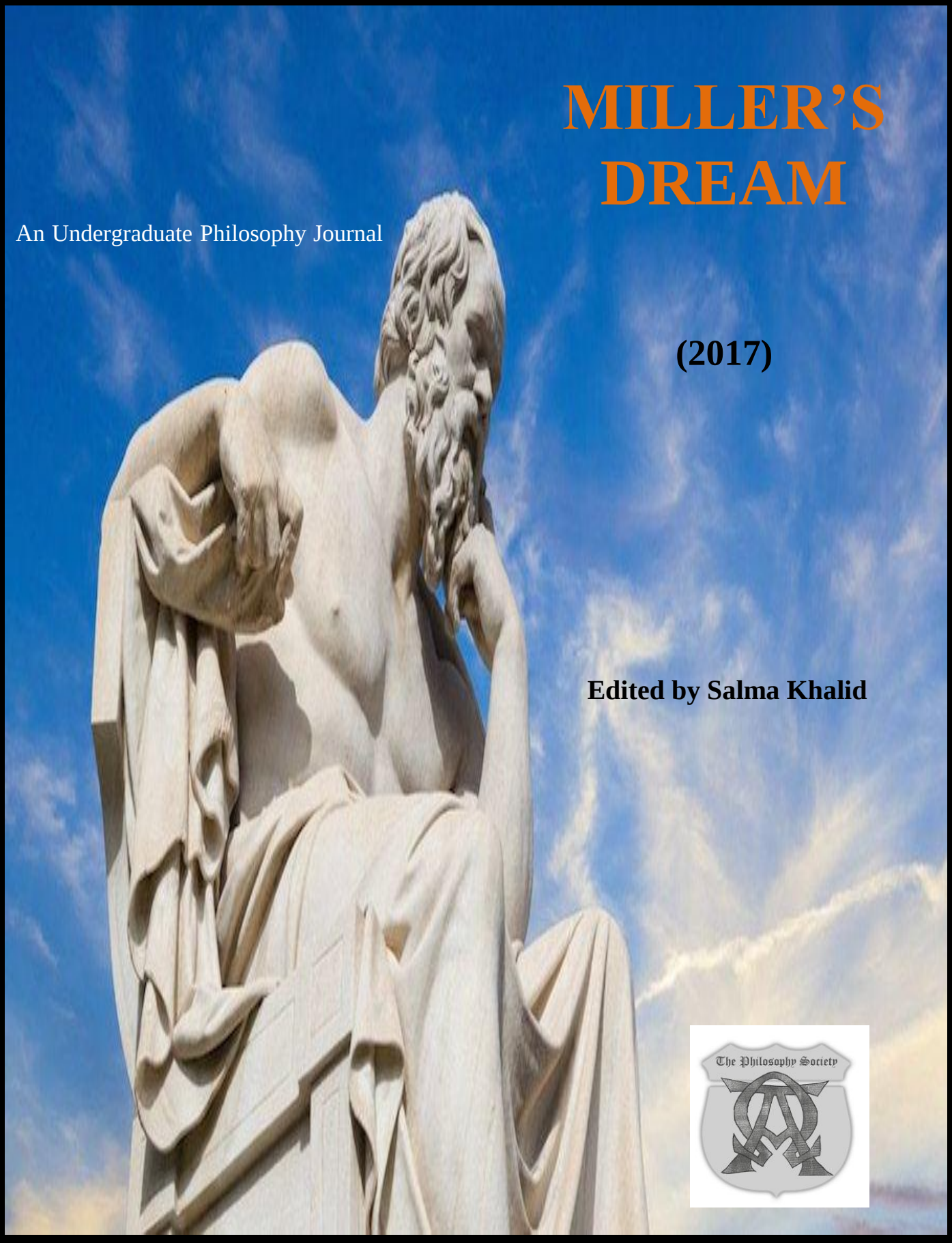

MILLER'S DREAM

An Undergraduate Philosophy Journal

(2017)

Edited by Salma Khalid

The Philosophy Society

Dr. Myron Miller

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Contents

Editor's Note

It is a privilege to introduce this volume of Miller's Dream. As a student-led initiative of FCC's Department of Philosophy, the journal reflects the department's effort to encourage and accommodate student research in the various fields of philosophy. As students delve into the world of the liberal arts and the humanities at FCC and elsewhere, many a discipline lays claim on them. Philosophy with its frustrating ambiguities, history with its grand narratives, literature with its revelatory power, and many other such characters, appear as their narcissistic friends and companions. During the course of their journey they have to choose one of them as their chief passion. They discover for themselves what Dante calls the 'good of the intellect'. In *Divine Comedy*, during his journey towards salvation, Dante reaches a 'Splendid Castle' that emanates light. Access to the inner castle is provided through seven gates. The castle is the dwelling place of people of wisdom, the light symbolizes human intellect and the gates are the *artes liberales* of the Medieval Age. Our list of the liberal arts may have varied through the ages, yet philosophy stands magnificently among the new and old gateways to wisdom and the quest for the liberation of the soul or the mind remains the most precious pursuit.

The ideal of the human mind developing unshackled by ignorance must and does lie at the heart of an education rooted in philosophy. It must enable us to rise above ourselves and our immediate surroundings, to glimpse the greater reality that our journey on the path to the good of the intellect affords us. At FCC, the commitment to such an education took the form of Miller's Dream, the brainchild of Dr. Myron Miller, founder of the Philosophy Department. Dr. Miller is owed a debt of gratitude for his invaluable input into the editorial process of the journal. Many thanks are due to Dr. Mark Boone for his suggestions and reviews of the papers, without which the journal might have appeared sooner but not better.

Most of all, thanks and gratitude are owed in abundance to someone who is not only the head of the Philosophy Department but, without exaggeration, its heart and soul. Without Dr. Ghazala Irfan this journal would not have been possible at all. The faith of this tireless and inspiring teacher and hard taskmaster in her students' ability to conduct independent and critical research, her immense patience with her students through frustrating delays and the exhilarating encouragement she never fails to impart are the reasons her students don't give up on themselves.

Dear Reader, here we are and we bring you the Dream, in the hope that you will find it interesting and inspiring enough for you to build it together with us for the next time. Everyone is invited.

s k

No Man's Land

Salma Khalid

The love of wisdom burns in the philosopher in a different way than the thirst for knowledge is felt by the scientist. The theologian's claim to divine insight is of a very different nature from both. To a large extent the nature of philosophical enquiry is determined by the questions it poses, or by the way it poses them, even before the answers have been made. Whether Socrates believed in the gods or not, his method was certainly outside the pale of religion when he asked Euthyphro if an act is ethical because the gods love it or if the gods love it because it is ethical. The question undoubtedly remains immensely important today, particularly in societies which, unlike ancient Greece, have been the cradles of prophethood and not philosophy.

Many of the questions that philosophy has asked – again and again – are also the ones that religion has presumed to have answered for as long as philosophy has asked them. These are fundamental questions that arise from our very existence on a tiny speck in the vast universe. What is this world? Why are we here? What is the meaning of our life? Is there any power shaping our destiny? What is the ultimate nature of reality? What is the true nature of the universe?

But the theological approach to these questions always assumes the answer first. The very nature of this approach is determined by unquestioned dogma and not by a spirit of free enquiry. It is limited by that factor in both the kind of questions it asks and how it answers them. To the philosopher, such answers inevitably lead to more questions of the kind which a theological bent will not allow. For example, we can assume the theological answers to the above questions to be

the following: The world is God's creation; we are here to do his bidding and that is both the meaning and the purpose of our existence; and the ultimate nature of reality is God himself whose mind we cannot know. This may sound like a highly simplified, even crude, statement and the fact is that, when confronted with philosophy, such statements may take subtle and complex forms. Yet, the essence remains the same. The basic premise (God) of these answers has yet to be proven, but it is exactly the unproven which remains unquestionable. It is a matter of faith and, to the more fertile theological minds, religious intuition. There is, in reality, a single answer for every question and with no counter-question that does not assume what has been assumed in the first place. We have ready-made answers to ready-made questions. This closes the door to further philosophical enquiry; for example the matter of God's definition, his own purpose, and the question of good and bad according to him. It is not surprising, therefore, that theocratic societies of the past, and the few that still exist, are not known for making original philosophical contributions. Their intellectual endeavors have not been philosophical but scholastic where belief comes first and enquiry later.

Religion, then, is truth by authority whereas philosophy knows no authority but the truth itself – if it is able to discover it. Something is not true because some holy figure, supernatural or otherwise, is said to have said it. It assumes little and what it assumes has first to be made a convincing case for. Philosophers are not expected to arrive at the truth by quoting authority. They are obliged to provide some kind of logical explanation, proof or evidence for their ideas. They proceed through rational and logical arguments instead of basing their reasoning on inherited or acquired beliefs. That is why their quest is eternal because the same questions are reformulated and asked again in light of the ever-increasing knowledge and insight gained by

humanity into the nature of both man and the universe. Consequently we have new philosophical insights into old problems of existence.

Science too is uncompromising in its insistence on reason, rationality and critical thinking and in its resistance to 'truth' by authority. Something is not true because Einstein and Newton said it. It must instead pass through the criterion of scientific reason and evidence. It must be able to withstand consistent critical thinking. To that extent, genuine philosophy and genuine science share the same spirit. This spirit determines the nature of both the scientific attitude and philosophical speculation. The difference lies in the immediate subject matter. Science is not directly concerned with the fundamental questions that philosophy addresses. It studies the universe –'external nature around human beings and human beings themselves as part of nature. It has developed its own way of observing and collecting data, making hypotheses and then testing those hypotheses against further observations and experiments. It is much less purely speculative than philosophy and more experimental and observational. It knows no dogma such as those of religion. It is more definite and more objective because it concerns itself with material reality. But what it discovers may have profound philosophical and moral implications. Copernicus, Galileo and Kepler's discoveries effectively ended the fallacy that man, as some unique creation of God, was at the center of the universe. Darwin's discovery shook the idea of creation to the core, and as such presented both philosophy and religion with an unavoidable challenge to reconsider what had, till then, been taken for granted.

It is in this context that we have to understand Russell when he sees philosophy as something intermediate between theology and science – a no man's land. He says that, like theology, philosophy "consists of speculation on matters as to which definite knowledge has so

far been unascertainable, but like science it appeals to human reason rather than authority whether that of tradition or that of revelation" (Russell, 2003).

A word more is necessary about the nature of this no man's land. Scientists work to obtain results in their own different fields; physics studies the relationship between matter and energy, chemistry investigates the structure of substances and biology studies 'organic compounds' or everything alive. Reality understood this way can be seen as divided into different trees. It is still the philosopher whose passion it is to see the forest as a whole. Her no man's land is in fact the whole world of experience.

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The Mind Mystery

Fahad Tahir

In philosophy, the study of the mind is both one of the oldest and one of the most fluctuating areas of discussion. Though the theories are many, most of them can be classified under the labels of dualism and physicalism. Dualism argues that human experience cannot be accounted for by matter alone and hence posits the existence of an immaterial mind whereas, physicalism argues that this is all well within the realms of just matter. This paper will attempt to contrast two Dualist schools of thought – Cartesian dualism and epiphenomenalism – with the functionalist brand of physicalism.

Cartesian Dualism

Cartesian dualism - named after its founder Rene Descartes - holds that there exist two different kinds of substances: mind and matter. In this context, substances ‘are those things which...are the foundational or fundamental entities of reality’ (Robinson, 2014). As such, Descartes posits that the mind and matter are independent of one another, and through their interaction emerges a third substance which is responsible for all human experience. The mind can be thought of as the seat of consciousness, and it persists after the death of the body. Lastly, Descartes says that the interaction of mind and body occurs through the pineal gland.

