

Emulating Hilbert and Schrödinger: Three Problems for the 21st Century

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Abstract

This article presents a modest research program for scientists seeking the formal incorporation of a spiritual dimension in the pursuit of knowledge about life and consciousness. To be accepted as a bona fide scientific enterprise, this agenda must use rigorous methodologies; otherwise, whatever results it produces would be disregarded by the scientific community at large. Grounded in the maxim “life comes from life,” we give an outline of how to accomplish this and present one question posed as three problems that should be the focus of any successful agenda in this field.

1. Introduction

In 1900, at the age of 38, David Hilbert challenged the mathematics world by posing 10 problems¹ that he deemed most important for the mathematics community to solve. In his address to the Second Congress of Mathematicians held in Paris, titled *Mathematical Problems*, Hilbert essentially delineated the mathematics research agenda for the twentieth century. With at least two² problems defying the attacks of some of the brightest minds, Hilbert’s problems continue to have a great influence in mathematics research into the twenty-first century. This is unique in the history of science.

Can we, as scientists interested in formally incorporating a spiritual dimension to answer fundamental questions of life, consciousness, and ultimate reality, have a common agenda? Can we generate a list of problems that will engage some of the

¹ In 1902 he expanded this list to reach a total of 23 problems in an article published in the *Bulletin of the American Mathematical Society*.

² At least two of the original 10 and at least four of the extended list of 23 remain unsolved.

finest minds in an attempt to answer profound questions about life and death? Theists like to argue that atheists have been philosophically defeated - something most atheists would understandably deny - but can we take it a step further and defeat atheists on solid scientific grounds?

2. Scientific and Philosophical Qualifications for Inquiry and Research

In the preface to *What is Life?* (1944), Erwin Schrödinger cautions that as “a matter of noblesse,” a scientist should “not write on any topic of which he is not a life master” [1, p.1]. Yet, he also “begs to renounce the noblesse, if any, and to be freed of the ensuing obligation” because “we have inherited from our forefathers the keen longing for unified, all-embracing knowledge” [1, p.1]. Therefore, despite our limitations, “some of us should venture to embark on a synthesis of facts and theories, albeit with second-hand and incomplete knowledge of some of them -

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and at the risk of making fools of ourselves” [1, p.1]. Moreover, in a conversation with the founding director of the Bhaktivedanta Institute, Roger Penrose exhorts us to be “brave enough to do something that is not fashionable, which may be following your own ideas more truly” [2, pp.71-

72]. In this spirit, I will propose a research agenda for theistic scientists. My only qualification for assuming this role is a desire to see the work done.

3. Science and the (non)Existence of God

Although many have put forth arguments purporting to prove the existence of God - ontological (Anselm, Descartes, Leibniz, Gödel), cosmological (Plato, Aristotle, Aquinas, Leibniz), and teleological (Socrates, Aquinas, Paley), among others - the fact remains that we cannot even agree on a definition of God for a philosophical argument. This hints at the impossibility of ever having a direct scientific proof of the existence of God. However, I would accept it as a scientific proof of the *nonexistence* of God if it could be shown that life comes from matter (creating a living organism directly from inorganic matter) or that consciousness is ultimately algorithmic (the realization of strong artificial intelligence). I think, every honest

theist would have to accept defeat if either of those two things were ever shown to be true.

Does this mean that an indirect scientific proof of the existence of God is out of reach? I disagree. By an indirect scientific proof I mean a series of scientific proofs of minor claims that would entail the existence of God, that is, from which we could philosophically conclude the existence of God. Let me elaborate.

In Hilbert's aforementioned 1900 address, he stated:

Perhaps in most cases where we seek in vain the answer to a question, the cause of the failure lies in the fact that problems simpler and easier than the one in hand have been either not at all or incompletely solved. All depends, then, on finding out these easier problems, and on solving them by means of devices as perfect as possible and of concepts capable of generalization. This rule is one of the most important levers for overcoming mathematical difficulties and it seems to me that it is used almost always, though perhaps unconsciously [3, p.437].

