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ESSAY ON A COMPARISON BETWEEN SCIENTIFIC AND THEOLOGICAL EPISTEMOLOGY

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Abstract

A comparison of epistemology of religion and that of Science seems to be crucial to the human being of today who develops in a surrounding defined to a great extend by Science, and yet seeks a meaning of life that Science is not able to deliver. In particular, we describe several similarities and major differentiations between the scientific epistemology and the Christian-theological-eucharistic epistemology. We infer that there are several common features in both ways of knowledge and some major differences. Our analysis suggests that a synergy of the two methodologies is normal in modern times and that the theological epistemology can complements scientific research process to its humanization.

Keywords: theory, knowledge, Science and Religion, physical laws, Person-God

1. Introduction

In this paper we will compare the methods by which we reach scientific and religious knowledge (in the Orthodox Christian Church). By comparing the methods of each theory of knowledge, we hope to shed some light on our ability to understand the timeless physical and metaphysical questions that face all thinkers.

In Section 2, we will describe several common characteristics between the scientific epistemology and what we will call religious, theological or Eucharistic epistemology, that is, knowledge acquired by the practice and experience of the Christian faithful. In Section 3, we will discuss two major points of differentiation between these two methods.

2. Similarities between scientific and theological epistemology

2.1. Faith as a condition of knowledge

Many years ago while I was on sabbatical at Imperial College in London working on a scientific project investigating the dynamic of some planetary

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magnetospheres, I entered into a philosophical inquiry with another Greek physicist and philosopher about epistemological issues. My interlocutor attacked recent epistemology thought. "*I think*," he told me, "*I was the first to point out that Popper's principles are non-rational. Whatever is not proven rationally is impossible to discuss*," he added in a manner as if to provoke my reaction. "*Would you like to define what you mean by 'truth'?*" I asked. "*Truth,*" he replied, "*is what can be scientifically proven*". "*Yes, but can the statement just delivered be scientifically proven?*" I asked. "*No*" he replied in a way as if he were in urgent need to confess. "*Certainly, the definition of scientific truth lies on a logical contradiction*".

The answer to the question 'how is Science related to the truth' or even 'what is the criterion of scientific knowledge' cannot be delivered by Science itself, because no scientific theory confronts the above question; but must be given at the philosophical-metaphysical level.

My interlocutor's point of view that a scientific description of the Universe informs us of the ultimate truth of the Universe, presupposes that it is fully intelligible through the scientific method. But where does this confidence originate that man relying on his own capacity - the scientific method - can obtain an absolute knowledge of the world? *"This faith of Science, as it holds today, is as non-rational as any religious faith. The great majority of people nowadays, scientists included, do not share a rational attitude towards science: they believe in it. It is indeed a kind of faith. Furthermore this faith must be challenged, for it concentrates the power of knowledge in the hands of scientists; it promotes the view that physicians, engineers, physicists, and economists possess the answer to all the problems humanity confronts"* as stated by the philosopher Cornelius Castoriades [1].

The effect of the view that has been widely accepted since the Enlightenment - that the scientific method is the only valid tool of knowledge, is to raise the creator and user of the scientific method, the human being – to be the absolute judge of the truth of Being, in essence to become Lord and God. This amounts to the most powerful implementation of the anthropocentric principle to the core of Science, which is rejected by scientists in other cases.

The Church suggests that our faith should be placed in Jesus Christ, in Man-God, and certainly not in the finite human being. Faith in Man-God lays the foundation from which man starts his way towards the realization of truth.

2.2. The functional and social dimension

Scientific investigation is learned by a person engaged in research; it is not enough to read scientific manuals to learn how to conduct scientific research. Thomas Kuhn wrote that "*the concept of science resulting from these (classic texts and manuals) can be compared to the image of a national culture emerging from tourist brochures or foreign languages manuals*" [2].

Indeed, the evolution in scientific knowledge functions within a frame of life and action that not only includes, but transcends the learning process as reading a scientific text. This framework includes personal research activity, apprenticeship with other scientists, familiarity with experimental methods and theoretical analysis, participation in scientific conventions, meetings and membership in associations, the assessment and publication of research results in scientific magazines, collaboration with other scientists, the guidance of a scientific team, interdisciplinary approaches, interaction with the cultural, political, religious and social environment, and the interaction with technology, industry etc.