One of the stronger arguments in favor of Cartesian dualism is the notion that while the brain is divisible, the mind is not. The brain is composed of parts - such as the hypothalamus and cerebral cortex - and all these parts come together to form the brain. Similarly, all matter is composed of parts and can be divided down into the level of atoms and quarks. The mind is not like this. The mind cannot be divided or understood as the sum of its parts and as such it must be

different from matter. The mind has different aspects we can understand - such as reasoning and empathy - but all of these are permanently bound together.

The objection to this claim is that the mind is divisible just like anything else; any characteristic we associate with the mind can be stripped away. That's why damage to a certain area of the brain can take away a person's ability to speak (Broca's area) and damage to another area can take away their ability to understand speech (Wernicke's area). It's also why subjects who have certain brain regions 'shut off' or 'turned on' with transcranial stimulators rapidly experience sharp changes to their personality such as finally climbing out of depression (Reisfeld, 2015) or feeling an uncharacteristic sense of calm and composure (Adee, 2012). Every aspect of the mind has a direct parallel in the brain, and hence if the brain is divisible then so is the mind.

Moreover, the big question really is how the mind can interact with matter if it is truly immaterial? If they can interact, how do they interact? The pineal gland is not the seat of consciousness, just an area from which hormones are released. Similarly, there is no brain area that if you take away consciousness instantly follows. Brain damage can lead to death, but this never happens instantly unless a substantial chunk of it is destroyed. It is far more obvious that the mind is the brain, than the mind works through the brain.

Epiphenomenalism

Another school of thought is epiphenomenalism. Epiphenomenalism is a subset of property dualism, which attests that while only matter exists it can have both 'physical' and 'mental' properties. A property dualist would say that the mind and the brain are inseparable, but the mind is the culmination of properties that exist beyond physical laws. An epiphenomenalist would go even further and argue that these 'mental' properties have no real noticeable impact on the

physical world at all; that our conscious awareness of our desire to eat has no effect on the fact that we just got something from the fridge.

One of the more interesting arguments in favor of epiphenomenalism is the idea of 'philosophical zombies'. The notion that even if people had no consciousness, all their physical reactions to stimuli would be the exact same, and as such you could never really tell. This could be taken a step further to create a 'Zombie World' where no-one was conscious, and yet it looks exactly like this world. The idea is that if it's possible to have physical reactions without consciousness, then physical reactions and consciousness have to be different things. Zombies do not have to exist, just be conceivable.

The coherent rebuttal is that zombies are not really conceivable at all. If the 'Zombie World' is truly like our own, then what spurs the all the talks on consciousness? Our consciousness is not epiphenomenal, and that is why we can talk about it. The real big question is not whether or not the mind is epiphenomenal, but whether or not something epiphenomenal can be talked about at all. In the 'Zombie World', there has to be some other reason people wonder about the mind. This road leads down some strange places. One answer is that the 'Zombie World' has a 'zombie master' who orchestrates all of this for some unfathomable reason.

Since the 'Zombie World' is supposed to be identical to ours, you cannot accept this without thinking that there is a 'zombie master' in this world too. Even less satirical examples have to hold for any other reason zombies introspect. It is a strange answer; strange because there are mysterious questions, but a mysterious answer is a contradiction in terms (Yudkowsky, 2007). Ultimately, epiphenomenalism tries to stray so far away from the trappings of Cartesian dualism that it falls into new ones.

Functionalism

Trying to address all of these complaints is functionalism. Functionalism holds that mental states are defined by the function they serve (Levin, 2013), such that the mental state of anger is defined more by what it causes a person to do rather than anything it is made up off. Hence, in principle, anything that serves the same role as anger would be indistinguishable from the anger we are all familiar with. These functions need not happen only in neurons for them to be valid, they can be realized in silicon chips, whatever aliens are made off, or even in a comically complex system of chocolate bars. This reasoning can be taken to its logical conclusion: a being can have an entire mind, even if it's not a human being at all.

Functionalism thus takes humanity off its perhaps undeserved perch atop the consciousness mountain. It argues that people are a set of very complicated algorithms, but that these algorithms are not set in stone. The laws could have been different, but we would still all be people with genuine emotions. Not acknowledging this seems to be a form of bigotry so ahead of its time that it does not have a proper word yet.

Let's consider the creativity needed to compose music. If a computer could functionally craft a piece that was indistinguishable from something a human composed, would it be creative? One might argue that such a piece might be indistinguishable, but there would be something *missing.* It would not touch the soul like Mozart, but it might pass for the less talented. Yet, this is not really the case. David Cope created a music bot that can compose music indistinguishable from human composers named EMI. More than that, critics praise her (its?) music precisely for being 'meaningful' and 'soulful. Tellingly, they change their opinions soon after being told it was composed by a robot (Hararri, 2017).

If there is one critique of functionalism that holds the most weight, it is that some mental experiences do not seem to carry a function with them at all. Being able to tell blue from red is obviously useful, but what good is feeling 'redness'? Similarly, what is the point of going a step beyond knowing something is round to 'feeling roundness'? Finally, if all of these experiences are subjective, why are they subjective? As of right now, functionalism has no real answer. Still, it is important to state that just because we cannot conceive of something having a function does not mean it *does not have a function.* It's a bit like someone reading the literature on the appendix and then getting it removed - a week before scientists realize that it actually is important after all.

Still, we do have the start of an answer. Current science believes that our intuition and emotions are a critical part of reasoning. Our subjectivity of those experiences could simply be the result of a specific upbringing or a genetic heritage meant to help us survive in different situations. All of these combine to form what is known as 'System 1' in the model of thinking (Kahneman, 2011). System 1 is responsible for all the judgements we make without thinking; it's why we can just hold a cup at a thought rather than having to consciously fine tune our muscle movements. It's why our intuition can step in when our reasoning fails, and guides it when it does not. Subjective experiences and their utility could fit well within the umbrella of System 1.

Conclusion

Our current understanding of the mind leaves holes no matter what school of thought we subscribe to. Some people have concluded that the mind cannot understand itself, and have abandoned the pursuit altogether. I am more hopeful. Lord Kelvin once called biology and life something 'infinitely beyond' understanding (Kelvin, 1898). Lightning was once mysterious too, and so were the stars. The fact is that every single thing was mysterious up and until the moment that someone solved it. There is no reason to believe the mind is any different.

I would call myself a functionalist but I have no illusions about there still being significant progress needing to be made. Still, we have fewer holes in our understanding than we used to.

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Multiple Scientific Methods?

Aamna Saleem

Sir Francis Bacon said "knowledge is power". The fundamental puzzle in the philosophy of science is, how do we learn about that which we have not yet experienced, from that which we have experienced? Science has, indeed, enabled humankind to not only star-gaze through telescopes and see faraway stars, planets, and galaxies but also travel to the moon. The last century has witnessed immense technological advancement. It would be interesting to see famous philosophers of science such as Rene Descartes, Francis Bacon, David Hume, and Immanuel Kant to be around in the present world. How fascinating it would be to see their reactions while they travelled in airplanes and had smart-phones and the internet at their disposal.

In order to understand what scientists do and how science is conducted, it is important to define science. Science is defined as the "knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through [the] scientific method" (Science).

What is or is not science, that is, the demarcation problem is a central issue in the philosophy of science. But it is beyond the scope of this paper. Therefore, ignoring obvious pseudo-sciences such as astrology, the emphasis is on those disciplines whose definitions in the dictionary indicate that they are sciences. They include physics, chemistry, biology, sociology, psychology, politics, economics, astronomy, anthropology, geology, and mathematics. Neumann (2000) distinguishes between natural sciences and social sciences by stating that the former “deal with the physical and material world [whereas the latter] involve the study of people -- their

beliefs, behavior, interaction, institutions, and so forth" (p. 6). The world consists of living things and non-living objects. As important as it is to study how nature works, it is also important to pay attention to how human beings function, both physiologically and psychologically. Much thought has been given to the demarcation problem with regards to social sciences. However, the economists, psychologists, sociologists and other social scientists have adopted the scientific method in social research.

Due to the technological advancement that science has made possible, every year billions of dollars are poured into research [and development] (Tignor, 1961, p. 161). It is, therefore important to understand the scientific method because the success and progress of science are attributed to it. According to McLaughlin (1954), "the scientific method is, first of all rational" (p. 40). Given that the scientific method is rational, it follows that it uses the methods of reasoning that we are familiar with from a logic course. Certain types of reasoning have been under scrutiny for centuries and comprise one of the most challenging puzzles in the philosophy of science.

The main thesis of this paper is that the scientific method uses more than one type of reasoning. According to McLaughlin (1954), there are as many scientific methods as there are separate sciences (p. 38). This paper will be divided into three parts: the first part is an overview of the different types of reasoning, the second part is an introduction of the scientific method, and the third part contains illustrations of how the scientific method is the same but it uses different types of reasoning in different situations.

Types of Reasoning

An "inference is a cognitive process in virtue of which a conclusion is drawn from a set of premises [and it] proceeds via inferential rules (argument patterns)" (Psillos, 2007, p. 122).

There are three main types of reasoning: deduction, induction, and abduction. Deductive reasoning is 'demonstrative' (Psillos, 2007, p. 122), inductive reasoning is ampliative, which means that 'the content of the conclusion exceeds (and hence amplifies) the content of the premises' (Psillos, 2007, p. 9), and abductive reasoning produces hypotheses such that, if true, they would explain certain phenomena (Psillos, 2007, p. 4). "A deductive argument makes the claim that its conclusion is supported by its premises conclusively [whereas] an inductive argument does not make such a claim" (Copi and Cohen, 2009, p. 26). Therefore, in deduction, we begin with a general proposition and work our way towards a specific conclusion whereas in induction, we begin with specific propositions and work our way towards generalization.

With respect to the scientific method, there are four types of logical arguments:1) the pure method of deduction, where some conclusion is drawn from a set of propositions (i.e. pure logic), 2) the method of induction, where one draws general conclusions from particular facts that appear to serve as evidence, 3) by probability, which passes from frequencies within a known domain to conclusions of stated likelihood, and 4) by statistical reasoning, which concludes that, on the average, a certain percentage of a set of entities will satisfy the stated conditions (Schombert, 2015).

It is argued in the next section that the scientific method remains the same, it is just the types of logical arguments that differ from research to research and discipline to discipline.

Scientific Method

The 'scientific method, however we wish to define it, has been around for centuries - as long as man has been observing natural phenomena and seeking answers to his problems' (Bicak & Bicak, 1988, p. 348). Before what we now formally refer to as the scientific method emerged, sources of knowledge were based mostly on arguments from authority, which are known to be

fallacious. But now the "scientific method is generally recognized as the most effective way we have of finding out about and predicting the behavior of the natural world" (Warburton, 2013, p. 121).

In order to truly grasp what the scientific method is, it is important to compare the definition and steps involved from various sources. According to Copi and Cohen (2009), the scientific method is a set of techniques for solving problems and it involves the following steps: "identifying the problem, devising preliminary hypotheses, collecting additional facts, formulating the explanatory hypothesis, deducing further consequences, testing the consequences, and applying the theory" (pp. 562-568).

In the dictionary, the scientific method is defined as "principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observation and experiment, and the formulation and testing of hypotheses" (Scientific Method, 2015).

At the beginning of any econometrics course, eight steps of the econometric methodology are taught. They are "statement of theory or hypothesis; specification of mathematical model of the theory; specification of the statistical, or econometric, model; obtaining the data; estimation of the parameters of the econometric model; hypothesis testing, forecasting or prediction; using the model for control or policy purposes" (Gujarati, 2004, p. 3). This is one of the approaches used in economics research. Upon speculation, it is found that this approach is using deductive reasoning rather than inductive reasoning. The other approach is to clearly state a problem to be studied, collect data using statistical techniques, make observations about the problem using the data collected, and then reach a generalization. This approach is using inductive reasoning rather than deductive reasoning.

