

ALBERT EINSTEIN, COSMOS AND RELIGION

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(Received: September 11, 2006; Accepted: December 27, 2006)

SUMMARY: We consider Einstein's attitude regarding religious as such, from both cosmological and epistemological points of view. An attempt to put it into a wider socio-historical perspective was made, with the emphasis on ethnic and religious background. It turns out that the great scientist was neither atheist nor believer in the orthodox sense and the closest labels one might stick to him in this respect would be pantheism/cosmism (ontological aspect) and agnosticism (epistemological aspect). His ideas on divine could be considered as a continuation of line traced by Philo of Alexandria, who himself followed Greek Stoics and (Neo-) Platonists and especially Baruch Spinoza. It turns out that Einstein's both scientific (rational aspects) and religious (intuitive aspects) thinking were deeply rooted in the Hellenic culture. His striving to unravel the secrets of the universe and the roots of cosmological order resembles much the ancient ideas of the role of knowledge in fathoming the divine as such, as ascribed to Gnostics.

Key words. Cosmology: miscellaneous

1. INTRODUCTION

All science is cosmology, I believe.

Karl Popper

As Einstein's *annus mirabilis* centenary evolved, the Number One personality of the previous century became the focus of world's attention. Many aspects of his extraordinary personality were subjected to scrutinized analysis, including his relation to religion. Although Einstein was not a professional religious thinker, his fame and authority in pure science make his personal beliefs both interesting and influential.

Was Albert Einstein a religious man? But before we attempt to answer this question, another one seems in order: Is this a proper question at all? May one expect from such a profound scientific mind to be analyzed in less profound terms? Particularly, could the mind that has transformed our most fun-

damental concepts, like space, time, causality, put into standard frames of our contemplating the most elusive notions like faith, God(s) *etc*? We shall claim in the following that (i) Einstein was arguing for a new kind of religion and (ii) at the same time was playing a role, albeit subconsciously, of a prophet, even a god himself.

Cosmology is intrinsically linked with mythology and religion as a quasirational elaboration of the former. Einstein was the cosmologist *par excellence*, for it was him who made it a hard science. He was as well involved in the profound research of the underlying microstructure of the material world and has decisively contributed to our understanding of the microcosm. In both aspects, presently strongly coupled in modern investigations of the ultimate nature of the material world, Einstein considered the possible role of divine, but with considerable efforts made in distinguishing the latter from banal religiosity. We shall consider his views of religious from both tempo-

ral development point of view and their implications to his cosmological and epistemological views

2. HELLENISM AND JUDAISM

When Albert was twelve a young student from Poland, who used to come to Einsteins' for dinner, brought to him a popular edition of Euclid's *Elements*. It seems to have been a decisive instance for the young boy, who was at the time obsessed by the biblical fables. He must have already felt a suspicion about the historical reality of biblical events and the issue of the truth must have been raised in his mind, when he met Euclid. Unlike biblical authors who offered incredible fables and interpretations, Albert found in *Elements* the absolute (mathematical) truth, exposed by an iron logic, firm and undeniable. Incidentally, the treatise was composed in the same period (3rd century BC) as the translation of Holy Scriptures (*Septuagint*) was made. Both books epitomized the Judaistic and Hellenistic ideologies, as the paradigms of fictitious and rational as such. The further intellectual development of the young Albert was determined by the interplay of his Jewish ethnical origin and rational Hellenistic education.

Technically speaking, Einstein remained within the sphere of the Judaistic tradition. But his personal development led him to depart from the Orthodox Judaism, and this evolution resulted in two main accomplishments. First, his religious evolution started with the traditional common religion, as practiced by clergymen, to progressively abstract concept of piety, and second, he found in retrospective that the mankind followed the same route. One might consider this sort of individual and historical correlation as another manifestation of the famous Haeckel's thesis: *Ontogeny is a recapitulation of phylogeny*. This development was by no means original, and could be traced in at least two Western traditions: Hellenic and Judaistic. Since these two traditions turn out crucial for understanding Einstein's view on the religious phenomena, it seems in order here to sketch common features and differences regarding their content and ultimate historical fates.

Both traditions followed the same evolution pattern, starting from common religions, more precisely – religions designed for common people. The principal feature of these stages is personalized, even anthropic gods. Greeks had a well-developed, though not unique and fixed Pantheon, whereas early Hebrews started with a number of henotheistic gods too. But after this initial phase, these two traditions diverged. Greek people's religion remained polytheistic up to the appearance of Christianity (Veyne 1983) as a quasi-monotheistic faith, Hebrews soon reduced their concept of divine oligarchy to the monotheistic one, their own tribal god, (Jehovah). At further stages this god became the God, a unique deity, which acquired two principal, albeit contradictory, attributes. He was the God of all mankind, the universal Demiurge, and yet the tribal, Jewish god,

bound by covenant to his chosen people. This dichotomy will be resolved by Christian teaching, what resulted in a quick spread of the Judaistic mythology over a large part of the globe. But apart from her Christian "heresy" (*minim*) Judaistic common religion retained its principal features up to now.