Likewise, spiritual knowledge is gained by a process that surpasses the notion of knowledge as information obtained by reading, and has a liturgical character, similar to that of scientific knowledge as described above. For the Orthodox Church, the centre, the heart and simultaneously the expression of reality is in the Divine Liturgy (the Greek word λειτουργία comes from the synthesis of the words λαός = people and έργον = work), whereas the work is accomplished through hymns, words, images, motion, scent, physical exercise, bread and wine. There in the Divine Liturgy all senses and the whole mind are used to reach the supra-sensible viewing and contemplation of the mystery of life. For the Orthodox Church, Scripture is the ultimate written text. But Scripture cannot be considered outside or apart from the Church; it is placed, that is, it is read and understood, within the Divine Liturgy and the Church.

Furthermore, it must be added that scientific research cannot develop unless the researcher takes into consideration the experience of other researchers on the subject at hand. When a researcher announces his results to the scientific community, and these in turn are either accepted or rejected by other experts-scientists. It is obvious that the function of scientific knowledge operates within a community of experts. The progress of Science presupposes science as a social phenomenon.

By analogy, spiritual knowledge of the faithful is guaranteed when it is liturgical and ecclesiastical. That is, when, it is in agreement with the experience of all the living and deceased saints, and when it functions with their help. As Saint Apostle Paul says: "*May be able to comprehend with all saints what is the breadth, and length, and depth, and height; and to know the love of Christ, which passeth knowledge, that ye might be filled with all the fullness of God*" (Ephesians 3.18-19). A spiritual individualistic knowledge even when it wishes to be religious and spiritual is at risk of deviating to an imaginary world of psychological and other experiences far away from the community of "all saints".

2.3. Experience as a basis of knowledge

Another correlation between the function of scientific knowledge and the nature of religious knowledge, as offered by the Divine Liturgy, is the feature of knowledge as experience.

The scientific method is based on the gathering of empirical data through experimentation to support theoretical suggestions or claims. Since the Enlightenment, this grounding of knowledge in empirical experience has given greater credibility to science than to any other kind of knowledge.

In a similar way with the modern scientific methodology, the knowledge of God often starts with faith, the study of His word, and then becomes experience inside the space and spirit of the Divine Liturgy. Abbot Isaac describes the relationship of faith and real knowledge or experience as follows: "*Knowledge which precedes faith is one thing, whereas knowledge born by faith is another… faith leads us so as to conduct good deeds and thus spiritual knowledge is given to man…Spiritual knowledge is the sense of hidden divine mysteries, and when man feels these invisible and utterly transcending things, out of which the name of spiritual knowledge is acquired, and through this sense another faith is born, which does not turn against the first type of faith but confirms it*." [3]

A faithful person and even a non-religious person experiences the serenity and peace of the Holy Spirit during the Divine Liturgy and even while sitting alone in a church, simply because he is inside a sacred space. This experience of grace felt is explained by the fact that in this space, at some other time, the mystery of Holy Communion took place during the Divine Liturgy. Orthodox Christians believe that within Holy Communion lies the core of the Universe, the source of love, the grace of God. And what is written in the Bible and other texts of the Church is mostly the record of saints' experiences in God and is offered by the Church not just for hearing or learning, but as an invitation to every person to verify these experiences (not only supra-sensible experiences of the spirit but even sensible ones).

2.4. The unknown substance of being

According to the Fathers of Orthodox Church, it is beyond the limits of human experience and thought to understand either the substance of the world (Saint Basil, Bishop of Caesarea) or the substance of God (Saint Gregory Palamas, Archbishop of Salonika). In this worldview, scientific knowledge extends to knowledge of the energies of the natural world and spiritual knowledge tastes and contemplates the acts and energies of God; the essence of the natural world as well as the essence of God remains unknown.

We know, for example, the electron by its actions but what the electron is cannot be grasped. We can neither grasp what matter is.

Materialistic philosophy defines sometimes 'matter' as whatever exists, but this is a philosophical definition and not empirically derived. The question is: "what is Being?"

2.5. Is there any objectively demonstrable knowledge?

Although the observable data resulting from the experiment is what gave glamour to the scientific method, as well as arrogance concerning its undoubting power as a cognitive way in contrast to all other ways of knowledge like for example religion, modern research has demonstrated the difficulty to answer in a rational way certain of the basic questions related to the nature of the science itself, and finally the question: 'what is science?' This is due to the fact that all certainties concerning the invincible power of the scientific truth are shaken the very minute we attempt to answer with rational clarity the question: 'what is the criterion of the scientific method, which differentiates it from non science?' The common prejudice that 'science is that knowledge which can be experimentally proven by everyone', it is obvious that it is an approach not compatible with the history of Science. This simplified definition of the scientific method is imperfect for various reasons. We will refer to a few of them epigrammatically. According to most indications, a claim about a final agreement between theoretical models and observations is in general highly problematic. Succinctly I will refer to the following relevant formulations of distinguished researchers of scientific methodology.

