Logic of Mystery: Reading Wittgenstein in parallel to Orthodox theology and quantum theory

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Theology and philosophy are predominately found within an analytical context, that is, a context within which a 'rigorous' system of thought is built from one element to another element. In parallel fashion, the same can be said regarding classical physics and its mechanical casual movement from one point to another point. Yet there are voices stepping out of these systems and moving towards a more 'living' thought. The move toward the 'living' can be found in post-classical physics with the inclusion of the observer, but long before this shift in physics there is the long standing Orthodox theology, and in between there are well known yet often misunderstood philosophers, such as Ludwig Wittgenstein. These 'living' voices want to draw us away from inert abstract systems back to ourselves and thereby back to humanity.

Introduction

Why is there a seemingly insatiable desire for templates behind our lives to secure knowledge, the ultimate physical building blocks of reality, causality, and perhaps even determinism? This yearning consumes much of Western philosophy, theology, and science; and frequently Aristotelian logic drives this mode of thought. There is no question regarding the general value of such logic, but to what extent can it be questioned? Archbishop Lazar Puhalo certainly does bring questions when he states: 'The Platonism and quasi-Gnosticism of Augustine of Hippo distorted theology in the West into a system of philosophical speculation, and forever separated it from the existential, living theology of Orthodox Christianity'.[1] Likewise, as noted by Léon Rosenfield in conversation with the Japanese physicist Hideki Yukawa: 'I asked Yukawa whether the Japanese physicists had the same difficulty as their Western colleagues in assimilating the idea of complementarity … He answered "No, Bohr's argumentation has always appeared quite evident to us;… you see, we in Japan have not been corrupted by Aristotle"'.[2]

Certainly, in our daily lives it can be very useful to check a barometer and a thermometer. We see the air pressure and temperature falling, dark clouds forming in the sky, and decide that there is a good reason to bring one's jacket and umbrella

[1] Archbishop Lazar Puhalo, *The Evidence of Things Not Seen: Orthodoxy and Modern Physics* (BC, Canada: Synaxis Press#, 2013), 16.

[2] Léon Rosenfeld, 'Niels Bohr's Contribution to Epistemology', *Physics Today* 16 (1963): 47.

for the day. We are obviously familiar with causality and it is useful. Indeed, we trust the independent and encompassing nature of causality to such an extent that we trust weather reports and do not feel the need to determine our own measurements to confirm a weather forecast. Yet how far can we go? How far can we go behind and beyond a particular person and weather? Is there a more basic and fundamental structure from which we can guarantee meaning in our lives—in contrast to our ordinary lives—whether a metaphysical principle or a reduction to the smallest parts? Of course, most are happy with the weather as it is explained. However, there must be something more meaningful to reality than our lives as we see them—something measurable beyond us or, so to speak, below us. Yet the move to seek meaning and foundations outside our lives and experience can lead to misguided abstractions. Perhaps we think that although an umbrella and the weather have no need of turning to abstractions, theology must deal in abstractions. However, as Puhalo notes, 'Orthodoxy is consistently critical of all forms of reductionism, all efforts by human beings to reduce the mystery of life to some comforting abstraction'.[3]

Obviously, classical physics has been and continues to be extraordinarily useful within a casual mode of thought, as is the person who reasons that an umbrella is in order, but confusion begins and grows as this mode of thought extends further and further beyond our ordinary daily lives. For example, when physics became more mathematically abstract and particularly when dealing with quantum theory, few seemed to notice that the empirical nature of everyday measurements, such as mass and velocity, were extending beyond its reach. That is, the empirical was boldly carried into mathematical formulations to carry the empirical into hypothetical entities beyond our ordinary lives as beacons of light. The desire to do so is aptly noted by Paul Holmer: 'intelligent people confront the uncertainties of life with all kinds of talents. Some of them complicate matters by seeing the uncertainties as temporary gaps in an otherwise seamless robe of complete truth, and one is intimidated by the gallantry of the vision'.[4] The posited beacons of light may seem like a guide for progression, but they are a misconception.

Moreover, many miss the relation between Western theology and the fundamental conceptions of Classical physics. Indeed, as Paul Davies says:

> The orthodox concept of laws of physics derives directly from theology. It is remarkable that this view has remained largely unchallenged after 300 years of secular science. Indeed, the theological model of the laws of physics is so ingrained in scientific thinking that it is taken for granted. The hidden

[3] Puhalo, 41.

[4] Paul Holmer, *On Kierkegaard and the Truth*, Foreword by Stanley Hauerwas (Cambridge: James Clarke & Co, 2012), 165.

> assumptions behind the concept of physical laws, and their theological provenance, are simply ignored by almost all… [5]

Clearly, more contemporarily many scientists have jettisoned God, but the theological concepts of immutability, unchanging nature, impassibility, etc., have remained in the physical laws.