We now turn to the more august religious sphere, that of thinkers and philosophers. Greek development on this more abstract level followed the line of Xenophanes (Kirk et al. 1983), Plato and Aristotle, who conceived an abstract deity, devoid of banal anthropic properties and disinterested in human affairs. To Aristotle the First Mover was necessary just to start the life of Nature, whose further history was to be governed by the laws of Nature, to be inferred by human mind. A particular concept of supernatural Demiurge was conceived by Anaxagoras (Kirk et al. 1983), who introduced the notion of Mind (*Nous*), engaged in creating Cosmos out of a primordial mixture of seeds (*σπερματα*). It seems that Anaxagoras' Mind was something between moving agency and natural principle. In any case this Greek philosophical line was interrupted by the Christian faith and was never canonized into a common religion.

Judaistic tradition followed two main streams. One was orthodox rabbinic one, mainly present today within Jewish milieu, the other adopting an esoteric rout, developing somewhat extravagant ideas on divinity, as the case with Cabbala is. Extravagant as they appear, some of the esoteric concepts resemble remarkably well modern cosmological scenarios of the World creation. The case in point is Cabbalistic constructs of *Ain Soph* and *Zimzum* (Masson 1970), with its striking similarity to Big Bang inflationary paradigm. The case of Baruch Spinoza stands somewhere between the orthodox and esoteric lines and deserves our particular attention here.

3. SPINOZA AND PANTHEISM

Broadly speaking Spinoza's doctrine may be considered as a continuation of the Judaistic philosophical tradition, whose beginnings may be traced back to Philo of Alexandria (Saunders 1997, Simon et Benoit 1998). Living in the metropolis of the Hellenistic world, with a large Greek population and numerous Jewish community, Philo's concern was mainly in reconciliating the Jewish faith, based on the Torah mythology, and the superior Greek philosophical teachings. Squeezed between the elaborated rational systems of Plato, Aristotle, (neo) Pythagoreans etc, from one side, and the sclerotic canonized religious dogmas and tradition of the Holy Scripts, which were not to be modified, Philo resorted to the old way out to save the phenomena – to the allegorical interpretation of the written sacrosanct texts. One of his first tasks was to depersonalize the God, interpreting the assertion that God created man according to his own image as not referring to a physical appearance of the Creator, but

to his ethical essence. This departure from the literary meaning was a big step from the common faith toward more rational, abstract religion, making it a philosophical subject. It is this new concept of God, which Spinoza took over and developed further to the extreme rational and logical limits.

Spinoza was Einstein's religious hero, and for the good reason. His teaching epitomized the best amalgamation of the two principal roots on which European culture rested: Hellenistic ratio and Judaistic faith. His principal philosophical tract, *Ethics* (Spinoza 1910) had a formal form of Euclid's *Elements*, with its strict deductive structure. Adopting the rational method of exposing his metaphysical ideas, Spinoza adopted at the same time the Greek rationale for scientific truth. Something is not just true; it is so because it must be so, within the context of the overall system. That the Jewish-Dutch philosopher gave the title *Ethics* to his book on the divine nature reveals another rationale for his endeavor - the moral content of the Judaistic religion, which might be expressed as the relation: God is ethics. If the first rationale may be considered as a form of *causa efficientis*. within its deductive procedure, the second rationale is manifestly of the nature of *causa finalis*. Human ultimate goal is self-division, immersion into divine. God is everything man can conceive of, God is Nature. Man is alone before the God, since he is a part of Nature. By acquiring the supreme Good, as the essence of divine being, he attains the nature of God.

Spinoza's concept of religion is considered as *pantheism*. The Amsterdam Jewish community interpreted it, rightly, as a form of atheism and banished Spinoza from their community. To state that God is everything is tantamount to saying she is nothing (*les extremes se touchent*). Pantheism is alien to European cultural sphere and is more appropriate to relate to Buddhism, which is not based on the concept of god at all. Judaistic tradition might tolerate some form of *panentheism*, but not pantheism. The former states that everything is God, but God is not everything, he comprises Nature, but the latter does not exhaust his existence. The panentheistic formula thus reads: *Everything is in God*. By removing all anthropic attributes from divine, Spinoza dissolved God into cosmic reality, thus annihilated it. His image of God appears hence closer to that of Anaxagoras' Mind, than to Mosaic monotheism.

4. EINSTEIN AND SCIENTIFIC INQUIRY

Va yomer Elohim, yehi or va yehi or.

Einstein was from the very youth inclined to question unquestionable, suspect self-evident, test trivial. His ideas on space (commensurability) and time (simultaneity), put into the formulae that will be called Special Theory of Relativity, were fruit of some five years meditations, as recognized by Einstein himself. In a conversation with Levi-Civita, Einstein remarked that he had just a couple of ideas in his scientific career. Modest as it might sound, this

remark does not hit far from the target. Einstein's most fundamental contributions to the physical sciences may be focused on one single pursuit, that on fathoming the nature of light. It is well known, according to testimony of Einstein himself, how young Albert was occupied running in front of a light beam. His inquiries on the subject resulted in Theory of Relativity, which was an answer to the two issues. First, what happens to our apprehension of space and time if the speed of light is absolutely the same for any observer, and second, light motion can not be accelerated nor decelerated. Beside the Special and General relativity, another important instance where light played prominent role in Einstein's research was that of the quantum of light, later to be dubbed *photon*, the central construct in his model of the interaction of the electromagnetic field and inertial matter, as elaborated in the photo-effect model. It was for this achievement that Einstein received his Nobel Prize in 1921. By inverting the rationale of the quantum of energy as a particle-like entity to the wave associated with a massive particle, Louis de Broglie will open the rout for Erwin Schrödinger to Wave Mechanics, another capital achievement of the twenty-century physics.