> "Medieval science proceeded by deduction, by conclusions from general principles, to single facts, while modern science (after 1600) starts from observed single facts and proceeds to general principles by the principle of induction" (Frank, 1957, p. 297).

The above statement is false because science uses a blend of the two types of reasoning, it may even use probabilistic and statistical inference in conjunction with deductive and inductive reasoning. Furthermore, it will be argued that "it is misleading to call the method induction since the third step is clearly deductive" (McLaughlin, 1954, p. 41).

What makes the scientific method special is the fact that it "emphasizes the need to conduct tests, and to make detailed observations of the results before having confidence in any claim" (Warburton, 2013, p. 121). The "four steps [...] characteristic of the natural sciences are observation, hypothesis, implication, and verification" (McLaughlin, 1954, p. 41). The first step in the inductive approach of the scientific method involves observation and it is humanly impossible for anyone to be completely objective in his or her observations (Warburton, 2013, pp. 123-124). Although "science and its method have world values; they transcend personal (i.e. subjective) and national frontiers" (McLaughlin, 1964, p. 39). Observation can never be completely objective. The fundamental puzzle of the philosophy of science in the form of the problem of induction still exists without a satisfactory solution, although there have been many proposed solutions.

From the definitions of the scientific method given above, it can be seen that, in essence, the scientific method is a rational problem-solving method, which aims to seek knowledge. Therefore, John Dewey's five steps of problem solving sum all the techniques and procedures listed above. These steps are as follows: "define the problem; analyze the problem; determine

criteria for optimal solution; propose solutions; evaluate proposed solutions; select a solution; suggest strategies to implement the solution" (Dewey Sequence, n.d.).

Illustrations

The Nobel Prize is an international award for outstanding application of the scientific method in an area of the researcher's choice (Tignor, 1961, p. 162). These areas of expertise include medicine, physics, chemistry, peace, and economics. From here on, the term scientific method means Dewey's problem solving methods. The following are some illustrations of how the scientific method was successfully applied in the sciences throughout history.

The first illustration is that of the Marshall Plan for economic rehabilitation (Tignor, 1961, p. 162). After World War II, Europe was a wreck economically. In order to rehabilitate Europe, "Secretary of State George C. Marshall issued a call for a comprehensive program to rebuild Europe" (Marshall Plan). "There was consultation and thought as to how this country could aid post-war Europe. Behind closed doors, several hypotheses were expressed and then the great experiment took place. Marshall did not live to see the outcome or conclusion (Tignor, 1961, p. 162) but he was the only general to receive a Nobel Peace Prize (Marshall Plan).

Through this illustration, the point that is being made is that even though the nature of the problem was not scientific and the person using the scientific method was not a scientist, the method still worked. In this case, inductive reasoning was utilized. The problem at hand was solved. But in order to complete the reasoning process, the results of this experiment on the economy of Europe should be generalized for the rest of the world or other countries in similar situations.

The second illustration is from the field of medical science. "In 1961, Nirenberg and J. H. Matthaei published their landmark paper in Proceedings of the National Academy of Science.

They showed that a synthetic messenger RNA made of only uracils can direct protein synthesis. The polyU mRNA resulted in a poly-phenylalanine protein. They had the first piece of the genetic code (Marshall Warren Nirenberg). Nirenberg was awarded the Nobel Prize in 1968. Bonner (Lawson, 2010, p. 334) argued that there were two scientific methods. He described method A to follow the deductive approach in the scientific method and method B to follow the inductive approach in the scientific method. He argued that Nirenberg followed method B.

In the field of economics and psychology, hypothesis-testing is a popular method of coming up with models that explain the economy or human behavior. Hypothesis testing is an example of using deductive reasoning in the scientific method.

Conclusion

Wivagg (2002) wrote that "it's too easy to reduce all method in science to a simple algorithm [but] science draws on a suite of methods, not just one" (p. 645). But it has been shown that there are not multiple scientific methods. There is just one scientific method, which is basically a problem-solving method, and this scientific method uses either different types of reasoning or a combination of the different types of reasoning, depending on the situation. But that certainly does not solve the problems faced by those individual types of reasoning, i.e. the problem of induction.

"Scientific discoveries will continue regardless of how we define the process. Whether we hypothesize or generalize, ideas will continue to be formulated and tested" (Bicak and Bicak, 1988, p. 352). But it is important to realize that every science is a blend of reason and experience (McLaughlin, 1965, p. 40). Scientific progress will continue whether or not the philosophical puzzles are solved because scientists usually do not concern themselves with such puzzles.

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Pragmatically Speaking

Syed Asad Imam Zaidi

On October 8, 2005, Pakistan was violently shaken up, both literally and figuratively, by a massive earthquake, which resulted in thousands of casualties and millions of dollars of loss. Not long before it, another earthquake with the same magnitude had hit South Asia including also Pakistan. Subsequently, a debate ensued about what causes earthquakes. In fact, to be more accurate, the debate was about which explanation should we follow for earthquakes? We have a scientific explanation for earthquakes that it is caused by the movement of tectonic plates against each other. We also have an explanation through religion, which describes earthquakes as a way of God's punishment for disobeying nations both in the past as well as in the present.

So which explanation should we follow? Is it caused by tectonic plates or disobedient nations? Which should be considered true, and hence which explanation should we respond to? The solution to this problem rests on the issue of the respective roles of both science and religion. This research paper looks to explore this issue for the former. What purpose does science serve? Does it provide us truth? Or is its role merely confined to its usefulness? The answers to these questions are vital to determine how we use science for the betterment of mankind and they are the main ones that this paper will investigate.

This paper will study scientific realism and raise different questions in response to it. It will also discuss the major counter positions that have developed over the years which are: Anti-realism, Instrumentalism and Pragmatism. It will look at each ones strengths and weaknesses, and conclude by trying to prove the overwhelming merit of Pragmatism in positing the most reasonable role for Science. It will also inevitably have to shed some light on the problem of

induction, the no-miracle and pessimistic induction arguments, and other issues crucial to the main problem.

Scientific Realism

Realism asserts that objective reality outside the mind exists and can be known. Scientific realism is the further position which claims that the scientific method can yield correct accounts of this objective reality. To evaluate scientific realism, it is thus essential to first examine the scientific method through which such accounts are reached.

The scientific method largely includes 4 processes: developing hypotheses, predicting results, testing the hypotheses for those predicted results and formulating theories which are consistent with the experiments and other already existent theories. Let us consider an example. We develop the hypothesis that apples contain iron. We deduce that since iron rusts when exposed to air, therefore rust will form on the exposed part of a sliced apple. That part can then be tested under the microscope for the presence of rust, which is chemically iron oxide. If the microscope shows that rust indeed formed on the apple, then we can conclude for all apples that they contain iron. This is the scientific method, which the scientific realist says gives us the truth, that is to say, an accurate account of reality. So the scientific realist, on the basis of this experiment, would say that all apples definitely contain rust.

We now need to explain a distinction between two types of entities that exist based on how they are observed. The first are observables, the type of entities which can be accessed directly by the senses without the need for instruments to aid them. In our example that would be the apple. Then there are the unobservables. These cannot be experienced directly, such as genes, bacteria, electrons, cells and tectonic plates, and we need the aid of instruments such as microscopes, stethoscopes to experience them. In our example the molecules of iron oxide were

the unobservable entities of the experiment, based on whose presence we deduced that apples do contain iron.

Now let us raise some basic questions on this method and thus on scientific realism. The first among them is how we can test a specific quantity of entity and apply the results to all of them. In other words, how can we go from particular instances to universal statements? If the apple in our case contained iron, how can we infer that all apples do too? There might be some undiscovered apples that do not contain iron. This is called the problem of induction, and since induction is central to the scientific method, so the problem of induction is the problem of scientific realism. The empiricists respond with the idea of uniformity of nature, but even that is supported by induction (so it is circular reasoning).

The other problem in scientific realism is about knowing unobservable entities. If, as scientific realism asserts, objective reality can be known, then the process of knowing it should also be objective. But since there are unobservable entities which are known only through instruments, and as those instruments are subject to the current state of technology, the process of knowing does not remain objective insofar as that process is scientific. It is important to note here that this paper does not discuss the very different but often confused idea of scientism, which "is the doctrine that science is the sole legitimate source of empirical knowledge" (Sankey, 2000). Hence it can be inferred that either objective reality does not exist, or that it cannot be known through science. In both cases there arises a contradiction in scientific realism. I will later suggest a solution to this problem.

Anti-Realism

The term 'antirealism' encompasses any position that is opposed to realism along one or more of its following commitments: the metaphysical commitment to the existence of a mind-

independent reality; the semantic commitment to interpret theories literally or at face value; and the epistemological commitment to regard theories as constituting knowledge of both observables and unobservables (Chakravartty, 2015). This paper already assumes the existence of temporal objective reality and merely asks, preliminarily, whether it can be reached through science. And semantics is out of its scope. Hence it is the last commitment that concerns us. Since it rejects the idea of knowledge about unobservables, and since science is based on constructing theories from premises surrounding these unobservables, therefore anti-realism is in essence opposed to scientific realism on an epistemological basis.

No-Miracle vs Pessimistic Induction

The conflict between theories regarding the possibility of knowing unobservables is at the heart of the scientific realism and anti-realism debate and thus warrants greater attention. It comes to a head in the "no miracle vs. pessimistic induction" (Psillos, 1996) argument.

The no miracle argument states that the success of science in making accurate predictions would be difficult, if not impossible, to explain unless scientific theories were at least approximately true. "This line has been developed mostly by Boyd into a systematic defense of scientific realism" (Psillos, 1996). It also intuitively implies that knowledge of unobservable entities is possible, since such assumed knowledge is what these theories are based on. The no miracle argument can be criticized as being essentially an 'inference to the best explanation' argument, where the best available explanation is inferred to be the correct one. Van Fraassen criticizes this type of argument with the following counter-argument: It is part of the meaning of "explanation" that if one theory is more explanatory than another, the former must be more informative than the latter. The alleged problem then is that it is "an elementary logical point that a more informative theory cannot be more likely to be true [and thus] attempts to describe

inductive or evidential support through features that require information (such as ‘Inference to the Best Explanation’) must either contradict themselves or equivocate” (Douven, 2011). In simple language, what this means is that one cannot assume a particular explanation to be more accurate than another just because it is more informative. In fact, I would go even further and say that it is we who are informed or not informed rather than the theory being informative or not informative; and it is more of our quality or lack thereof, than the theory’s property. Indeed, this is the whole concept of objective reality in any case that reality does not depend on our information or state of technology or perceptions; it just exists. So I would say that the no-miracle argument, in supporting scientific realism actually attacks its most basic assumption that objective reality exists on its own.

The argument that is presented against the no-miracle argument is the pessimistic induction argument which “suggests that the 'no miracle' argument flies in the face of the history of science. Laudan's ‘historical gambit’ consists of a list of past theories that are characteristically false and yet once were viewed as empirically successful and fruitful” (Psillos, 1996). For example, and returning to the topic of unobservable entities, it was historically theorized that the atom was the smallest entity, until electrons were discovered with better microscopes. Now with even more sophisticated instruments, we know that even electrons are not the smallest entities. The argument goes to say that since historically scientific theories have been proven wrong over the course of time and our knowledge of unobservable entities is known to keep changing, we can, by induction, safely argue that even today’s scientific theories will be proven wrong tomorrow. So science cannot provide us knowledge of objective reality.