In both cases, science and theology, one can easily find a desire for certainty and security, a foundation that, in some sense, is in opposition to mystery. This point must not be misunderstood. It is not being claimed that there is no point in investigation; rather, it is being said that the assumption that with enough time and resources our investigations will discover the answer to most, if not all, mysteries is wrongheaded. In other words, I am not referring to mystery as an epistemological mystery that will be solved someday given enough resources; instead I am pointing out mystery in and of itself. As such, Andrew Louth rightly notes that 'these are not just mysteries to contemplate, still less to solve; they are mysteries that draw us into communion with God'.[6]

In contrast to Western philosophy, theology, and Classical physics, Wittgenstein, Orthodox theology, and quantum theory (e.g., Bohr and the Copenhagen interpretation) are more comfortable with mystery and do not have the similar drive to explain and justify knowledge. Obviously, these three points of view—Wittgenstein, Orthodox theology, and Bohr—are distinct from one another, yet they all converge on the importance of our lives (participation) in contrast to excessive ratiocination.

For example, Andrew Louth notes:

> Had Jesus presented himself as a philosopher, then we would naturally have looked to him for teaching on the nature of God and his relationship to the world, the nature of divine providence and so on. Had Jesus presented himself primarily as a moral teacher, then we would not be surprised if his notion of God turned on how God is a source of moral values, moral commandments and so on. And in the tradition of western philosophy, going right back to Plato, we can see the way God has been invoked as the first cause, the ultimate explanation of everything, or as One who underwrites our moral values, either by issuing divine commandments for us to observe, or as himself the 'Form of the Good', or as the One who as Creator understands in a fundamental way human nature, so that from that understanding there can be derived a set of moral values, or a natural law.[7]

[5] Paul Davies, 'Universe from Bit', in *Information and the Nature of Reality: From Physics to Metaphysics*, eds Paul Davies and Niels Henrick Gregersen (Cambridge: Cambridge University Press, 2010), 71.

[6] Andrew Louth, *Introducing Eastern Orthodox Theology* (Illinois: Intervarsity Press, 2013), 20.

[7] Louth, 17.

And, as Puhalo notes, this can 'became no more than a system of religious philosophy and a school of ethics … strangled by the dry, lifelessness of philosophical theology and the moralistic religious fascism that it produced with its speculation in ethics, collapsed into … spiritual delusion … yet emancipated by St Antony (Khrapovitsky) of Kiev'.[8] Can we say, as it were, that science saw *this* God of the theologians and were therefore right to jettison such a God and instead turn to the above mentioned godless natural laws?

Wittgenstein and Orthodox theology

To provide an idea of the discord between reductionism and abstraction, on the one hand, and Orthodox theology and science on the other, it is useful to begin with an example in philosophy. In particular, Ludwig Wittgenstein provides an interesting example since his thought shows a change from seeking an independent logical structure for language to connect to in order to secure meaning to the logic and meaning found within our language use—our form of life. That there is a shift in his work after his 'early' work (*Tractatus*) is clear. He says, 'It suddenly seemed to me that I should publish those old thoughts and the new ones together: that the latter could be seen in the right light only by contrast with and against the background of my old way of thinking'.[9] Once again, he moves from placing logic under language to seeing logic revealed and shown in our common use of language. In the *Tractatus*, he thinks of language as tied to an independent reality; he thereby thought that logical form gives meaning to signs in our language, not agreement, as connected to the logical structure of the world. Thus, language equals using a sign logically, and the consequent meaning is a result of a link between the world and the corresponding signs of language which is set in a pre-established harmony. If the correspondence between the sign and the world link, then there is meaning.

Regarding this sort of conception, Puhalo notes:

> …the Scholastic process conceived that there had to be a one-to-one correspondence between every point of codified doctrine and spiritual reality, and this led to a form of idolatry. So also, in Aristotelian science, every theory was thought to have a one-to-one correspondence in physical reality. It was supposed, therefore, in both antique physics and Scholastic theology, that reality could be rationally determined, codified, linguistically defined and visualized in a constant form.[10]

[8] Puhalo, 18.

[9] Ludwig Wittgenstein, *Philosophical Investigations*, trans. G.E.M. Anscombe (Oxford: Basil Blackwell, 1983), iii.

[10] Puhalo, 68.

Moreover, 'Truth, then, is reduced to a rational system, deduced by logic … rather than on the living encounters of human experience in the realm of faith'.[11]

In contrast to his 'old' thoughts, Wittgenstein's 'new' thoughts do not emphasize epistemology or what we can and cannot say based on an underlying logical syntax. Instead they emphasize what we do say. In his later work, *Philosophical Investigations,* he shows the shift from his former atomistic conception of meaning; in particular, he rejects the idea that a proposition is whatever can be true or false. That is, what is true or false determines what is or is not a proposition. Wittgenstein was unsatisfied with the idea that philosophers can work out the logical possibility and impossibility of what can be said. Similarly, Bohr notes, 'It is wrong to think that the task of physics is to find out how Nature is. Physics concerns what we can say about Nature'.[12]

To posit an underlying pre-established harmony or some type of conception of 'how Nature is' Wittgenstein's 'early' thought rejected metaphysics, such as 'how Nature is', and his later work also rejects metaphysics—but now *including* the underlying logical syntax. Abstractions and reductionism are rejected. Indeed, he becomes dissatisfied with the idea of any theory to explain language:

> Formerly, I myself spoke of a 'complete analysis', and I used to believe that philosophy had to give a definite dissection of propositions so as to set out clearly all their connections and remove all possibility of misunderstanding. I spoke as if there were a calculus in which such a dissection would be possible… At the root of all this there was a false and idealized picture of the use of language.[13]

He discards the idea that there is primary data upon which all else depends, such as Bertrand Russell's 'ultimate furniture of the world.' In a similar manner, as Puhalo says:

> Aristotelian Realism became the basis of religious philosophy. Where Platonic thought sought to transcend physical reality (and desire) in pursuit of a more abstract, spiritualized ideal, Aristotle espoused rationalistic logic… every teaching and dogma of the faith would be ascertained rationally through logic, and defined in minute detail… For the holy fathers, on the other hand, theology is always paradoxical.[14]

[11] Puhalo, 26.

[12] Niels Bohr, in A. Petersen, 'The Philosophy of Niels Bohr', in *Niels Bohr: A Centenary Volume*, eds A.P. French and P.I Kennedy (Cambridge: Harvard University Press, 1985), 299.

[13] Wittgenstein, *Philosophical Grammar*, ed. Rush Rhees, trans. Anthony Kenny (Oxford: Basil Blackwell, 1974), 211.

[14] Puhalo, 24.

Certainly, there are limits to knowing, but often we wrongly assume that it is the meaning that remains unclear, then we consider the possibility of thinking better, harder, longer, and with a language free of uncertainty, then we might succeed in knowing all. Regarding such thoughts, Wittgenstein notes:

> …a remarkable and characteristic phenomenon in philosophical investigation: the difficulty—I might say—is not that of finding the solution but rather of recognizing as the solution something that looks as if it were only preliminary to it... This is connected, I believe, with our wrongly expecting an explanation, whereas the solution of the difficulty is a description, if we give it the right place in our considerations. If we dwell upon it, and do not try to get beyond it. The difficultly here is: to stop.[15]

However, when he speaks of stopping philosophy, it is not philosophy in and of itself that he is stopping; rather, he is using philosophy to stop what he regards to be misguided philosophy.

The common opinion is that philosophy discovers the truth that is 'out there', a form of realism that seeks some form of reality beyond human forms of life; and these ideas are so entrenched in our thinking that one may assume that the only alternative is non-realism, subjectivism, and relativism. However, we do not need to fall into the flip side of these ideas. That is, realism and non-realism are the same coin, just the flip side of one another—both function with the idea of discovering a secure and knowable foundation—one says it is possible and the other says it is impossible. Perhaps both answers are wrongheaded, and instead of considering the possibility of a secure foundation outside our lives, or lack thereof, we should look at our lives.

Wittgenstein clears his thinking from the remnants of realism found in the *Tractatus*, where language and logic are independent of human life and people are, as it were, left out of the equation. Language is removed from the participant, and that it is not my or your language, but language itself with its own logical form—making it transcendental. In contrast, Wittgenstein's 'new' thoughts turn to the shown and revealed nature of logic and the language that we use in our everyday lives. The ideas that we are removed from the world as solitary observers and that ultimately there is a primary foundation outside our secondary everyday experience is rejected. Likewise, Kierkegaard rightly says, 'modern philosophy has tried anything and everything in the effort to help the individual to transcend himself objectively, which is a wholly impossible feat; existence exercises its restraining influence'.[16]

[15] Wittgenstein, *Zettel*, eds G.E.M. Anscombe and G. H. von Wright, trans. G.E.M. Anscombe (Oxford: Basil Blackwell, 1967), §314.

[16] Soren Kierkegaard, *Concluding Unscientific Postscript*, trans. David F. Swenson and Walter Lowrie (Princeton: Princeton University Press, 1941), 176.

What Wittgenstein also rejects, consequently, is scepticism. For the sceptic, the mind is a passive recipient of uncertain data that we cannot absolutely link with the external world. The sceptic sees the rather fleeting sense-data link between the external world and the mind and asks the obvious question: namely, 'how can I ever know or accurately describe reality with certainty?' Wittgenstein stops this scepticism in its tracks, not by winning the fight against it by positing further theories to provide a better explanation of how we can have knowledge, but by denying that the sceptics are even making any particular case.

Knowledge and certainty are found within our lives and do not rely on external strictures (e.g., simple object, innate ideas, perceptual qualities). Language and the world do not link by means of independent elementary propositions, which are either true or false. Rather, propositions are internally related and logic is based in language use; it is not that which underlies language. In contrast to Western thought, exactness is not dependent on metaphysical foundations, or a transcendental underlying structure, instead it is found in our everyday lives and conversations that show what is ruled out of our everyday language. If we focus on external foundations to gain exactness, we actually trade exactness for abstract theories.