According to Popper pioneering work 'The Logic of Scientific Discovery' [4] there are but false scientific theories; however, there has been progress towards less erroneous theories in the course of time.

Kuhn pointed out that "*No theory ever solves all the puzzles with which is confronted at a given time; nor are the solutions already achieved often perfect",* and concludes that "*If any and every failure to fit were ground for theory rejection, all theories ought to be rejected at all times"* [2, p. 146]. In the same direction, P. Feyerabend concludes: "*According to our present results, hardly any theory is consistent with the facts. The demand to admit only those theories which are consistent with the available and accepted facts again leave us without any theory. (I repeat: without any theory, for there is not a single theory that is not in some trouble or other). Hence, a science, as we know it can exist only if we drop this demand also and revise our methodology, now admitting counterinduction in addition to admitting unsupported hypotheses*." [5]. Or as an article in Physics Today infers: "*Sometimes theory and experiment are correct, but they are not in agreement. Sometimes a wrong theory fits in with the experiment. We must therefore be careful not to jump to conclusions*." [6] At this point, we must note down that what scientists often call the 'agreement' of the observable data with the theoretical model presupposes – almost always - a generalization of the validity of a finite number of measurements or facts or an approach of the observations to a model.

Moreover, it seems that there is no a well described and generally accepted criterion that leads us in a rational way to the verification of a false theory and to the acceptance of another. Kuhn characteristically comments: "*Lifelong resistance, particularly from of those whose productive careers have committed them to an older tradition of normal science, is not a violation of scientific*

standards but an index of the nature of the scientific research itself. The source of resistance is the assurance that the older paradigm will ultimately solve all its problems, that nature can be shoved into the box the paradigm provides. Inevitably, at times of revolution, that assurance seems stubborn and pigheaded as indeed it sometimes become. That same assurance is what makes normal or puzzle-solving science to exist." [2, p. 146]

The difficulty of using strictly rational criterion in Science to initiate the transition from a false to a correct scientific theory has been remarked on by the eminent physicist of the 20th century M. Planck as follows: *"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it"* [2].

Lakatos proposes the following criterion for the rejection of a scientific theory: the general sense that scientists have in a specific era. It is immediately understood that the concept of the criterion is so much broadened, that it obviously cannot be considered as a rational one.

An analysis of the history of Science and the failure to agree on a rational criterion for the truth of a theoretical statement as based on observations led the physicist and philosopher Feyerabend to make the following comment: "'Anything goes' does not mean that I shall read every single paper that has been written - God forbid! - it means that I make my selection in a highly individual and idiosyncratic way" [5, p. 159]. This statement could mean in our view that logic can finally return to its lost source: the logical Person or, even more, the Person - Logos [7, 8].

An elevation of the rationalism or the absolute relativism of knowledge as social faith may allow political authorities to an absolute authoritarian manipulation of society in the name of the Absolute Truth or Its absence. The elevation of the truth of the Person as a point of reference supports the responsibility of the community of persons as a propulsive force of society.

Let me conclude this point with a discussion of a well-known scientific event. As has been widely reported in the scientific literature, the depletion of ozone in the atmosphere endangers life on our planet. The first records of ozone depletion in the Antarctic were made by a British scientific group while studying the problem from 1982 to 1984. The first publication of this phenomenon took place in 1985. The group, however, was distrustful of their measurements of ozone reduction, because the meteorological satellite Nibus-7, which had been in orbit since 1978, and was equipped with the appropriate instruments did not give the relevant information. But why didn't the instruments of Nibus-7 lead to the discovery of the 'ozone hole'? Experts in Atmospheric physics and chemistry knew that the measured accumulation of ozone had never before been below 200 Dobson units. So the programmers in the Center of Space Flights of Goddard (CSFG) decided to reject every measurement below 180 Dobson units, attributing these measurements to a fault of the satellite's instrumentation. This action lied upon the hitherto measurements and the conviction that theoretical models ascribed with fidelity the atmospheric processes. This action was

scientifically legitimate since Science functions constantly with working hypotheses. Such a scientifically legitimate procedure led the scientists of CSFG to the deletion of this anomalous behavior of the atmosphere (depletion of the atmospheric ozone). However, there is a bigger risk for scientists (and non-scientists). Forgetting that not only every theoretical model is a working hypothesis for the research of nature but also that the scientific method itself should be considered as a 'working hypothesis' helping us certainly to acquire a partial knowledge of reality.

Through this realization of the fundamental limitations of the scientific method, that new facts and new cognitive instruments may transcend its conclusions, we avoid the rejection of vital regions of reality, deleting them as 'wrong' facts or data.