What are those "easier problems" that might help us understand what life and consciousness are, and hence hint at the existence of God? I will attempt to find them by negation, that is, by eliminating those that cannot be the questions we should ponder.

4. Losing Strategies

A very inefficient use of intelligence in trying to defeat atheistic arguments is to devote one's time to finding flaws within evolutionary theory or the Big Bang or the theoretical underpinnings of artificial intelligence, instead of engaging in a scientific program whose realization would shake the philosophical foundations of those theories. This might be an ambitious plan, but also a more honest one.

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Instead of concocting "creationist" models of no scientific value or misquoting Gödel or misinterpreting Darwin, we should be honest enough to recognize our

limitations and look for scientifically acceptable ways of invalidating those theories. If one wants to accept any particular religious version of creation - be it Mayan, Judeo-Christian, Vedic, or Celtic - then so be it. Let us just not call it scientific, because it is not.

Besides, we should note that even some theistic or religious scientists - for instance, those with the Metanexus Institute - accept evolutionary theory. They find it totally acceptable to be a religious person, or even to belong to an organized religion, and at the same time embrace evolution. Essentially, as I have gathered through conversations with several of these colleagues, they claim that "evolution is just the way in which God chooses to create." I find this contradictory because of the implications it would have on our understanding of consciousness and artificial intelligence, but admit that it is a fairly widely accepted stance. Even one

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of the greatest thinkers opposing artificial intelligence, Roger Penrose, accepts evolution when he claims in *The Emperor's New Mind* that "natural selection has imposed upon us, as individuals, certain 'goals' which are to a large extent governed by the need to propagate our genes" [4, p.15].

Another losing strategy is misquoting Gödel's incompleteness theorem. Hilbert's second problem - at least one interpretation of it - was solved in 1930 by the preeminent logician of the twentieth century, Kurt Gödel. This problem asked whether a formal system, in particular Peano arithmetic, was consistent, that is, whether it could be shown that no contradictions could arise from its axioms. Gödel startled the mathematical world with what came to be known as his first incompleteness theorem. This result, coupled with the second incompleteness theorem presented in 1931, is sometimes referred to as Gödel's theorem. Unfortunately, it has become one of the most misquoted mathematical results in philosophical and religious discourse.

Although, I tried to clarify this situation during my presentation at the 4th All India Students' Conference in Science and Spiritual Quest in 2008 [5], I will certainly hear it misquoted again at this conference. For those interested in understanding these results, I recommend logician Torkel Franzén's *Gödel's Theorem: An Incomplete Guide to Its Use and Abuse*, where Franzén aptly demystifies these misconceptions.

In all fairness, those who misquote Gödel's theorem are in good company. Even Nobel Laureate in Physics, Freeman Dyson, has accepted erring in this regard [6, p.88]. Franzén clarifies that "The basic equations of physics, whatever they may be, cannot indeed decide every arithmetical statement, but whether or not they are complete considered as a description of the physical world, and what completeness might mean in such a case, is not something that the incompleteness theorem tells us anything about" [6, p.88]. Besides, "nothing in the incompleteness theorem excludes the possibility of our producing a complete theory of stars, ghosts, and cats all rolled into one, as long as what we say about stars, ghosts, and cats cannot be interpreted as statements about the natural numbers" [6, p.88]. Furthermore, even though Gödel was not opposed to theological reasoning, as I argued in my presentation at the 2nd All India Students' Conference in Science and Spiritual Quest in 2006 [7], Gödel "did not attempt to draw any theological conclusions from the incompleteness theorem" [6, p.91].

Yet another non-winning strategy is to attack the philosophical foundations of artificial intelligence without positing an alternative. What is the mind? What is life? What is consciousness? Is there a soul or the continuation of consciousness after death? Can we answer these questions scientifically? I think we should make an honest attempt, but we must first recognize that these questions have not been answered satisfactorily in any scientific way.

