rather than dissipated by the clear subject/model distinction. The degree to which they are the same matches the degree to which they are distinct. Whereas mimetic rivalry leads to undifferentiation, a mimetic

relationship completely free of rivalry seems to grow into a kind of sublime differentiation. The Son and the Father are not doubles attempting to acquire each other's being, they are distinct persons sharing to the fullest extent each other's being. There is therefore no ambiguity in this mimetic relationship – Jesus is not a model for God, God is the model (the sole model) for Jesus.

This unique relationship has a special significance in the hypothesis of triangular observation. Physical reality is quantum mechanical to the degree that it is determined by the mimetic uncertainty between the observer and the model, which increases as the mimetic relationship between the two becomes more intense. By contrast, the lack of ambiguity in Jesus' relationship with the Father means that the quantum mechanical uncertainty is zero, despite the fact that this relationship is maximally mimetic. This is precisely the inverse of the normal relation between human subjectivity and physical reality. It is nothing new to say that Jesus had a unique relationship with the Father – the perfect subject imitating the perfect model. What is important to realize for our purposes is that this unique relationship between Jesus and His model implies a unique relation between Jesus and physical reality.

According to Mimetic Theory, the defining characteristic of the human being is the capacity for mimetic desire. The crucial moment in which our first ancestors crossed the threshold into humanity was the moment that their acquisitive needs took on a transcendent quality defined by the Other – when instinctual imitation became mimetic desire. The hypothesis of triangular observation suggests that this moment was also the opening of a new dimension that resulted in a kind of “transfiguration” of physical nature, which we now call “quantum mechanics.” Jesus has been understood as representing a *new* kind of human being: a “new Adam.” He is, of course, uniquely perfect in His humanity. But this does not mean that he is a perfect example of humanity, but rather a new example for humanity to follow. He is a human being that relates to the world in a fundamentally different way, characterized by a different subject-model relationship. So, if the introduction of the first Adam resulted in a transfiguration of physical nature, then it is only reasonable to suppose that the introduction of a *new* Adam would result in a *new transfiguration* of physical nature.

Like the first transfiguration, this second one would most likely not involve a wholesale change in the laws of physics on some global scale. It would allow for differences in the behavior of nature in the presence of this new subjective observer, in relation to Him. For the rest of humanity, the world would continue to operate as before, as their relation to nature would be unchanged, determined by the same imperfect mimetic relationships.

But what would happen if an old observer were to observe this new human? By entering into a mimetic relationship with Jesus, another person would participate to some degree in the new triangular structure that has transfigured physical reality in relation to Jesus. Now, in order to enter into a mimetic relationship with nature, one must first have had a mimetic relationship with a model. Even if this connection is an existential one stretching back to the collective origins of humanity, the first experience of mimesis is the relation with the Other. Therefore, the first experience of the new transfigured reality would have to be via an experience of Jesus. By “experience” we mean in this case the observation of physical reality. A person would essentially catch a first glimpse of this new physical reality in his/her observation of the physical reality of Jesus – i.e. in Jesus’ body. In other words, the first experience of the new reality opened up by the presence of Jesus would most likely be the observation of a physical transfiguration of Jesus’ body.

This brings up a rather obvious question: If this transfiguration of Jesus’ body is ultimately the result of His unique relationship with the Father, why does it only manifest itself *after* the resurrection? Didn’t this relationship exist before the resurrection as well? There is in fact nothing in the Gospels to suggest that there should be any difference at all between the pre-resurrection and post-resurrection body of Jesus, except that it was only the latter that was not recognized by Mary Magdalene and the disciples. This implies that there was indeed some sort of difference, if not in Jesus’ body itself then in the relation between it and external observers. But if the body remained the same, then from what could this difference have been derived?

The only clue is found in John 20:17. Immediately after Mary recognizes Jesus in the tomb, He says to her...

“Do not hold on to me, because I have not yet ascended to the Father...”

Jesus makes no such comment or prohibition anywhere else in the Gospel. He clearly was not yet ascended to His Father before the resurrection, and yet there was apparently no issue with hugging Him, washing His feet or helping Him up from the ground. Now this same condition is used as the basis for a new restriction pertaining to His physical body. So there is a difference, and it has something to do with Jesus’ relation to the Father. This is all we can glean from the Gospels, but it is enough to support what we have said thus far with regard to triangular observation. The transfiguration of Jesus is a transfiguration of physical nature that is ultimately the result of His unique relationship with the Father, which is unique in such a way as to produce this effect only after the resurrection.