Wittgenstein notes:

> In reflecting on language and meaning we can easily get into a position where we think that in philosophy we are not talking of words and sentences in a quite common-or-garden sense, but in a sublimated and abstract sense. As if a particular proposition wasn't really the thing that some person utters, but an ideal entity… But is the chess knight that the rules of chess deal with such an ideal and abstract entity too? (We are not justified in having any more scruples about our language than the chess player has about chess, namely none.)[17]

Likewise, Menas Kafatos notes that 'the dualistic conception of reality as consisting of abstract disembodied ideas existing in a domain separate from and superior to that of the sensible objects and movements became the most characteristic feature of Western philosophical and religious thought.'[18] Additionally, 'Khomyakov—according to description of Berdyaev—maintained that both rationalism and empiricism abstractly dissect the living consciousness and conceal from us that experience, in which is immediately given real being, the existent'.[19]

[17] Wittgenstein, *Philosophical Grammar*, 121.

[18] Menas Kafatos, *The Conscious Universe: Part and Whole in Modern Physical Theory* (NY: Springer--Verlag, 1990), 102).

[19] Rojeck, Pawel., & Oboevitch, Teresa, *Faith and Reason in Russian Thought* (Copernicus Centre Press, 2015), 13.

It is the context, the system of language, the existent, not abstracted ideals that are the basis of meaning. Yet some will then say, 'if there is no foundation, then it must mean that everything is arbitrary and reality is in question'. However, Wittgenstein notes: 'the rules of grammar are arbitrary in the same sense as the choice of a unit of measurement. But that means no more than that the choice is independent of the length of the objects to be measured and that the choice of one unit is not "true" and another "false" in the way that a statement of length is true of false.'[20] Moreover, he notes, '"So are you saying that human agreement decides what is true and what is false?" —It is what human beings say that is true and false; and they agree in the language they use. That is not agreement in opinions but in the form of life.'[21] He is emphasizing that the standard for correct or incorrect measuring is not an external measure, such as Platonic Forms or truths. There is no one measure of language that determines language. Instead, there is the entire system of language before us. He shows how the realist is in error when attempting to justify a particular proposition since the realist misses the entire context. In contrast to any one independent foundation that language rests on, he says, 'one might almost say that these foundation-walls are carried by the whole house'.[22]

Yet if Wittgenstein emphasizes everyday living and not a predetermined, independent, and external foundation, then does it follow that he is an idealist? The answer is no. Linguistic idealism denies that there is anything independent of language; instead, what we regard as reality is dependent on our language; that is, reality is shown in our language. It should be clear that this is the inverse of the *Tractatus*, where language mirrors the logical structure of the world. Linguistic idealism appears to leave language in a random position, with no anchor—which is exactly what the realist fears.

It is clearly problematic to regard reality as a product of minds and language. Did 'things' exist before humans and their ideas and language were able to create reality? Note, however, that if reality is dependent on language, then the idealist may resort to a timeless foundation, such as the Berkeleyan God, in order to avoid the criticism that there could obviously not be a reality prior to human beings creating it. By positing a God, it is then possible to make sense of prehistoric objects that are independent of human language and creation, but are internal to, and dependent upon, God's language. However, this is just disguised realism. Idealism in this form, like realism itself, posits an external and metaphysical foundation to which language necessarily conforms.

In any case, Wittgenstein is neither a realist nor an idealist. He does not argue in any way for the idea that language use creates reality. Clearly, reality is larger, so to

[20] Wittgenstein, *Philosophical Grammar*, 185.

[21] Wittgenstein, *Philosophical Investigations*, trans. G.E.M. Anscombe (Oxford: Basil Blackwell, 1958), 241.

[22] Wittgenstein, *On Certainty*, §248.

speak, than humanity. The close relationship between language and life, in contrast to the realist, is the nexus of the meaning. It is not an object of logical analysis or passive experience of data, nor is it a mental process of ideas; rather, the meaning is the use of the word as applied in everyday life. As Wittgenstein himself notes, we 'could not apply any rules to a private transition from what is seen to words. Here the rules really would hang in the air; for the institution of their use is lacking'.[23] We are placed in a physical world where our traditions and customs play a role in the development of language, while at the same time, our understanding of history, tradition, and custom is mediated by language. Language and life are complementary. Language mediates our contact with a reality that is not reduced to language; however, that reality so mediated is not independent of language. For Wittgenstein, logic was formerly outside language, but later he sees that logic is in language and shown through language. He shifts the discussion from one of distance and separation—that we and logic are independently related to the world—and the attached theories that try to mend what has been torn apart, to a discussion that shows how we, language, and logic, are in the world.

Likewise, in terms of theology, Ivan Kireyevsky aptly notes:

> The Slavophiles maintained that the West had lost the legacy of the Fathers and that is why in the West, theology became a matter of rationalistic abstraction, whereas in the Orthodox world it retained its inner wholeness of spirit. In the West, the forces of reason were split asunder, whilst here there was a striving to maintain a living totality. There the mind sought to find the truth by establishing a logical sequence of concepts, whilst here people aspired to it by elevating their self-consciousness to the wholeness of heart and the concentration of spirit. There we see a search for a superficial, dead unity, whilst here we find a striving towards inner, living unity.[24]

Mathematics and reality

We are not passive recipients (against realism), nor do we impose whatever we like on data (against idealism). These ideas can similarly apply to mathematics. Namely, the realist idea that numbers mirror reality, and the formalist view that numbers are only marks we fool around with; instead, it is in application that numbers become mathematics.