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5. Life Comes from Life³: A Scientific Observation

The distinctive criterion for determining the validity or appropriateness of a mathematical model is to check whether its predictions are confirmed by observation. Newton's laws of motion, for instance, allow us to predict the trajectory of a bullet fired in a certain direction at a given speed. Similarly, a mathematical model of water pollution in a given lake would be taken as acceptable if it were able to predict the amount of pollutants - within an acceptable

³ *Life Comes from Life* is the title of a book published by the Bhaktivedanta Book Trust based on conversations between A.C. Bhaktivedanta Swami Prabhupada and several intellectuals, including his disciple Dr. T.D. Singh.

margin of error - in the lake after a certain period of time. Likewise, a mathematical model of life arising from inorganic matter would have to be able to predict just that. However, this hypothetical event, which evolution supporters would love to behold, simply contradicts all scientific evidence that life comes from life. Every single instance of life that has ever been observed has attested to this truth. Why then are some people obsessed with proving that this has not always been the case?

If life comes from matter, then so would the brain and its concomitant consciousness. Hence, the mind, whatever it may be in this evolutionary scenario must conform to the laws of physics, and therefore, thinking would be algorithmic, albeit extraordinarily complex. This is what artificial intelligence supporters claim! On the other hand, only if life does not come from matter, can we argue that consciousness is more than a machine. If this is true, then consciousness must originate elsewhere. Likewise, if life is something else, it must ultimately come from a different source.

6. One Question, Three Problems

Now that we have identified the certain pitfalls we should avoid, what are the problems, à la Hilbert, that we should focus on which hold the promise of achieving a scientific proof of the spiritual dimension? We already discarded the question "What is God?" as directly unassailable from a strictly scientific perspective. However, what question or questions can shed light into this? The sole candidate is: Does the soul exist? That is, does an individual essence continue to exist after death or has it existed prior to a person's taking birth? Is

Does the soul exist? That is, does an individual essence continue to exist after death or has it existed prior to a person's taking birth? Is there a continuation of consciousness pre or post life?

there a continuation of consciousness pre or post life? If we were able to definitively settle this issue - not just argue about it with philosophical or pseudoscientific arguments - we would force major revisions into the fields of evolutionary theory, the Big Bang, and artificial intelligence, since a spiritual dimension would have to be

integrated into those models. Until such glorious moment, the proponents of the said theories would have no need to incorporate a spiritual component into their

models, be it a “spiriton” particle to account for the soul as proposed by T.D. Singh or any other similar concept.

To assail this question, I would suggest solving, or at least making considerable progress to solve, the following three problems:

- i. What is life?
- ii. What is consciousness?
- iii. What is death?

How we approach these questions is up to creative individuals or teams of researchers. These might include developing mathematical models to explain either of them; revising or building upon the work on reincarnation started by Ian Stevenson [8] and continued by Jim Tucker [9] at the School of Medicine in the University of Virginia; or finding new laws of physics that account for consciousness and life.

7. Concluding Remarks

In closing, it is not that I reject “trans-rational” or “mystical” approaches as legitimate paths to answer these questions; I welcome them. However, recognizing the objections to these means by many atheists - the target audience - the agenda I have proposed carefully avoids them in the actual formulation and verification of models, although certainly individual scientists may consider exploring those paths to enhance or nurture the creativity needed to tackle these problems.

Echoing Schrödinger, I have followed his advice to “venture to embark on a synthesis of facts and theories, albeit with second-hand and incomplete knowledge of some of them - and at the risk of making fools of ourselves” [1, p.1]. Yet, if we can prove that there is a continuation of consciousness after death or that the soul exists, then we would be in a position to scientifically support the existence of God, a possible definition being that God is the most advanced or powerful soul. Hence, the task merits my risk. May the Lord of the Universe be pleased!

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