2.6. Knowledge as creation

What is the relationship between Science and spiritual knowledge to art, that is, with beauty and creativity?

Artistic creativity does not arise deterministically from matter and experience, but it presupposes it. That is why every artistic creation is an act of the historic incorporation of the artist into a temporal and social region as well as with his freedom, his personal uniqueness and evolution. Accordingly, the intellectual concepts of scientists depend on observable data, but they are not arrived at deterministically. It is well known that many revolutionary theories have been conceived in dreams, where the imagination of the scientist is liberated. Albert Einstein observed: "*There is no logical path leading to the outmost general laws*" [9].

How are the above characteristics of art and research related to the Divine Liturgy and the praying experience of knowledge? The liturgical act reveals to us the praying experience of knowledge as a possibility of our freedom and the indeterminate personal source of our being. The experience of spiritual life and the liturgical act are common to all of us and present each time. They pre-exist and are offered to all of us as a possibility to participate in a yet unknown experience of God. But the leap towards the unknown Present is not accomplished by everyone or not by everyone to the same extent.

In Science, new ideas often arise intuitively, sharing characteristics of elegance or beauty of structure. Likewise, according to the Fathers of the Orthodox Church, in the spiritual way of life, the attraction to God is a fact of a holy eros.

The Church has her saints, art its masters and science its great discoverers. Or rather, the saints of the Church lead art and Science beyond their limits.

2.7. Knowledge and act

It is worth noting the analogy between Science and Theology, and technology and ethics. Technology is an applied science and furthermore a

contributor to Science, through technical instruments. On a liturgical understanding of Christian epistemology, ethics or personal spirituality is an applied theology. Bishop Kallistos Ware makes the following main comment on the book of Dumitru Staniloae 'Orthodox Dogmatic Theology, Vol. 1' [7]: "It is the theologian's task to make manifest the link between dogma and personal spirituality, to show how every dogma responds to a deep need and longing in the human heart, and how it has practical consequences for society" [http://www.amazon.com/Orthodox-Dogmatic-Theology-Experience-Revelat ion/dp/0917651707/ref=sr_1_3?s=books&ie=UTF8&qid=1452961975&sr=1-3&keywords=orthodox+dogmatic+theology]. On the other hand ascesis becomes the natural ground of a true and live theology (Saint Gregorios the Theologian). The link between dogma and personal spirituality is as strong as that of the link between temporal science and technology.

2.8. The personal guide to knowledge

Finally, we should note that beginning scientists learn how to conduct research under the guidance of an experienced researcher, who will lead him to new areas of knowledge, beyond books. The would-be researcher is instructed in practical methods, discusses with the scientific advisor points not elucidated in books, and learns that which can neither be explained by personal knowledge nor intelligence solely. By analogy, the true knowledge of life and Theology in Church culminates in participation in the Divine Liturgy; usually starting from the moment somebody wants to be apprenticed to a spiritual guide. This interrelation between searching and apprenticeship to a guide distinguishes the personal relationship as a common element of both types of knowledge-scientific and liturgical.

3. Major differences between scientific and theological epistemology

3.1. Law or person?

The goal of the scientific method when applied to the Natural sciences lies in the discovery of laws functioning in nature and the emergence of the mathematical and logical order of structural elements. However, the crucial question raised by the development of Science is the following: Does logic or 'physical laws' exhaustively describe the ultimate substance of the world? Is the rationality of the world exhausted to an impersonal rationality of natural laws and arithmetical relations?

If we accept the arithmetical harmony and the impersonal rationality of natural laws as the final rationality that substantiates nature and turns it into cosmos (=ornament), then emerges the consciousness of the absurdity of a conscious rational being, searching for a meaning in life in a rational world, which is deprived of an objective reason or meaning.

The Divine Liturgy, as an offer to life ('for the life of the world') and not to death, does not start with the utterance 'Blessed is the Kingdom of the Law' or 'Blessed is the Kingdom of the Number', but 'Blessed is the Kingdom of the Father and the Son and the Holy Spirit'. When we bless, we accept, and we begin our way towards the Kingdom of the Persons and the Love of the Persons. Of those who are counted as Three hypostases - persons and at the same time they transcend counting, since they are One God. One Kingdom. Because we dare, after our incorporation into the community of the Son of God, to invoke the 'heavenly', 'beyond comprehension', 'invisible', and 'beyond understanding', not as 'substance' or 'number' or 'law', but as 'Our Father'.

So an intrinsic distinction between scientific and liturgical methodology lies upon the fact that in the latter, the ultimate truth and beauty of the world are searched for in the Person, who transcends the number (1 = 3, 1 = 2), while in the former, we are searching for Law and Number.