What would this new transfiguration look like? This is a question that science cannot answer, not because it is outside the scope of scientific enquiry, but as a consequence of the logic of triangular observation. Classical physics can be derived from quantum physics – it is basically what quantum mechanics looks like on a macroscopic scale. Quantum mechanics, however, cannot be derived from classical physics. There is nothing in classical physics that would suggest quantum mechanical behavior. The birth of quantum mechanics, therefore, was something unforeseeable, something radically new. So it was with the first transfiguration of nature, and so it must have been for the second transfiguration brought about by Jesus after the Resurrection.

As an analogy, imagine a two-dimensional world, in which all physical reality exists on the surface of a flat sheet of paper. There exist the concepts of length and area, but there is no notion of volume. Now suppose the birth of a new form of humanity opened up a third dimension for this world. For the first time it would be possible to observe, for example, a cube. What would an inhabitant of this previously two-dimensional world make of this strange object? In time, after studying its characteristics, the person may learn that, when projected a certain way onto a two-dimensional surface, the cube becomes the old familiar square. In other words, the person may eventually come to recognize the “squarishness” of a cube. But his first impression of this six-sided object would certainly not be that it had anything to do with a square. The radical otherness of this new dimension would make it, at least at first, unrecognizable.

In the same way, the first experience of quantum mechanical behavior appeared as an unexplainable violation of the laws of physics. This first experience was the measurement of a type of thermal radiation called “blackbody radiation,” and it contrasted so deeply with any previous experience that it was dubbed the “ultraviolet catastrophe.” No one could have looked at the results of this experiment and recognized them as having anything to do with blackbody radiation. They would, however, have seen these results as a measurement of some other very different form of radiation, as they were still expressed in terms of parameters like wavelength and radiant intensity. Similarly, with the second transfiguration brought about by Jesus, people could recognize Him as a human being, but a very different human being.

Consequently, while the hypothesis of triangular observation cannot tell us the precise character of this new transfiguration of physical reality, it does allow us to make two basic statements about it. Firstly, the initial experience of this new transfiguration was most likely in the observation of the transfigured body of Jesus. Secondly, whatever this transfiguration actually looked like, it was necessarily, at first, unrecognizable.

This happens to be everything said about the post-resurrection transfiguration of Jesus by the Gospels themselves. They say nothing about what Jesus looked like or why He should have looked different in the first place. We know only that it was the resurrected body of Jesus that was somehow the same and different, and different in such a way as to be, at first, unrecognizable. We therefore have arrived at a complete description of this post-resurrection miracle, exactly as it is described in the Gospels, except that we have described it entirely in terms of the principles of the triangular interpretation of Quantum Theory.

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Now, it is obvious that the use of scientific principles in discussions of miracles of faith may seem in bad taste to both scientists and theologians. Consequently, any attempt to classify this essay as an effort in either science or theology may be problematic. Let me conclude, then, by stating what this essay is *not*. It is not an attempt to *explain* the post-resurrection transfiguration of Jesus “scientifically.” That is, we have not tried to reduce a miracle to a set of physical principles or processes. Rather, we have described this post-resurrection miracle within the context of a science that takes humanity and human relationships seriously. Unlike most other mathematical or empirical sciences, triangular observation does not reduce the human (much less the divine) to pure physics. It essentially elevates physics to include the reality of human subjectivity, which in turn is described in terms of mimetic relationships. This makes it possible to “explain” the transfiguration of Jesus without explaining it away. It explains *what* this transfiguration was physically, and *how* it manifested itself in nature. It does not explain *why* it happened, and therefore preserves the mystery of faith that characterizes this event as a miracle in the first place.

In this way, triangular observation provides a new basis for conversation between the physical sciences and theology. These two fields now share a truly common ground, namely the sphere of mimetic human relationships. Mimesis determines the relation between the physical and the human. Mimesis determines the relation between the human and the divine (as expressed, for example, in Matthew 25:40). This seamless continuity suggests an ontological connection between the physical and the divine that goes beyond the static relation of creation to creator. One could even speak of a “hypostatic union” of the physical, the human and the divine – a not just triangular but Trinitarian interpretation quantum mechanics.

But perhaps that is the subject of another paper.