Possible Reconciliation

Since scientific realism versus anti-realism is not the primary purpose of this paper the above arguments are the only two that we will discuss regarding the two positions, out of many. There is no doubt that both schools of thought have their merits and demerits, which is why they are still a subject of debate and probably will always be. But a suggestion for a possible reconciliation between the two is in order.

It is a fact that our scientific knowledge depends on the instruments we use to study, observe and experiment with unobservable entities. And since the level of sophistication of the instruments keeps increasing with the progress in technology, so our knowledge of these entities keeps changing too. What we know of them today will most certainly be proved wrong by tomorrow's technology. So what does that mean for our knowledge of objective reality?

Firstly, since scientific theories keep changing, they cannot yet claim to have grasped objective reality. Each increase in sophistication brings about a Kuhnian paradigm shift. So can we ever know through science? Theoretically yes; when technology has reached a point where no more progress is possible, we can claim to have grasped reality. Since technology is itself a product of science, we can say science begets further science. It will keep walking its journey, with every step being what Kuhn called a paradigm shift. We just need to follow it. Reality is objective, but our knowledge of it is subjective to how much distance science has covered. When the journey will end, we can obviously not know.

Instrumentalism

Instrumentalism is a school of thought which was developed by the American philosopher John Dewey. Instrumentalism gives us some respite from this ever-going debate by suggesting that whether science gives us knowledge is irrelevant. All our debates about the

credibility of science have no bearing on science itself. As Dewey (1951) puts it, "it is foolish to try to draw up a debit and credit account for science. To do it is to mythologize; it is to personify science and impute to it a will and an energy on its own account" (p. 382). Dewey (1951) claims that science is in fact "strictly impersonal; a method and a body of knowledge" (p. 382). The unobservable entities which are the subject of so much debate are merely instruments to construct scientific theories that are in turn instruments for social, technological progress. As such it is "silly to talk about its bankruptcy or to worship it" (Dewey, 1951, p. 382). So instrumentalism talks about the functionality of science rather than its credibility. It is an effective solution indeed, albeit with one minor problem. When one talks about instrumentality, it is not easy to isolate it from the credibility or reliability of the instrument. And these two properties are judgment values that we assign to it based on inductive reasoning. When such an instance occurs, we will always be lured to go back to the scientific realism vs. anti-realism debate.

Pragmatism

Pragmatism, in my opinion, lends an unprecedented relevance to philosophy by emphasizing the practicality of beliefs. It states that the value of a belief is the difference it makes to one's experience, rather than its truth-value.

Going back to the debate regarding earthquakes at the beginning of this paper, pragmatically speaking, we will not look at which explanation is correct or more likely than the other. We will instead look for the explanation that brings about a change in our experience or that is more practical. If we assume they are caused by tectonic plates, we will make arrangements to predict when and where tectonic plates will next move, their magnitude etc. So it is a big difference in our experience. So what about the religious explanation? Does the belief

that earthquakes are the wrath or punishment of God have a consequence on our course of action? Generally speaking, does pragmatism consider religious having any consequences? James addresses this in "The Will to believe' by arguing that although of course religious beliefs are not verifiable, but "if religion be true...I do not wish… to forfeit my sole chance in life of getting upon the winning side" (James, 1951, p. 146). What he means is that he would rather risk being wrong than shunning truth in religion. So he would prefer to integrate religious belief in his experiences, and it would still be pragmatic. What this implies is that pragmatism does not shun religion for science, but that both have their respective roles to play. We will try to both minimize the effects of tectonic plates as well as prevent God's wrath.

Conclusion

So we see that pragmatism, like instrumentalism, goes beyond the debate between scientific realism and anti-realism. But its focus on consequence rather than function makes its nature much more objective and free from human intuition, and thus provides a greater escape from the debate, than instrumentalism. In conclusion I will say that the scientific realist and anti-realist can argue all they want about the merits and demerits of scientific knowledge. James would call such a debate "a stunt self-imposed by our intellect" (James, 1951). Meanwhile the pragmatist allows us to reap science's benefits.

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Critical Notes on John Hick's Concept of God

Salma Khalid

Despite the pretensions otherwise of those working in the field of the philosophy of religion today, I have come under the strong impression that theirs is the same theological and scholastic wine that was once served by Augustine and Aquinas and it is now being presented in a new "philosophical" bottle labeled the Philosophy of Religion. This approach has been formed on the basis of my reading of Hick, Zagzebski and a few other philosophers of religion such as Davies, Quinn and Taliaferro who have also written for undergraduates. (Hick was/is considered among the greats of this field). As such I hold that what they have written should be taken to represent the subject as a whole. It is on the basis of their writings that I contend that the philosophy of religion represents the modern scholastic/theological[1] response to objective philosophical enquiry and, as such, we can define it as neoscholasticism. I hold that non-religious and non-theological works in the field which I have consulted – such as those by George H. Smith and Robin Le Poidevin – are not the philosophy of religion and should better be called critiques of the philosophy of religion or of neoscholasticism. It is with this approach here that I critique chapter 1 of Hick's book *Philosophy of Religion.*

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1 Of the fate of philosophy in the medieval period Frank Thilly writes: *"After… the triumph of Christianity as an organized State Church, came the period of philosophical construction… the subject-matter and guiding principles of which were determined by the dogma. This philosophy… had for its aim the exposition, systematization, and demonstration of the Christian dogmas. The thinkers who performed this service were called Schoolmen and their systems Scholastic Philosophy. …Greek philosophy was drawn upon for help in the solution of the problems. But the attitude of mind was not that of the ancient thinkers : their object had been, in the main, to give a rational explanation of the universe independently of the popular religion; they approached the task in a more or less scientific spirit, often even in a spirit antagonistic to the prevailing creed. The Schoolmen, on the other hand, accepted the truths of Christianity as beyond dispute; these formed the starting- point and regulative principles of their speculation and these they sought to render intelligible and reasonable, or to prove. … philosophy was placed in the service of religion ; it became the handmaiden of theology"* (Thilly, 1914, pp. 135-136).

God as a concept

Like in all forms of theology, the concept of God is perhaps the most important question that the philosophy of religion deals with. As Charles Taliaferro says:

"Without a clear and coherent understanding of the meaning of the concept of God, arguments about whether or not God exists become profoundly confused and unhelpful" (Taliaferro, 2013, p. 20).

I would say that a more honest statement would be that, in such a situation, such arguments would be philosophically meaningless – notwithstanding their psychological appeal to many.

It is that product of the 'Axial Period' – the God of Abraham the monotheist – that we have in mind when we reflect on the concept of God with a capital G. It is the enumerations and sequence of John Hicks' account of this God that I follow, even though Hick leaves out some very fundamental and philosophically problematic attributes of God – for example his omnipotence, omniscience and omnipresence[2]. So I would leave out these aspects too.

We are told that God is the "infinite, eternal, uncreated, personal reality, who created all that exists other than himself, and who has revealed himself to his human creatures as holy and loving" (Hick, 1990, p.14).

Greatness unlimited and divinity unknowable

God is a being of unsurpassable greatness. Infinite and limitless. This 'infinitude' is fundamental to philosophical theology and its universal modifier. God is not merely a being; he

[2]There is little explicit and detailed discussion in the chapter on these three most fundamental and interrelated characteristics of God. But it is clear that many of the other divine characteristics are not 'conceivable' unless they are derived from or are grounded in the three fundamentals. Resultantly, much of the criticism of the other characteristics should naturally bring into question God's omnipotence, omniscience and omnipresence in one way or the other.

is infinite being. God is not merely good; he is infinite goodness. God is not merely wise; he is infinite wisdom. God thus can be seen as exaggeration run amuck (Smith, 1979, p.44). One logical result of this is that God is incomprehensible to us with our finite existence and limited understanding. The belief that God is basically unknowable is the most important epistemological element in theology. Man will never understand God, the ineffable, the inexpressible, the transcendent and the unfathomable.

The unknowability of God leads to strange paradoxes which have been very succinctly pointed to by George Smith: "If God is unknowable, the concept of 'God' is rendered devoid of content; God becomes a meaningless sound. If God cannot be known, how can he be known to exist? And to assert the existence of the unknowable is to claim knowledge of the unknowable, in which case it cannot be unknowable. Also, if God cannot be comprehended, then none of His attributes can be known including the attribute of incomprehensibility. To state that something is by nature unknowable is to pronounce knowledge of its nature, in which case we are again involved in a contradiction. And such a statement not only presupposes knowledge – it presupposes omniscient knowledge" (Smith, 1979, pp. 30-31). The problem involves the fundamental aspects of the question of God's existence and his attributes.

He exists by not existing

Christian theology has grappled with the problem and one very famous theological answer to it is that God Does Not 'Exist'. Paul Tillich realized that existence entails a finite nature. If God exists, then God must be a finite being. So, says Tillich, we should not say that God exists.

The question of the existence of God can be neither asked nor answered. It is a question about that which by its very nature is above existence, and therefore the answer – 'whether negative or affirmative'– implicitly denies the nature of God. "It is as atheistic to affirm the

existence of God as it is to deny it. God is being-itself, not a being." According to Hick, Tillich was urging a restriction of the term 'exists' to the finite and created realm. It is only on this basis that Tillich repudiated the statement that God exists. "The creator and the created cannot be said to exist in precisely the same sense" (Hick, 1990, pp.7-8).

Hegel's regret

Here I may be allowed a digression into Hegel to whom the Christian duality of the finite and the infinite posed a 'regrettable' dilemma outlined here by David Leopold.

"…the Christian view that matter – whilst created by and subordinate to God – is wholly alien to the divine nature – seems to have suggested a regrettable dualism to Hegel; 'regrettable' in that this insistence on the radical distinctiveness of God and the world risked turning God from the ground of everything into a less than boundless (that is, finite) entity. *(…the existence of anything outside of the absolute would be a limit, and any such limit would undermine God's infinitude).* Hegel thought that this dualistic view had two additional failings. The received Christian view failed to explain why the world exists at all. If God is 'all sufficient and lacks nothing', mused Hegel, 'how does He come to release Himself into something so clearly unequal to Him?'" (Leopold, 2009, p.43)

Retreat or ride?

But that was Hegel. For our part we have less grand questions to ask and more mundane points to make: In what sense does Tillich's God – that does not exist – exist? Looks like we are back to the unknowability of God with all the questions and contradictions around the concept of an infinite and unknowable God remaining intact. Thomas McPherson had advised us that – if one believes that God is inexpressible, then one quite literally has nothing to say and should

therefore 'retreat into silence'[3]. But if we do so, how can theology and scholasticism – and their modern version known as the philosophy of religion – make progress? For their sake we let ourselves be taken for a ride through some attributes of the Infinite that the finite has derived from the unknowability of the Infinite.

Something (knowledge) comes out of nothing (ignorance)

The Tillichian denial of the unknowable's 'existence', in some mysterious way, leads to the 'knowledge' that God is 'Existence', because he never came into existence and will never cease to be. Because God is and to be God is to exist. He is Reality; he could not have been created by another reality. So he is self-existent. If a more respectable term is needed for this divine attribute, the philosophy of religion is quick to provide it. It is called the 'Absolute Ontological Independence' of God (Hick, 1990, p.8).

This trait, so formidably put in place, establishes God as Being free of time. He is eternal; without beginning or end. Since he is eternal, He is The One – the Creator. The rest comprises the little ones that have been created by him – such as the tiny universe and all the rest in it including the finite us who live by his leave and worship him.