For example, is a number or formula a mathematical object? This is what happened in the case of physics as it became ever more complex and moved away

[23] Wittgenstein, *Philosophical Investigations*, §380.

[24] Ivan Kireyevski, *On the Nature of European Culture and on Its Relationship to Russian Culture*. Letter to Count E.E. Komarovsky , http://www.oocities .org/trvalentine/ortho - dox/kireyevsky_culture. html, May 2019.

from apples towards the abstract, and the idea of the physical causality of objects slipped into mathematical entities. Davies sees this and notes:

> …quantum mechanics demolished the concept of an external state of reality in which all meaningful physical variables could be assigned well-defined values at all times [in contrast to Newton and others]. So a subtle shift occurred…in which the ground of reality first becomes transferred to the laws of physics themselves, and then to their mathematical surrogates, such as lagrangians, Hilbert spaces, etc. The logical conclusion of going down this path is to treat the physical universe as if it is mathematics.[25]

This is exactly what Max Tegmark does with his Mathematical Universe Hypothesis wherein mathematical entities exist.[26]

In such a mathematical universe, Alexei Nesteruk's comment is apt:

> Fr Sergei Bulgakov,…builds his attitude to science on the basis of a criticism of its fragmented description of reality and limited capacity of comprehending the world as living nature. The mathematical universe expels living subjects by converting it into the kingdom of shadows and 'subjectless' objects: 'the ideal of natural science (…) would be to overcome this theoretical murder of nature that permits the study only of nature's corpse.'[27]

Although Wittgenstein is also obviously not commenting on Tegmark in particular, he aptly notes:

> …the comparison with alchemy suggests itself. We might speak of a kind of alchemy in mathematics. It is the earmark of this mathematical alchemy that mathematical propositions are regarded as statements about mathematical objects,—and so mathematics as the exploration of these objects. In a certain sense it is not possible to appeal to the meaning of the signs in mathematics, just because it is only mathematics that gives them their meaning. [28]

To assume that numbers exist somewhere beyond us to determine our calculations, or that logic or simple objects underlie mathematics and language to determine what we can and cannot say, and how we calculate, is upside-down. Or more properly,

[25] Paul Davies and John Gribbin, *Matter and Myth: Dramatic Discoveries That Challenge Our Understanding of Physical Reality* (New York: Simon & Schuster Paperbacks, 2007), 18.

[26] Max Tegmark, *Our Mathematical Universe: My Quest for the Ultimate Nature of Reality* (New York: Knopf, 2014), 255.

[27] Oboevitch, Teresa, *Faith and Reason in Russian Thought*, 45.

[28] Ludwig Wittgenstein, *Remarks on the Foundations of Mathematics*, 142e.

not even upside-down since not only are these structures a confusion, the logic in language and mathematics is internal to their respective propositions.

Certainly, descriptive propositions about the world can be true or false, but Wittgenstein argues that the logical syntax of mathematics is often wrongly construed as true or false. In other words, mathematical syntax does not form a description of the world, it is not part of epistemology. Mathematics does not arise from numbers, mathematics gives numbers meaning, and language does not arise from logic, it is in language that we understand logic and it by calculating that we understand numbers. An example of the problem of epistemology can be seen in the simple case of 1 + 1 = 2, and a 'law of nature' such as Einstein's famous equation E = mc2. Does the former contain pens or pencils, or the latter mass? We do not say, I am going to investigate '8'.

Moreover, the confusion of conflating mathematics with epistemology can be seen in the well-known Zeno's paradox of the tortoise racing the hare. If we say that points are empirical, then the result is that the hare must move half way from one point toward the next point, but to get there the hare must cross half the distance first, then the previous half, and so on *ad infinitum*. Once again, this problem is the consequence of treating mathematical propositions as empirical. It is a Platonist confusion to think that all the points together of a curve means the curve exists; instead, the curve is the rule. When mathematicians think that an expansion is surveyable they fall into Wittgenstein's criticism; namely, 'There is no religious denomination in which the misuse of metaphysical expressions has been responsible for so much sin as it has in mathematics'.[29]

What about a mathematical proof? Perhaps we assume that there is a truth in the proof. However, consider the distinction between a mathematical proof and the proposition, 'There are two dogs in my office'. A proof does not prove anything that exists prior to the proof. There were already two dogs in my office before the proposition was formed and the subsequent empirical investigation. Yet in the case of the proof there is not something *a priori* behind the proof, instead it is the proof itself that proves the rules of logical syntax in the proposition. The proof and the mathematical proposition are internal to each other—unlike the contingency of the proposition regarding how many dogs are in my office.

What Wittgenstein does in language and mathematics is reject an external independent foundation of logic and metaphysical objects, of course this leads many, given the prevalence of realism, to assume that he is providing a skeptical account of mathematics and turning it into a will-o-the-wisp. The problematic idea is that either mathematicians discover mathematical truths that were existent 'out there' to be discovered, or mathematicians concoct mathematics, which then is not certain and is open to revision and construction. Mathematical knowledge, once divested of

[29] Wittgenstein, *Culture and Value*, 1.

epistemological considerations and an independent foundation may seem suspect, but Wittgenstein wants to show the certainty mathematics has: its rules.