It seems that the impasses of western civilization are to a great extend due to the absoluteness of calculation and the logic of the law as the *par excellence* instruments for interpreting and administrating the world [10].

3.2. Gift or possession?

The second transcendence of liturgical knowledge over the scientific research as the ultimate tool of knowledge, results from the first one. The liturgical experience is Eucharistic. Likewise, the Divine Liturgy, the holy Eucharist is the heart of the Church. The faithful visualizes God as Creator and Donator to the world and beings created out of love: "…*We give thanks to you, invisible King. By your infinite power You created all things and in Your great Mercy, You brought everything from nothing into being.*" [Saint John Chrysostomos, *Devine Liturgy*]

Christ again as a perfect human being calling us to follow Him is presented offering himself on the Cross eucharistically; this action gives life to the world: "*He took bread in His holy, pure, and blameless hands, gave thanks, blessed, sanctified, broke and gave it to His holy Apostles, saying: Take, Eat….*" [Saint John Chrysostomos, *Devine Liturgy*]

The faithful, finally, are initiated in the Eucharistic participation and in the Eucharistic acceptance of the world, of other human beings and of God: "*we offer to You these gifts from Your own gifts in all and for all"… "It is proper and right to sing to You, bless you, praise you, thank you,… For all these things we thank You and Your only begotten Son and Your Holy Spirit,….*" [Saint John Chrysostomos, *Devine Liturgy*]

Rendering the scientific method of knowledge absolute and not including it in a Eucharistic perspective allows the assumption that the inventor of 'natural laws', the human subject, is the supreme form of being of nature. The feeling of possessiveness is his primal experience. An individualistic-anthropocentric epistemology is normally followed by a social and technical action based on the same function. The exploitation hitherto of a self-deified ego upon other egos

and nature is a matter of logical and practical implication. Extreme individualization and irrational exploitation of nature are normal phenomena in a society like this.

On the contrary, the sense of the world as a gift of God and even the sense of God Himself as a sacrificial Gift, as supper at which we have been invited by God, places in a natural way limits to the of the world. Furthermore, it develops the sensitive and a refined behaviour towards the great innkeeper, the supper and its participants. In other words, the liturgical knowledge or experience is not simply the knowledge of certain relations, but it is – the knowledge - a relation itself. It is the knowledge as knowledge of Love, and Love.

The human being becomes whatever he knows. Knowledge has the tendency to identify the subject of knowledge with its object. The knowledge-experience of the love of God transforms the faithful in the course of time into a subject of love. Scientific knowledge, when it is not eucharistically functional, but anthropocentrically instead, transforms the subject of knowledge into the form of its object: into an automatic mechanism or number.

4. Conclusions

In the present paper we compared certain characteristics of the scientific research methodology with the characteristics of the spiritual experience, as it is handed down in the Orthodox Church and particularly in the life and spirit of the Divine Liturgy.

A comparison of epistemology of religion with that of Science seems to be crucial to the human being of today who develops in a surrounding defined to a great extend by the findings of Science, and yet seeks a meaning of life that Science is not able to deliver.

The comparison attempted in the two previous sections (2 and 3) suggests that there are numerous significant common features in both ways of knowledge and, of course, some major differences. However, the differences are not based absolutely on the nature of the scientific research process itself, but on the anthropology of religion which gives emphasis in human existence as of a person in communion with other persons. Therefore, from our comparative analysis of the two epistemologies we infer that a synergy of them is normal or in action in modern times, and that the theological epistemology can complements scientific research process to its humanization.

We note that several issue of the present paper need further elaboration and discussion. In particular, the concept of ‘Person’ and ‘Logos’ may rise some questions in a western educated reader, since they presuppose the theological background of the Eastern theology, and the extended analysis of them is not possible within the limits of the present paper..

We also note that the description of the scientific research presented in the previous sections might give the impression to a non-scientific researcher of a strict scientific relativism. This not the case. The features of the scientific

epistemology we described rather recall the theological 'apophatism' or the fact that Science is the image of its creator, the human existence.

In concluding, I would like to present my impression from the reading of a book written by Elder Sophrony Sakharov entitled 'On Prayer'. The very first sentence of the book impressed me indelibly: "*Prayer is a never-ending creation, above any art or science*" [11]. I think that the statement "*prayer is superior to any art or science*" results from a comparison and indicates a correlation between praying on the one hand, and art or science on the other. I would dare to say that the comparison of the characteristics of two ways of knowledge, the scientific way and the theological one, presented here provides some partial analytic discussion of the experiential apophthegmatic discourse of this major ascetic and theologian of the 20th century.

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