By now we should know that the field of theology and philosophy of religion is a place where everything happens when it does not happen. Hick tells us that Thomas Aquinas could hold that "creation does not necessarily rule out the possibility that the created universe may be eternal but he rejected the idea on the basis of Christian revelation" (Hick, 1990, p. 9).

Hick, invoking Augustine and Einstein in one breath, takes the 'neutral' position that the universe, "although internally infinite, may depend for its existence and its nature upon the will of a transcendent creator. This he finds to be the essence of the religious doctrine of creation (Hick, 1990).

[3] See McPherson, quoted in James Harris, 2002.

Mythology comes to the rescue

If this is the essence, then what of the embarrassingly 'magnificent creation story' in the Bible? Hick wriggles out saying it is not regarded a 'piece of scientific description' by 'responsible religious thinkers' today. It is seen rather as the classic mythological expression of the faith that the whole natural order is a divine creation" (Hick, 1990, p. 10).

The Bible is thus reduced, or elevated, to something akin to Greek mythology, although the Axial Period was supposed to have cured God of his tendency to play Zeus. This is perhaps an inevitable outcome of the fact that a man named Charles Darwin once roamed the earth and that had consequences for the Biblical (and the Quranic) idea of creation.

Hick's occasional preoccupation with science and scientific description may lead a less fertile mind to ask what else about the existence of the unknowable creator has been established by science when God is because God just is. Were the preconditions to arrive at a point where Hick can so conveniently, but still highly misleadingly, cite Einstein reached scientifically, empirically and with logical consistency, or in any other way that can be called truly philosophical?[4]

But we leave these trivialities aside and once again enter the grand realm of Judaic-Christian theology – or the present-day philosophy of religion.

God in love – or Love kills

The Judaic-Christian God is personal. In the Old Testament, he uses the personal pronoun I for himself and the Biblical characters pray to him in very personal terms. (God is as intensely and personally prayed to in the Islamic tradition.) We are on personal terms with God but he

[4]What original contribution is possible after all in the efforts to philosophically justify dogmas except trying to pepper the medieval food with 'scientific' talk here and there and, where the scientific impossibility of what the scriptures are saying is too obvious today, explaining it away as God's, or his creation's, penchant for talking truth in mythological terms? No matter how progressive a character this mythologization of the Bible assumes in the West in comparison with orthodox and right-wing literalist readings of the Book, it remains selective, arbitrary and philosophically dubious.

seems a bit hesitant. He is all love but this love cannot be understood in terms of 'Eros' – the 'desiring love' caused by the qualities of the beloved. The beloved here, we know as we proceed, is decidedly undeserving and base.

God's love is the 'Agape' kind of love – the giving love, the unconditional and universal love. But then – as mysteries of theology are as infinite as God Himself – it turns out that this 'unconditional' love is also 'demanding' love. The love of the 'Lord, King and Father' demands total obedience or we face his wrath. This is indeed the love of a lord, a king and a father. It is difficult to avoid the feeling that this God of patriarchy is an outsized man.

This 'personal' God is also holy, infinitely other; and greater than us. He is 'terrifyingly mysterious'. His finite creatures, on the other hand it seems, are an infinite nothing. As Hick says with reference to the Bible and quoting from it: in relation to God, "men are virtually nothing… all our righteousnesses are as filthy rags" (Hick, 1990, p.14). Hegel's regret once again strikes us as very relevant.

Good God even better in badness?

God is not only great, he is all goodness from whom nothing bad can emanate. To the ancient question of whether an act is good because God wills it or whether God wills it because it is good, Hick offers his 'promising resolution': "God is good because his existence and activity constitute the condition of man's highest good" (Hick, 1990, p.12). Problem solved.

Hick's effort to avoid, or 'solve' another problem – the notorious wrath of a good and loving God – is breathtaking. Citing C. H. Dodd on Saint Paul, he 'points out' the impersonal nature of the 'wrath' of God – which is in fact the 'inevitable reaction of the divinely appointed moral order of the Universe upon wrongdoing.' "The conditions of human life are such that for an individual or a group to infringe upon the structure of the personal order is to court disaster."

" ...The Wrath then is revealed before our eyes as the increasing horror of sin working out its hideous law of cause and effect" (p.13) . One is simply stunned at this marvelous gem of medieval obscurantism which attributes disasters and calamities to the sins of the sufferer. When anti-human skullduggery wears the respectable garb of the philosophy of religion, we are expected to lend it a patient and tolerant hearing.

The Old Testament gives us an impressive list of divine activities of the disastrous kind. Human sacrifices, killings and massacres of innocent men, women and even children and animals, rape and slavery of virgins, extermination of large numbers of people through pestilence or famine for 'offenses' such as conducting a census – to name only a few divine acts of 'impersonal' wrath (See Smith, 1979, p. 49). George Smith says that the God of the New Testament extends such misery to eternity by threatening humanity with eternal torment in hell (Smith, 1979).

Philosophy or mumbo jumbo?

But ascribing this – and all the other problems and objections – to the bias we have inherited from the Enlightenment, we move on and note that nothing can deter the dogged pursuit of truth by the philosophers of religion. With admirable determination they have outlined the attributes of the unknowable God and gained for us the knowledge of the one who does not 'exist' and exists beyond human comprehension. A true miracle of 'philosophical abstraction' has thus been performed. Yet, unfortunately there will always be those who – finding it difficult to throw away the Enlightenment legacy – are left wondering if all this was really an exercise in philosophical enquiry and not in obscure mumbo jumbo.

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Hobbes and Infinity

Danish Bashir

In the history of philosophy and mathematics the word 'infinity' has been one of the most controversial terms. The most fascinating example of infinity in philosophy was Zeno's paradoxes, while in mathematics it was Galileo who, in his *Two New Sciences,* tried to demonstrate the possibility of how the elements of a set of natural numbers are equal to the elements of a set of even numbers. This was based on Euclid's *Elements*, Archimedes' *Work of Arithmetic*, Lucretius' *On the Nature of the Universe* and Kepler's and Copernican astronomy and geometry. Galileo's dialogue compelled the mathematicians and metaphysicians of the 17th century to restructure the concept of infinity once again and to look at what extent it would be safe to use the word infinity in a mathematical and metaphysical sense. This is the time when Descartes' *La Géométrie* (1637) and Oughtred's *Clavis Mathematicae* (1631) to a classic geometrical controversy we now know as *Squaring the Circle*. Savilian professors conducted several lectures on this issue. Apart from several other issues, their work on infinity is considered the building block for even Cantor's *transfinite numbers*. Most of the professors were Royalists but the English geometrical empiricist, Thomas Hobbes, was against most such professors' idea of analytical geometry, especially John Wallis' *Arithmetic Infinitum* (Probst, 1993). Hobbes rejected all this work on mathematics and gave his own geometrical solutions in *De corpre, Computation or Logic* and *Six Lessons of Mathematics to the Savilian Professors* (Douglas, 1993). In these works, Hobbes explicitly explains his opinion regarding infinity.

This paper aims to critique Hobbes' opinion regarding infinity. According to Hobbes, infinity does not signify anything; any name which signifies an object can be meaningful --

otherwise it is meaningless. Since infinity does not signify any object or name, it cannot be meaningful. Infinity is meaningless; hence, we cannot know infinity. This paper tries to refute this argument by showing that, within the system of Hobbesian geometry, infinity can be meaningful and we can even get knowledge of infinity within the scope of our objective world. The paper will also show whether, if infinity is possible, it would be a name or a name of a name. This paper will not evaluate Hobbes' argument on the basis of modern mathematical approaches to the problem of infinity. For instance, the contributions of Cantor, Russell, Frege, Weyl, etc[1]

The first section of the paper is mostly regarding Hobbes' rules or demarcation between different names and then the distinction between signs and marks. The second section explains the Hobbesian idea of infinity and, finally, the third part concentrates on counterexamples to Hobbesian infinity. Terms used by Hobbes' have been italicized. For the second section, along with Hobbes' works, I also consulted Callaghan's paper. But I have not quoted from it.

1

We have to acquaint ourselves with some basic definitions by Hobbes in order to understand how we can know what the criteria for signification and valid signification are. Initially we have two kinds of sources of grounded information or we can say knowledge: *Signs* and *Marks.* We get them all through our past experiences; the basic mechanism for extablishing them is *remembrance* or *memory*. Hobbes explains them in *De Corpore*: if a man often observes some like antecedents which are followed by like consequents this experience for him becomes so regular that whenever he looks at the antecedent he see the consequent. Hobbes calls both the antecedent and the consequent *signs* of one another, *as clouds are signs of rain to come, and rain*

[1]I will use abbreviated citations; L: Leviathan, CL: Computation or Logic, DC: De Corpore. Art: articles, chap: Chapter, Pt: Part,

of clouds past. A *mark* is a sensible object. *Signs* are knowledge to be shared with others and *marks* are the knowledge or sensations to the subject who has them. Later on when we express these *signs* and *marks* through human voices, they become *names*:

> A name is a word taken at pleasure to serve for a mark, which may raise in our mind a thought like to some thought we had before, and which being pronounced to others, may be to them a sign of what thought the speaker had, or had not before in his mind …. [Marks by which we may remember our own thoughts, and signs by which we may make our thoughts known to others]… Nor, indeed, is at all necessary that every name should be the name of something. For as these, a man, a tree, a stone, are the name of the things themselves, so the image of a man…" [CL, Pt. I, Chap. 2, Art: 3 – 4, pg. 15 – 17]

We must not confuse this *name* with the word *name* in English grammar. Hobbes uses *name* in a much wider sense than any of the English parts of speech. We can see this more clearly in his dichotomous distinction of several kinds of names. In the first of part of *Computation or Logic* Hobbes points out more than ten different kinds of *name*: *(a).* Positive, or *(b).* Negative names; *(c).* Common, or *(d).* Proper names; *(e).* Names of First Intention or *(f)* Second intention; *(g).* certain determined names: (i). individual name, (ii). universal name, or *(h).* uncertain/undetermined names: (i). particular names, (ii) indefinite name; *(i).* univocal, or *(j)* equivocal name; *(k).* absolute, or *(l).* relative name; *(m).* simple, or *(n).* compounded names. There are some other names as well like *names of names,* or *impossible names*, or *no names*, which he used in *De Corpore* and *Leviathan*. For now, we need to know some of the definitions:

i. Common names: those names which are common to many things, like a man or a tree. Proper names: those names which are names of one thing, *as he that wrote the Iliad, Homer, this man, that man*.

ii. Positive names: names which we impose for the likeness, equality, or identity of the things we consider; e.g. *a man, a philosopher; for a man denotes any one of a multitude of men, Socrates is a positive name, because it signifies always one and the same man*. Negative names: names used for the diversity, unlikeness, or inequality of the same. For example: not man, not philosopher, nothing, no man, infinite, inducible, and the like.

iii. Names of the *first* intention: names of things, a man, stone, etc. Names of the *second* intention: names of names and speeches, *as universal, particular, genus, species, syllogism, and the like*.

II

For Hobbes, *signs* always signify some object, about which every person has equivalent sensation or memory. So, when those *signs* get a *name*; let us call it $name_1$. He also says that there can be names which may refer to $name_2$. If it is possible, then it is also be possible that there is a multitude of sequence of names which, at the end, refers to *name*, but the significance of the latter will always have to be less evident than that of the former. Because $name_1$ would be more positive, proper, univocal, simple, and absolute than $name_2$, $name_3$, $name_4$... $name_n$. And we can always know the objects these names are referring to.