In other words, unlike empirical propositions, mathematical propositions as rules of syntax, need to be grammatically understood—but this is not empirically verified. The propositions in language and mathematics are similar in that both must have an application—that is why they are both called propositions—but the proof and the mathematical proposition are internally related. Yet there is the constant search for an external and independent reality to justify our propositions. For example, Euclidean geometry was 'demoted' since it no longer held an *a priori* status, and it was seen for what it is, namely, an autonomous axiomatic system that has its own rules of logic and uniformity. Yet why would this confirm devaluation? The reason is that it did not offer the 'true' connection to reality. The problem realist mathematicians get into is that they focus on a complete realist system, and Euclidean geometry no longer fits. What they miss is that Euclidean geometry is just one form of propositions within a system of propositions.

As Wittgenstein sees regarding language, there can be various language-games, and since there is no *one* language, it then follows that one does not displace another. His philosophy of language, in terms of logic, then applies to the logic of math in a corresponding manner. Both language and mathematics have propositions that are in a relation within their own system; however, since the nature of each is different, that is, the former are descriptions of the world while the latter are not, it follows that they are verified differently. The former are verified by checking the world while the latter are verified by means of their logical syntax. In other words, there is no isomorphism for language or mathematics—as if real numbers mirror those transcending us. Meaning is not some entity that somehow connects to a name or number, rather the meaning follows from its application. Words cannot say their meaning; the meaning is shown, and it is shown in human life and activities.

As previously noted, Wittgenstein abandons referential meaning, for example, that the meaning of a name is the object it links to, or a formal principle, and instead sees that a word only has meaning within a system of propositions and the rules within each system. Consequently, in terms of mathematics, Wittgenstein remarks:

> What does mathematics need a foundation for? It no more needs one, I believe, than propositions about physical objects—or about sense impressions, need an analysis. What mathematical propositions do stand in need of is clarification of their grammar, just as do those other propositions. The mathematical problems of what is called foundations are no more the foundation of mathematics for us than the painted rock is the support of a painted tower.[30]

[30] Wittgenstein, *Remarks on the Foundations of Mathematics*, 171e.

It then follows that 'it is essential to mathematics that its signs are also employed in civil life. It is the use outside mathematics, and so the meaning of the signs, that makes the sign-game into mathematics'.[31] Hence, mathematics is not based on abstract forms, objects, formalism, logical atomism, or the like; rather, it takes form as applied within our form of life. Likewise, as Louth notes:

> The Orthodox taste, the Orthodox temper, is felt but it is not subject to arithmetical calculation. Orthodoxy is shown, not proved. That is why there is only one way to understand Orthodoxy: through direct orthodox experience… to become Orthodox, it is necessary to immerse oneself all at once in the very element of Orthodoxy, to begin living in an Orthodox way. There is no other way.[32]

Yet Wittgenstein sees the questions being asked:

> But doesn't it follow with logical necessity that you get two when you add one to one, and three when you add one to two? And isn't this inexorability the same as that of logical inference?' –Yes! It is the same. –'But isn't there a truth corresponding to logical inference? Isn't it true that this follows from that?' –The proposition: 'It is true that that this follows from that' means simply: this follows from that.[33]

He uses the following analogy to show this point: 'How should we get into conflict with truth, if our footrules were made of very soft rubber instead of wood and steel? –"Well, we shouldn't get to know the correct measurement of the table." –You mean: we should not get, or could not be sure of getting, that measurement which we had with our ridged rulers'.[34] The search for a justification for a mathematical proposition is a consequence of bringing in epistemology, while Wittgenstein sees that a mathematical proposition, unlike an empirical proposition that is contingently true or false as compared to the world, is not something we justify; rather, we have agreed that it is a rule.

Wittgenstein rejects the idea that numbers inhabit an external reality (realism) and he also rejects the idea that numbers are nothing more than marks on paper (formalism); instead, through use and application numbers become mathematics. Likewise, rather than a name standing in for a simple object as was the case in the *Tractatus* (logical atomism), he later showed how words have meaning within a system of propositions, and logic is not underlying this system as a supporter of

[31] Ibid., IV, 2.
[32] Louth, 15.
[33] Wittgenstein, *Remarks on the Foundations of Mathematics*, 4e.
[34] Ibid., 4e.

regulation and meaning; instead, logic is shown in the propositional system. In other words, the key here is not an independent external reality, but the logical syntax of what we say and how we do mathematics: their use.

Quantum physics and reality

This confusion of confounding the epistemological with logical syntax and the empirical is perhaps even more difficult to work out in physics, since there must be an empirical verification. However, as physics became much more theoretical it became more difficult to separate the empirical experiments with mathematical constructions of reality. Indeed, as noted by Paul Davies, 'scientists often use the word "discovery" to refer to some purely theoretical advance. Thus one often hears it said that Stephen Hawking "discovered" that black holes are not black, but emit radiation. This statement refers solely to a mathematical investigation. Nobody has yet seen a black hole, much less detected any heat radiation from one'.[35] The notion of universal and transcendent mathematical relations, a universal concept, an independent reality we discover, conflates the empirical abstract calculations.

Yet within physics there is still a strand supporting the idea that since there are various results in experiments and differing possibilities (quantum theory), it is still necessary to find a determined and independent mathematical system—the idea that reality is more wondrous than our own humble and rough roads. Yet the observant still noticed the fog in these theories and the incredible difficulty of charting a proper course of causality from one to the other. So, in order to progress, they posited hidden variables, that is, beacons of light hidden by the fog that nonetheless connect the causal points. This then created a rather odd chart (in other words, that they were unknown was proof of their hiddenness) and the uncertainty of it all became too exasperating for many—where is the shore? Some answered that, in the end, there is no particular foundational shore to reach. I think this is the correct point. However, their particular answer is not an answer. They say that there is no particular shore to reach because there is an infinite number of shores. The multiverse. If there is an infinite number of shores, then all possibilities are accounted for at once. In a sense, this amounts to no possibility. Whichever way this is perceived, it is thought that we can then be out of the fog and back on the clear solid causality and determinism. Even though no one has ever seen or lived in this foggy charted area—it is only a thought.

The problem of extending into metaphysical reality is noted by Bohr in the following:

[35] Paul Davies and John Gribbin, *Matter Myth: Dramatic Discoveries That Challenge Our Understanding of Physical Reality* (New York: Simon and Schuster Paperbacks, 2007), 18.

> …it must be realized that the very definition of mathematical symbols and operations rests on a simple logical use of common language. Indeed, mathematics is not to be regarded as a special branch of knowledge based on the accumulation of experience, but rather as a refinement of general language, supplementing it with appropriate tools to represent relations for which ordinary verbal communication is imprecise or too cumbersome. Strictly speaking, the mathematical formalism of quantum mechanics and electrodynamics merely offers rules of calculation for the deduction of expectations about observations under well-defined experimental conditions specified by classical physics concepts.[36]

Likewise, in theology Puhalo aptly notes that many 'failed to realize that dogma and doctrine, are only the algorithm for theology, and the artificing and refining of the algorithm became, for them, the very meaning of theology itself'.[37]

For example, Wittgenstein read Hertz and said:

> Hertz addresses the problem of how to understand the mysterious concept of force as it is used in Newtonian physics. Hertz proposes that, instead of giving a direct answer to the question: 'What is force?' the problem would be dealt with by restating Newtonian physics without using 'force' as a basic concept. When these painful contradictions are removed' he writes, 'the questions as to the nature of force will not have been answered, but our minds, no longer vexed, will cease to ask illegitimate questions.[38]

In contrast, for example, to conventional logic, what is pursued is the participatory nature of reality. This can be seen in Bohr's principle of complementarity, he states: 'the old question of an ultimate determinacy of natural phenomena has lost its conceptual basis'.[39] In contrast to determinacy, a basic point of complementarity is the simultaneous and contradictory nature of a particle and wave. Aristotelian logic cannot demarcate this contradictory nature other than showing that it is a paradox. To be tied to Aristotelian logic may not be surprising; there are, of course, many differing points of view. However, it is very surprising that it has become so unquestioned, perhaps even a universal assumption in Western theology and science.

In any case, it is clear that physics may not be best understood fundamentally as Aristotelian, nor can it eliminate the observer in favour of an independent mechanical clock reality. As Wolfgang Pauli notes:

[36] Bohr, *Collected Works*, Vol. 10, 406.
[37] Puhalo, 17.
[38] Ray Monk, *Ludwig Wittgenstein: The Duty of Genius* (London: Jonathan Cape, 1990), 25.
[39] Bohr, 'On the Notions of Causality and Complementarity'. 54.

> To me it seems quite adequate to call the conceptual description of nature in classical physics… the ideal of the detached observer. In drastic words the spectator must, according to this ideal, appear in a fully discrete manner as a hidden spectator. He can never appear as an actor. Nature is hereby left alone in its predetermined course of events, without regard to the manner in which the phenomena are observed.[40]

Additionally, Zeilinger comments:

> In physics we cannot talk about reality independent of what can be said about reality. Likewise, it does not make sense to reduce the task of physics to just making subjective statements, because any statements about the physical world must ultimately be subject to experiment. Therefore, while in a classical worldview, reality is a primary concept prior to and independent of observation with all its properties, in the emerging view of quantum mechanics the notions of reality and of information are on an equal footing. One implies the other and neither one is sufficient to obtain a complete understanding of the world. [41]

It is obvious, yet important to point out that information is not a type of Platonic Form, instead it is what we can experience through our everyday lives. From a theological point of view, Puhalo remarks, 'reality does not consist in abstract, disembodied ideas, but in that which we experience'.[42] There is meaning in, for example, the experience and life of liturgy, without logical analysis of justifying the connection of the parts of the liturgy with a metaphysical reality. Rather, the divine reality is shown in the liturgy. This is the most common mistake on behalf of the realist, to assume that since a metaphysically argued reality is rejected, then one rejects the reality of God. Clearly not. Instead, God's reality is not understood as a metaphysical reality but is a living reality. The problem is not reality in and of itself, it is the metaphysical realism that is so commonly accepted.