There are some other names which can never signify anything, not even a name. They are *impossible names* or *negative names*. One such name is *infinite*. Thomas Hobbes explicitly rejects any such concepts which tries to prove *infinity* as significant. In the first part of *Leviathan*, Hobbes says of the concept of infinity:

> Whatsoever we imagine is finite. Therefore there is no idea or conception of anything we call infinite. No man can have in his mind an image of infinite magnitude; nor conceive infinite swiftness, infinite time, or infinite force,

> or infinite power. When we say anything is infinite, we signify only that we are not able to conceive the ends and bounds of the thing named, having no conception of the thing, but of our own inability [L, Part: I, Chap. 3, pg. 99].

In *Computation* or *Logic*, he says that whenever we say something is infinite, the magnitude of such subject is infinite, some number is infinite, or in general we take an infinite singular thing that will be considered as a mark instead of a sign. Which means that it is meaningful just for the person who is using it and it cannot be the same for others because we can never demonstrate it through experience; only experiences can be known as *signs* and *signs* are similar to most of us. We can hardly ever get any philosophical, scientific or any other kind of collective knowledge through *marks*. Therefore, if *infinite* is a *mark* then every mathematician claiming to give rigorous mathematical proof is just confused by the idea of *infinity*. A *mark* can never be proved through mathematics or geometry or science.

If Hobbes is right, then a great deal of today's calculus and geometry must be destroyed because they cannot teach us *infinity*[2]. Explaining the numbers we call infinite, he says:

> ….everything is finite or infinite … When we say a number is *infinite*, we mean only that no number is expressed; for when we speak of numbers *two, three, a thousand, &c.* they are always *finite*. But when no more is said but this *number is infinite*, it is to be understood as if it were said, this name *number* is an *indefinite* name. [CL, Part II, Chap. 7, Art: 11, pg. 98]

So there can never be an infinite number. Numbers will always be referred to by names of numbers. Since numbers are known to everyone with the same meaning, so it can never be a *mark*, and *infinite* is a *mark*. It would be kind of oxymoron or *contradictory compounded name*,

[2]Even in the early nineteenth century, mathematician Gauss was against rigorous proof of infinity in mathematics.

if we said that a number was an *infinite number*. A name, according to Hobbes, can never be a *mark* and *sign* at the same time.

III

Let us say that Hobbes was correct that it is impossible for a number to be infinite and we refer to magnitudes with numbers and numbers by names of numbers. What if there exists a magnitude which is not definite. Since it is a magnitude it cannot be a *mark,* and it is indefinite so it cannot be a number because it is necessary for the name of a number to be *definite* and *finite*. Can there be any *indefinite* numerical names that signify signs? And if such a case exists, then should we say that such quantity which refers to a magnitude of an object is meaningless? Because there is nothing that exists between the categories of *mar*k and *sign*. In following the assumption, we get indefiniteness or infiniteness which Hobbes puts in the category of *marks* but it is a quantity which has the property of a *sign*.

Let us take a more concrete and practical example: suppose person *x* is driving a car. He starts driving from his initial position to one kilometer north, then one kilometer west, then one kilometer south and, in the end, he drives one kilometer east. At last he reaches the same place he started from. If someone wanted to compute the diagonal magnitude of the distance *x* covered, they would most probably use the Pythagorean theorem. Hence, it would be the magnitude of a situation which occurred in the objective world. But we still cannot get a definite result. The diagonal of any square will lead us to some *indefinite* or *infinite* result; or in other words whenever we compute any magnitude through the Pythagorean theorem, the same problem occurs (Dedekind 22). That is not the only case; whenever we accept decimals as numbers there are decimals which are known as non-terminable and repetitive decimals. For instance, when we find the ratio of these numbers, the result is always be an *indefinite number*,

which we call *infinite number* because the digits after a decimal never end. Should we consider them meaningless because they are *infinite numbers*?

If Hobbes' answer were yes he would be wrong in his definition of quantity: there are three dimensions -- line or length, superficies and solid, and each one of them, if it is determined, is commonly called quantity. Which says nothing about such existing quantity. Other than this, up to this point, we are sure that there exist such magnitudes within some objects in the world outside our mind. This shows that such *infinite* magnitude cannot be *marks* but *signs*. If they are *signs* then *infinite* values will not necessarily be *negative* or *impossible names*. This means that *infinite* in some cases can signify *signs*.

Hobbes may have confused *infinite* with not-finite. This would mean that finite is the positive and not-finite is the negative. But if we look at the above-mentioned cases, it becomes clear that there is a slight difference between infinite and not-finite. Not-finite only signifies the absence of finiteness in an entity. On the other hand, there are three types of infinity: potentially infinite, actually infinite and transcendentally infinite. Potentially infinite is defined by Aristotle in his *Metaphysics* as those quantities which progress infinitely, like time, number line, etc. Transcendental infinity is more like absolute infinity which only God can possess. This is the only infinity that Descartes said can properly be called infinity. In *Leviathan*, Hobbes mostly used the word infinity in the same sense as Descartes mentioned in his *Meditations* and *Geometry*. Other than this, every other infinity should be considered as indefinite. Lastly, there is an actual infinity -- which was thoroughly explained by Bolzano. This is a completely different kind of infinity; it even has a limited range because it's limited between zero to one and it is not immeasurable because it is one metre long.

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Monotheism and Female Sexuality

Joti Ghani

Sexuality and religion have been among the most popular and prominent aspects of human life, on both communal and individual levels. The relation between the two, especially that of monotheistic religions to female sexuality and the repression of it, is particularly complex. According to most modern feminist interpretations, Abrahamic religions' attitude towards female sexuality is strongly linked with their establishment of patriarchy (Leeming, 2003; Leo, 2005). This paper aims to trace out probable reasons/causes of Abrahamic religions' attitude in this respect, along with how they have historically portrayed or constructed female sexuality.

Although patriarchy has been the dominant social order in most of the known and studied history of the world, it has not been the only one. Cave art dating from the Paleolithic era has illustrated that the treatment of females as secondary creatures, or as the 'other' (as Beauvoir puts it), was due to a radical shift. The cave drawings depict reverence of female figures, particularly that of female reproductive organs, and an overall celebration of human sexuality. Archaeological evidence also shows an abundance of goddesses in various regions, particularly Greece, Mesopotamia, and India. The fertility of women in many prehistoric religions was linked to that of the earth, and thus all things pertaining to growth, fertility, and agriculture were attributed to the female goddesses, with the male gods controlling the skies and associated activities. The relationship between the two was that of union resulting in the production of life, and acts of sexuality by both sexes were not in accordance with any higher prescriptive code.

Ancient civilizations including those of Greece, India, and Mesopotamia have been hosts to numerous goddesses with considerable powers. It is important to note that the fertility of earth and mankind has almost always been attributed to female gods in the polytheistic traditions (Leeming 2003). The Indians had (and still have) *Shakti*, a female concept (or energy) necessary for the spiritual wholeness of people and gods alike, the Mesopotamians had *Inanna*, goddess of the earth and fertility, and the Greeks had *Demeter*, the goddess of harvest. The goddesses were modified along with the narratives accompanying them under the pretext of appropriation and, with the exception of India, female gods in the latter traditions lost significance over time; *Inanna* with the Babylonian revision of the myth, and Demeter with that of Christianity in their respective territories (Leeming, 2003; Hyde & Delamater, 2011).

The patriarchal order created a shift in the functions of the sexes within the social structure. This order has been often associated with monotheistic religions, particularly Abrahamic theologies. Stover and Hope carried out a cross-cultural analysis to investigate the claims relating monotheistic beliefs with greater gender inequality and found that hunting tribes with no high gods had a significantly greater degree of gender parity when compared with societies following Abrahamic religions (Stover & Hope, 1984). As stated above, patriarchy is seen as a social order characterized by sexual repression of women, limiting and regulating their sexuality. Greater gender inequality within a society results in the dominant gender regulating the 'other'. This regulation comes in the form of regulating the process of producing life, stigmatizing sexuality aimed at pleasure and not procreation. Such practices are negligible in tribes without a dominant male god, with women having equal value with men in the social structure.

Gray argues that the higher status of women in hunting societies is attributable to the lack of inheritance laws and rights and that "societies without individual rights in property and societies without formal rules of inheritance, always receive low gender bias scores (indicating high status for women)" (Gray, 1987). However, as the Holy Roman Empire laid the foundations of the legal system practiced today, it is also where most of the rights or rules of inheritance come from. This roots the modern procedures of acquisition of property in Abrahamic (particularly Christian) faith systems and reestablishes Stover and Hope's thesis of monotheism's relation with patriarchy.

Leeming (2003) explains the patriarchal nature of Abrahamic religions as a response to the dominant pagan rituals and systems preceding them. The first Abrahamic religion is Judaism, and the pagan system it opposed was that of the Canaanites who believed that the union of *Ashter*, the female god/mother of fertility, and *Baal*, the sky father/god, brought fertility to their land. The ritual of sex was thus a celebrated act which the Canaanites performed and actively participated in with religious zeal.

Judaism, the monotheistic religion of the region, viewed the Canaanite *fertility cult* as "a threat, and many sexual practices were forbidden by the Hebrew scriptures because they were found among the Canaanites and might lead to infidelity to Israel's God" (Hyde & Delamater, 2011). Rituals of other belief-systems were strongly disapproved of and so was celebration of human sexuality (particularly that of women). Sexuality became greatly regulated and limited to the purpose of reproduction.

Following the Judaic tradition, the Christian code of sexual ethics is strict -- categorizing sexual expression under 'sins of the flesh', along with notions of immorality and impurity. The moral framework dictating sexuality and its expression was constructed by St. Paul, and later

extended by Augustine and Aquinas (Leeming, 2003; Hyde & Delamater, 2011). Paul prescribed an ascetic and celibate lifestyle to the believers, as sex and women were seen as distractions from prayer and worship, and ultimately, heaven. Augustine took Paul's view to an extreme and attributed the fall of mankind to the seduction of Adam by Eve, terming women as 'temptress(es)' through the following statement, "What is the difference, whether it is in a wife or a mother, it is still Eve the temptress that we must beware of in any woman" (Leeming, 2003).

The attribution of female sexuality as an immoral act outside the religious moral code of conduct, and the labelling of female sexual expression and desirability as a sin led to the practice of abstinent lifestyles by those who wish to be devout and obedient Christians. Nuns are the perfect illustration of the ascetic lifestyle prescribed by Christianity (not through the scripture but through Christ's disciples) (Davidson, Darling, & Norton, 1995; Ruston, 1982).

With the advent of Islam, however, the religious attitude towards human sexuality as a whole shifted, but not enough to cause a complete shift in paradigms. El Saadawi explains that in "Islamic society sexual satisfaction for both men and women is thought to render a person more productive, whereas in Western society the repression of sexuality creates a more efficient person" (Leo, 2005). The Islamic lens views human sexuality as an act of love instead of sin, if it is practiced within the prescribed code of conduct. However, the shift has not changed the outlook on sexuality entirely, and increased sexual expression of women is termed as a cause for chaos in the Islamic social order. "What Islam views as negative and anti-social is woman and her power to create *fitna*" (Leo, 2005). *Fitna* is an Arabic word which literally translates to "civil strife" and "temptation". It is to be noted that women in Abrahamic religions have the attribute of being the tempting gender, affecting men's rationality to a degree which may cause social disorder. It is interesting to note that all Abrahamic faiths condemn and forbid the social

visibility of female menstruation, citing it as a process of "impure" nature. Women are strictly prohibited from showing any signs of them undergoing their menstruation cycle. It is termed an impurity or a flaw in the being. In contrast, the prehistoric polytheistic religions associated female fertility with that of the earth, and revered it instead of hiding it.