Interestingly, Bohr notes: 'Epistemological sophistries cannot possibly help him attain these ends (dealing with life, death, existence …). Here, too, the relationship between critical thought about the spiritual content of a given religion and action based on the deliberate acceptance of that content is complementary'.[43] It is not proofs that are the answer to such issues. The point here is that a metaphysical speculation is a rather disinterested investigation and certainly cannot heal issues

[40] Anton Zeilinger, 'Vastakohtien todellisus', in *Festschrift for K.V. Laurik Ainen*, eds U. Ketvel et al. (Helsinki University Press, 1996), 174.

[41] Zelinger, 'A Foundational Principle for Quantum Mechanics', 642.

[42] Puhalo, 73.

[43] Niels Bohr, in, Heisenberg, *Physics and Beyond*, 90.

of life and death. We live in a participatory world—Wittgenstein clearly saw this. Yet this is a difficult task because this dissolution of secure independent foundations brings us into the fray, and we are a messy business. It is much easier to live in abstract thought—a castle in the sky. Indeed, as Wittgenstein says, 'the very things which are most obvious may become the hardest of all to understand. What has to be overcome is a difficulty having to do with the will, rather than the intellect'.[44] In other words, generally speaking, the oddity of Western philosophy and theology lies in the assumption that philosophy and theology provide proofs for the erudite while the unschooled only believe.

Conclusion

Andrew Louth refers to Fr Pavel Florensky as 'one of the greatest Russian thinkers and theologians of the last century'. According Florensky,

> …the life of the Church is assimilated and known only through life – not in the abstract, not in a rational way. If one must nevertheless apply concepts to the life of the Church, the most appropriate concepts would be not juridical and archaeological ones but biological and aesthetic ones. What is ecclesiality? It is a new life, life in the Spirit. What is the criterion of the rightness of this life? Beauty, yes, there is a special beauty of the spirit, and, ungraspable by logical formulas, it is at the thinking and doing, being and praying same time the only true path to the definition of what is orthodox and what is not orthodox. The connoisseurs of this beauty are the spiritual elders, the startsy, the masters of the 'art of arts', as the holy fathers call asceticism. The startsy were adept at assessing the quality of spiritual life.[45]

Thus, experiments in physics and, for example, the startsy in Orthodoxy do not allow any sense of subjectivism. As Wittgenstein has said, it does not make sense to speak of a private language. We are necessarily grounded in a history and tradition.

Rather than the intellect solving epistemological mysteries, we are indeed led back to mystery itself. In contrast, to such metaphysical speculation, Louth states, 'I began by asking: where do we start? and reflected on the paradox that we seem to start from a place of unknowing, not in the sense of ignorance—as if we started off with little knowledge and found that it increased—but in a more fundamental sense—starting off with an awareness that the One we seek to know is beyond any capacity we might have for knowing'.[46] Moreover, 'These lead us to the other

[44] Wittgenstein, *Culture and Value*, ed. G.H. von Wright in collaboration with Heikki Nyman, trans. Peter Winch (Chicago, IL.: University of Chicago Press, 1984), 17.

[45] Louth, 14

[46] Louth, 4.

element involved, for prayer to Christ and openness to his voice takes us back to the point we started with—the mystery of God. For that mystery is not simply an intellectual mystery; it is something much deeper'.[47] Similarly, as Bohr notes, 'In quantum mechanics we are not dealing with an arbitrary renunciation of a more detailed analysis of atomic phenomena, but with a recognition that such an analysis is in principle excluded'.[48]

Accepting mystery and paradox is no longer so easily categorized as lazy or crazy. It is clear that physics has become aware of this and Orthodox theology continues this awareness. Moreover, it is more than obvious that neither Bohr nor Wittgenstein were opposed to scientific investigation, nor by any stretch were they Christian apologists. Yet they both showed the confusion of conflating or reducing reality and meaning to metaphysical or logical confines.

Again, this must not be misunderstood. The point is not that there is something that we simply cannot understand and therefore just accept the fact that we cannot understand it, but maybe someday someone will understand it. Instead, mystery is a given and in a theological context it is additionally a personal relationship. For example, mystery manifest in the liturgy, and this relation to mystery is not a cognitive metaphysical mystery. Another way of putting this is that since the mystery is in the liturgy, it is not the case that the liturgy points to an abstract metaphysical mystery outside the liturgy—it is concretely lived.

In the end, humanity is not a collection of objective entities who merely seek an increasing number of objective truths, but is the passionate subject who may, for example, participate in scientific measurements or participate in the liturgy. However, in the latter case, it is not only participating; it is becoming.

[47] Louth, 7.
[48] Niels Bohr, *Essays 1932–1957 on Atomic Physics and Human Knowledge*, Vol. II, 62.