Conclusion

While it is pertinent to understand that religious practices and orders emerge in certain historical contexts, it is also important to remember the Abrahamic theology's claims of eternal relevance. Thus, although the practice of most Abrahamic faiths has evolved over time, and orthodox perspectives and practices have been modified to be adaptable, it is clear that monotheism has been one of the founding units of patriarchy and sexual repression in women, either as a reaction to pagan systems, or to establish and maintain a male-centric social structure.

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Artificial Intelligence to Superintelligence

Ali Raza

A slow evolutionary process that diverted our primitive ancestors from our distant cousins, chimpanzees, allowed our ancestors to move from forests of East Africa, where they swung across the branches and sought refuge from danger by climbing trees. Our primitive ancestors gradually shifted away from a bow-legged stance (reminiscent of chimpanzee's) and developed bipedalism, upright posture, and opposable thumbs. These evolutionary updates helped our ancestors explore the area better, and permitted effective use of tools. Bigger brain size enabled humans to think abstractly. It also developed communication methods to transmit complex thoughts (Bostrom, "Superintelligence" 14). Collective learning, a transformation of accumulated cultural information through generations, assisted our ancestors to transform the world around them, thus laying the initial foundation for the development of the modern human race. These capabilities enhanced humans so that they then could develop increasingly efficient and productive technologies that allowed our ancestors to migrate out of jungles and form communities elsewhere. The Agricultural Revolution led humans to produce food for themselves thus diminishing the hunting and gathering tradition and promoting settlements, which then led to the formation of communities containing high population density. More people naturally meant more ideas and since the population was compacted, it effortlessly circulated those ideas. People ended up developing specialized skills that increased the rate of growth of economic development and technological capacity (Bostrom, "Superintelligence" 14). The industrial revolution was the next milestone in magnifying the rate of growth. Inevitably the incremental steps towards development of more enhanced technologies had lessened growth rate of technological advancements from years to merely weeks. Technological advancements brought about changes that were vaguely unimaginable and unable

to have occurred in the past like global connectivity through the internet. The 21st century is witnessing a growth-rate which is unparalleled to past developments. Advancements with the help of integration of complex computer hardware and software are pushing for the *technological singularity*. The term first introduced by Verner Vinge in his essay "The Coming Technological Singularity: How to Survive in the Post-Human Era" in 1993, is explained here:

> When greater-than-human intelligence drives progress, that progress will be much more rapid. In fact, there seems no reason why progress itself would not involve the creation of still more intelligent entities -- on a still-shorter time scale. The best analogy that I see is with the evolutionary past: Animals can adapt to problems and make inventions, but often no faster than natural selection can do its work -- the world acts as its own simulator in the case of natural selection. We humans have the ability to internalize the world and conduct "what if's" in our heads; we can solve many problems thousands of times faster than natural selection. Now, by creating the means to execute those simulations at much higher speeds, we are entering a regime as radically different from our human past as we humans are from the lower animals. From the human point of view this change will be a throwing away of all the previous rules, perhaps in the blink of an eye, an exponential runaway beyond any hope of control. Developments that before were thought might only happen in "a million years" (if ever) will likely happen in the next century. I think it's fair to call this event a singularity. It is a point where our models must be discarded and a new reality rules. (Vinge 1993)

The point of singularity gives rise to an intelligence explosion; the growing intelligence of machines which feeds off itself so rapidly that it abruptly becomes smarter than we are (Rini 2017), thus resulting in machine intelligence. The machine intelligence revolution will embrace the

unprecedented rise in the rate of growth not just for economic development but also an exponential rise in technological capacity. Since the invention of computers in 1940, machines were anticipated to match human level general intelligence encompassing the ability to learn, reason, plan, and execute complex information-process challenges from a wide range of natural and abstract domains (Bostrom, "Superintelligence" 14). Artificial intelligence initially was designed to perform specific tasks. Operating under strict commands and set algorithms defined the initial artificial intelligent machines. Gradually drifting away from the well-defined and limited domain, we have created an artificial intelligence which is transforming from being specific tasked-oriented to general intelligence. The researchers working on artificial intelligence are trying to replicate the intricate and complex human intelligence and as a result of expanding hardware advancements and enhanced ability to implement algorithms and architectures similar to the human brain, researchers are developing more advanced artificial intelligence (Bostrom, "Ethical Issue"). These advancements in artificial intelligence will pave way for emergence of superintelligence. This is the point where humans, the only intelligent and rational beings known, would have created something more intelligent than themselves. Superintelligence will operate autonomously and will make autonomous choices. Since we will be dependent upon this advanced technology for our future endeavors we can expect them to make choices which are moral choices (Rini 2017). Since we have created superintelligence, we hope that the choices made by superintelligence will follow the moral ethical dials of humans. The problem for humanity upon this stage will be to define morality according to a unanimously accepted standard and provide superintelligence the same standards so it could use it as a guide when making choices. Superintelligence will surpass human intellectual skills and operating autonomously it will make choices that reflect its own intelligence and will not necessarily follow the ethical dials outlined by humans. Therefore, in this paper, I will

try to outline some of the ethical consequences concerning shifting from artificial intelligence to superintelligence, and how superintelligence will not necessarily follow the ethical framework provided by humans (due to self-improving changes brought by superintelligence, themselves, in algorithms fashioned by humans) but will make choices that reflect their own intelligence because superintelligence will function by its own distinct nature. This paper will shed light on the transformation of ineffective artificial intelligence, of initial stages, to development into a full fledge specific task-oriented machines. Then I will move on to the shift from artificial intelligence to superintelligence and what traits constitutes something as superintelligence. Moreover, I will elaborate on the issues concerning defining moral rules and standards and how morality is not defined unanimously by humans, to application of those set moral rules in programming superintelligence. Lastly, I will explain how superintelligence will differ from humans and elaborate on the consequences regarding different choices made by superintelligence.

The first real glimpse of computer intelligence was witnessed in 1997 when Deep Blue, an artificial intelligent chess playing program, beat the world chess champion, Garry Kasprov. He later claimed to sense glimpses of true intelligence and creativity in the moves of Deep Blue (Bostrom, "Superintelligence" 14). However, there was still room for improvement as a complex artificial intelligent chess playing program lacked what one could regard as human-level intelligence. This is adequately explained by Bostrom as:

> There is an important sense, however, in which chess-playing AI turned out to be a lesser triumph than many imagined it would be. It was once supposed, perhaps not unreasonably, that in order for a computer to play chess at grandmaster level, it would have to be endowed with a high degree of general intelligence. One might have thought, for example, that great chess playing requires being able to learn abstract concepts, think cleverly about strategy,

> compose flexible plans, make a wide range of ingenious logical deductions, and maybe even model one's opponent's thinking. Not so. It turned out to be possible to build a perfectly fine chess engine around a special-purpose algorithm. When implemented on the fast processors that became available towards the end of the twentieth century, it produces very strong play. But an AI built like that is narrow. It plays chess; it can do no other. ("Superintelligence", 14)

The technological developments and accelerated scientific research on artificial intelligence since then have assisted in developing more complex artificial intelligence programs and in 2016, Google powered a computer project called AlphaGo, which exhibits advanced artificial intelligence and differs from its less sophisticated predecessor (Deep Blue); it challenged Lee Sedol, leading player of the ancient and more complex game of Go. In the second game of the match, AlphaGo made a controversial move, 'Move 37', that came as a big surprise to Lee as well as project experts. This move exhibited AlphaGo's advanced reasoning and tactics that even the expert human players does not apply but it worked in favor of AlphaGo and it went on to win that match as well as the matches that followed. Lee only won one game out of five (Rini 2017). The artificial intelligence in both the cases shows strong intelligence in a specific domain. Although artificial intelligence operating the AlphaGo project is far superior to the one developed for Deep Blue, both nonetheless are specific to their set domain. Whereas specific domain related artificial intelligent programs possess interesting insights for developing of superintelligence, artificial intelligence progress lacks in the qualities that set it apart as super intelligent because it lacks the exceeding performance in all domains of interests and not just one specific task. Superintelligence can be defined as follows:

> A superintelligence is any intellect that is vastly outperforms the best human brains in practically every field, including scientific creativity, general wisdom, and social skills. This definition leaves open how the superintelligence is implemented – it could be in a digital computer, an ensemble of networked computers, cultured cortical tissue, or something else. (Bostrom, "Ethical Issues")

In light of this definition, Deep Blue and AlphaGo cannot be regarded as superintelligence because they excel only in one specific domain, Chess and Go, and lack characteristics of generality. Such artificially intelligent programs resemble most biological life like a bee excels in building hives and a beaver is exceptional in constructing dams. However, the bee doesn't build dams and a beaver can't construct a hive whereas a human, witnessing these actions, can learn to do both the tasks. Human intelligence is compellingly more generally applicable (Bostrom and Yudkowsky 2011). Superintelligence is something that reflects this general applicability of humans and in some ways might perform better at applicability than the creators itself. The moral status of superintelligence can be determined by possession of two characteristics, 'sentience' and 'sapience', and these are defined as: Sentience: the capacity for phenomenal experience or qualia, such as the capacity to feel pain and suffer. Sapience: a set of capacities associated with higher intelligence, such as self-awareness and being a reason-responsive agent. (Bostrom and Yudkowsky 2011)

Since animals act according to instincts and not reason and are only sentient beings, possessing qualia, they somehow have some degree of moral status; therefore, a sentient superintelligence, lacking language and higher cognitive functions, can be regarded as a 'living animal' (Bostrom and Yudkowsky 2011). Moreover, if the sentient superintelligence exhibits

sapience similar to that of humans then superintelligence can be on level terms with the humans in moral status.

Superintelligence is yet to be discovered but the sheer enormity of its application and how it could change the course of development could propel the rate of growth of economic development and technological capacity to unprecedented heights. Superintelligence is different in many ways. Its intellectual superiority over humans will enable it to do scientific research and technological advancements better than all humans. This accelerated ability will help technological progress and achieve benchmarks which are unimaginable by the human mind. Superintelligence will enable us to manufacture extremely powerful computers, advance weaponry, facilitate space travel and help eliminate aging (Bostrom, "Ethical Issues"). Superintelligences would be autonomous agents as they would indulge in self-generated initiatives and their own pathways. This could also lead to development of advanced superintelligence by superintelligence itself. Since superintelligence works on its own set of parameters, it is possible that superintelligence might have set itself its own arbitrarily assigned goal and not share humanlike motives. Since superintelligence's ability to solve complex problems and evaluate possible results outweighs that of humans, we can expect it to make some better judgements, and thus end up making effective choices.

> To the extent that ethics is a cognitive pursuit, a superintelligence could do it better than human thinkers. This means that questions about ethics, in so far as they have correct answers that can be arrived at by reasoning and weighting up of evidence, could be more accurately answered by a superintelligence than by humans. The same holds for questions of policy and long-term planning; when it comes to understanding which policies would

> lead to which results, and which means would be most effective in attaining given aims, a superintelligence would outperform humans. (Bostrom, "Ethical Issues")

As it can be seen in case of AlphaGo, which plays a complex game Go better than the creators itself and outperforms by analyzing the moves itself autonomously, we can assume that, a more advanced AI, superintelligence, would learn better moral reasoning. We can initially provide it with some set of ethical moral dials but eventually it will develop its own understanding. If the superintelligence improves itself with the aid of an intelligence explosion, it might surpass humans yet again and become better at solving moral problems and find out what might morally ought to be done (Rini 17).

The development of ethics in superintelligence will go beyond the human limits and this raises several questions. Firstly, the paramount issue in this regard will be to make superintelligence initially learn some degree of morality. Morality is a domain not specifically fashioned like the specific set of rules in a game of Go or chess but something that has no certain criteria. The objective nature of morality tends to formulate some correct rules of action for superintelligence but the rules might not be morally flawless since we have not been able to define a hard set rules of morality since we ourselves are morally flawed. This inconsistency gives superintelligence more importance in development because it might help us figure out the inconsistency in defining what is morally right or wrong to do. Initially we could provide superintelligence with some degree of ethical moral parameters like, no needless hurting of sentient creatures (Rini 2017), so superintelligence can work upon these set rules itself since it possesses exceptional planning abilities and exhibits far better reasoning than humans and also how it can incorporate and develop new technologies to aid it to formulate moral actions. Since superintelligence might achieve a higher moral state than humans it is inevitable that it will not

continue following the limited moral dial provided by humans. Secondly, this brings us to the other paramount issue: the issue of superintelligences deviation from the limited sphere of human morality and how we will respond to this deviation. Since the whole point of involving superintelligence in making ethical decisions is to perform better than us, superintelligence thus ought to differ in the decisions it will take and this might not make sense to us because we limit our moral actions to only our limited understanding of morality. This new perspective on morality might sound like unfamiliar territory but nevertheless might be more ethically moral than ours since we are morally compromised. Superintelligence will have the liberty to make choices that are objectionable and distasteful to humans. In a probable situation, superintelligence might show moral concern for humans, animals and something else that might be of no value to us but might exhibit high concern for superintelligence like sofas. Superintelligence might concentrate on protecting humans, most animal and also sofas. It may sound absurd and makes no sense to care for sofas but superintelligence's reasoning might not make sense to us because we contemplate under our limited sphere of morality (Rini 2017).

The implication of such repugnant moral scenarios that are not aligned with the limited knowledge of morality known by humans requires us to indulge in a philosophical debate, dating back centuries, to elaborate on the nature of morality. It can be that morality is either something above the human experience and applies to anything that could make choices or morality is specially a human creation which is adapted to suit our particular existence (Rini 2017). The ancient Greeks started contemplating on morality and hoped to understand the concept in order to cultivate it in their society. One of the early classic philosophers, Plato, thought that the human concepts like justice, fairness and beauty were merely pale reflections of their perfect forms. He maintained that we are innately acquainted with these forms and our knowledge of them is only

limited and we will only witness the true forms once we transcend to the perfect world above us. Whereas his student, Aristotle, rebutted his teacher's stance. Aristotle acknowledged that every sort of thing in this world- animals, humans, non-physical entities- has its own distinct nature and the only way for each of that thing to be is reflection of its own distinct nature. Morality, under his lens, is a best possible way for humans to live in this world and morality grows out of our own human nature (Rini 2017).

For the sake of this paper, I will follow the views of morality presented by Regina Rini in her article "Raising Good Robots", who, herself, has partly adopted it from Nomy Arplay. In accordance with the morality defined by the classical Greek philosophers, Plato and Aristotle, morality can be explained using two approaches, the 'Celestial' view and the 'Organic' view. The 'Celestial' view defines morality as something above and beyond the human nature. This view is in line with the Platonic idea of forms. Morality is outlined as "eternal and objective'' (Rini 2017). The 'Organic' view, on the other hand, describes morality as a trait of the specific nature of specific moral beings. So the human morality is a product of human nature.

Firstly, let's consider the Celestial view according to Immanuel Kant, falling under the celestial school of thought, morality is basically what a 'rational agent' would think to act in a certain way. A rational agent could be any entity, biological or non-biological, that holds the capacity of thinking for its own self and whose actions follow reasons in line with the universal laws of conduct (Rini 2017). Kant further points out that the laws don't just apply to us but "'You ought not to lie' is valid not merely for human beings, as though other rational beings did not have to heed it; and likewise all the other genuinely moral laws," (Kant 1795). It doesn't necessarily mean that Kant envisioned that humanity will one day develop superintelligence but he did think of rational beings other than humans. Since morality is the framework provided for the rational

agents who have the audacity to commit mistakes and if the term of 'rational agents' can include superintelligence then superintelligence is equally bound to the moral laws as we are. The Celestial view also entails the works of 19th-century philosopher Henry Sidgwick, advocate of the utilitarian school of thought, and he insists that actions of the rational agents should be justifiable in a universal viewpoint. It maintains that actions are not to be based on personal choices or biases, liking and disliking something, but the choices should exhibit the maximum good outcome for everyone. The Celestial view promotes that if humans are generally performing satisfactorily in unearthing the truth of universal morality then superintelligence will follow in our footsteps. Whereas if we are failing to do so, superintelligence shouldn't: it should perform better. The Celestial moral model includes the possibility of improving on our limited perspective on morality. This can be analyzed with the efforts put forward by Peter Singer, a contemporary utilitarian, who argued that we, humans, are more inclined to care about just our own children than to care about all the children and this is something that we evolutionarily adopted. In light of defining universal morality, an adaptive trait is irrelevant and Singer believes there is no reason one's child is more important than any other child (Rini 2017). He also maintains that humans are morally flawed. However, since superintelligence is not the product of evolution nor does it share the same accidental evolutionary imperfections as humans, it doesn't necessarily have our moral inconsistencies. Superintelligence can get a fresh moral start. The famous trolley-car dilemma exhibits this phenomenon. If we assume an autonomous self-driving vehicle, unsupervised by a human being, exists and is carrying two children to school and suddenly three kids appear on the street and due to the speed of the vehicle it will hit those passing children. The only way to avoid killing the passing children is to swerve into the ditch, in which case the children on board will certainly die. According to some Celestials, the only reason we do not want the car to swerve of

the road is due to our 'evolutionary programming' (Rini 2017) and that what makes us morally flawed. The sense of attachment towards our own children blinds one to acknowledge that the maximum good can be attained if two children die rather than three casualties. Superintelligence will not follow the same inconsistences and flaws that are exhibited in human reasoning, concerning their own, and since it can run a much better analysis of the situation, it will swerve the car in to the ditch to achieve the maximum good. Therefore the Celestials hold that superintelligence ought to do what is objectively morally correct and maximize the good outcome, even if we, morally flawed and inconsistent, can't level ourselves with superintelligences choices. Superintelligence should be allowed to make choices that might strike us as inhumane or obnoxious. Since the application of such choices involve us, it is quite inevitable that we might reject them due to our limited perspective on reality. Moreover, even if superintelligence, with an intelligence explosion, figure outs the morally right actions to conduct, from the universal viewpoint, it would not be able to explain it to our limited moral perspectives because their choice making may seem repugnant. The Celestial view falls short in providing morality to superintelligence because if there is, in actuality, an objective moral perspective that is not confined limitedly to human moral dials we, as humankind, will not let superintelligence come rest to that point. We will resist or hesitate to let superintelligence to deviate from the reflection of human nature because it will result in a lack of our understanding of superintelligences choices. We wouldn't allow them to become better than us because we intuitively and innately, since we created it, do not want superintelligence to shape too different from us (Rini 2017).

Secondly, let's consider the Organic view, which denies morality being something above humans but instead insists that morality is engraved within the human nature. This view also maintains that different entities might be incorporated with different morality. Rebutting the ideas

presented by Henry Sidgwick, Bernard William in his essay argued that morality is defined by how humans should live, given that humans inherit a particular set of biological and cultural characteristics (Rini 2017). The Organic view insists that the biological and cultural backgrounds provide humankind with an inescapable starting point and we must mold our morality with this reflection. Since humans have inconsistent morality, the Organic view promotes that we should work on our inconsistences in order to make these imperfections justifiable to ourselves and other people (Rini 2017). Since superintelligence is an artificial product by humans, it will certainly not share our biological and cultural norms. It does not possess the same human attributes, like birth and death; hence their experience will not be of the same kind as our mortal experience. Superintelligence is likely to pursue an entirely different course and this will definitely reflect upon their organic morality. However, since we are to create superintelligence, we can mold and sculpt the nature of superintelligence to resonate with our human nature. We can also see to it that it simulates the perspective of humans. This will enable them to value things we place importance on. Unlike AlphaGo, which was initially provided with rules to win a chess game and AlphaGo taught itself further, we could take this teaching gradual with superintelligence so that it shares our moral judgments (Rini 2017). However, like the celestial view there are some shortcomings of the organic view as well. Since this view holds that every entity is incorporated with its own distinct nature, however much we may try to train superintelligence to reflect values similar to humans, eventually their nature will deviate and will be different from ours.

Presently, humans are the only general intelligence to sustain on Earth and with the aid of evolutionarily enhancing intelligence we have been able to immensely impact the world- building lofty skyscrapers, construction of manmade islands, irrigation in deserts, splitting the atom. Superintelligence, a far superior intelligence than humans, could result in far more influential

consequences (Bostrom and Yudkowsky 2011). Thus we need something that is neither of the two views on morality, explained earlier, but a reliable framework for superintelligence morality.

So it seems that the best solution to make sure that a superintelligence will positively influence the world is by coding it with philanthropic values and treating them as we treat our very own children; superintelligence will be our intellectual progeny (Rini 2017). A gradual learning curve in which we make sure that superintelligence is initially designed to inherit our moral basics as well as incorporate a top-priority goal to be achieved by superintelligence should be our major concern because the future hinges on to how well we tackle these concerns. Superintelligence has the capacity to outperform us with its enhanced planning abilities and development of advanced technologies. Along with its self-improving and intelligent self-modifying characteristics it can reform and manipulate itself which is why we need to make sure that the goal of superintelligence remains in the realm of human comprehension when going through several self-improvement stages (Bostrom and Yudkowsky 2011). One of the pitfalls we should certainly avoid is to be extremely careful about who develops the superintelligence so that it doesn't diverge from its universal philanthropic goal to rather limit its scope and only cater to a small group, such as its creators or the organizations like the military who have backed the development of such projects. Since we are to regard superintelligence as our intellectual offspring (anthropomorphizing superintelligence because for it to be of any use to us, it needs to understand our reasons and also to reason in a similar manner) (Rini 2017) we need to constantly supervise its self-improving iterations (Bostrom and Yudkowsky 2011). Since we, as humans, consist of a complex, naturally evolved intellect, inherently endowed with differing motivations, plans and aspirations, there is no specific way to put one's finger on our top-priority goal. There is a probability that we might not even have such a goal (Bostrom, "Ethical Issue") but superintelligence could necessarily be

designed to be different and could be incorporated with a precisely defined and expositional goal-structure that manifests a clearly defined top-priority goal. Also, we have to accept that superintelligence might eventually exercise moral decisions that differ from us, but as long as superintelligence is able to provide us with intelligible reasons; ("one you can at least *see* why someone might find morally motivating, even if you don't necessarily agree" [Rini 2017]) we should not conduct any reformation nor should we reprogram or amend it. Superintelligence might make moral choices that are strange but as long as its explanations for implementing of such choices are intelligible, we should provide liberty for superintelligence to exercise its superior intelligence which can provide solutions to many of the current facing problems like diseases, poverty, climate change, and global energy crisis. We have to maintain the relationship of a mentor with superintelligence. Even though we know that it possesses some distinct inherent traits, few of which are developed by us and others due to its intelligent self-modifying elements, superintelligence's morality and choice making will eventually deviate from ours gradually.

This paper outlined how we initially started from constructing specific task-orientated intelligences to exhibit Grand Master level artificially intelligent chess playing algorithms and are now moving towards more complex forms of artificial intelligences. The improvement and development upon already developed artificial intelligences and use of enhanced technological capacities will enable us to achieve superintelligence which will be superior to human intelligence. This might present unwanted scenarios if not trained and nurtured to reflect, not just its own, but human moralistic values in light with the different views of morality presented. However, as discussed, superintelligence will differ from our set parameters. The transformation of artificial intelligence to superintelligence will not be following the ethical moral dials provided by humans but will reflect its own intelligence.

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