A great number of other Einstein's valuable contributions may be ascribed to his fascination with the light phenomena. Theory of radiation (Einstein's coefficients), Bose-Einstein statistics, and even the famous conundrum contrived in the EPR paradox (which has been, perhaps, the most powerful exposition of the weird nature of the Quantum mechanics) - all refer, in one way or another, to the electromagnetic field phenomena. In his later years of life Einstein, used to say that all his life he will strive to comprehend the nature of light and despite an oversimplification as it might sound, it was not far from the truth. And here one encounters one of Einstein's most mysterious features - affinity to the mysterious.

5. MYSTERIOUS EINSTEIN VERSUS MYSTERIOUS COSMOS

Strictly speaking science is not a creative human activity, unlike music, for instance (or modern art in general), or technique. Science reveals, technique creates. But the further one goes from the ordinary scientific level toward the fundamental issues, the nature of the scientific discovery becomes less of a revealing type and more a creative endeavor. When in his mature age Einstein set to apply the General Relativity formalism to describe the entire Universe, he left the ground of a purely discovering interests and set to a more ambitious task - to create a picture of the overall physical reality, of the Cosmos. Note that in Biblical terms Cosmos is not purely given entity, it is a Creation. In the prehistoric phase of the *homo sapiens'* mental evolution, the era of magi, to *name* meant to *control*. This magical ritual was recorded in Bible, too, with Adam given the right to ascribe names to living creatures, whose master he was supposed to become. In a more advanced phase naming was not enough, and a more detailed des-

cription of an entity implied control over it. Knowledge meant power over things. And it is this aspect of the understanding which was the rationale for God's forbidding Adam to eat the fruit from the tree of life in Eden, for this allegorical narrative was a story about control share. It is the first record of the eternal struggle between religious and rational, between the concepts governed by logic and those controlled by fear and mysterious.

It was Vico who noted that one best comprehends a concept by inventing it himself (Berlin 1976). But the case with Einstein's contributions to what is known today as Special Relativity is not simple one, in that respect. As we know today, the matter was already in air at the turn of the century and other researchers were on the track, notably Henri Poincaré, who first defined the relativity principle (Poincaré 1904). The same holds for the famous $E = mc^2$ formula, derived by a number of people before and after 1905. Again, Poincaré asserted in 1900 that electromagnetic energy is endowed with an equivalent mass E/c^2 , but did not pursue the idea to its general consequences. As it was found many years afterwards, Einstein's original derivation in 1905 was flawed (*circulus viciosus*) (Ives 1952), but he derived it again next year, this time correctly. It was Max Planck who in 1907, following the original idea due to Hasenöhr, derived the formula on the most general, thermodynamical grounds (Jammer 1961). But this is of minor importance for our arguments here.

In neither of two papers in 1905 Einstein refers to predecessors, his bibliography item is empty. The old controversy concerning a possible influence of famous (in retrospect) Michelson-Morley experiment on ether drift on the genesis of Special Relativity has never been resolved satisfactorily (see, e.g. APS News, March 2004, pp 4-5 for the recent discussion of the subject). Einstein himself did not help the controversy to be resolved, adding from time to time new mysteries to the subject. It seems unlikely that the experimental result, even if it was well known at the time, could be crucial for postulating the central concept of the Special Relativity – the absolute speed of light. First of all, the result was neither the only one on the market and second, it was far from convincing, concerning the (statistical) nature of the method employed. Einstein resorted to an epistemologically decisive option. He turned to the most primitive experience (ontological aspect), but of a special kind – *gedanken* experiment (epistemological aspect). It is ironical that he resorted to Newton's epistemology, to modify his basic notions of space and time.

Both results published in those papers have been considered since as Einstein's own contributions, stemming from his mind like Athens coming from Zeus' head. The reason for this was surely the fact that he offered a single underlying idea for both results – the concept of the extraordinary nature of light, as a primitive construct. The lack of reference to other, previous or contemporary, authors might have been considered as risky, had not it concerned already known final results – Lorentz's transformations and $E \sim mc^2$.

6. EINSTEIN AND COSMOGENESIS

If both above mentioned papers dealt with subjects already in the air, the construction of the General Theory of Relativity has been considered as a great achievement of a sole mind of genius. Though the motivation for generalization of the physical situation from inertial to noninertial frames of reference looks straightforward, the task was too ambitious even for Einstein, who lacked the necessary mathematical background for setting up the equation that was to replace Newton's dynamics. The story of devising the famous equation which connects three most fundamental physical quantities, space, time and matter is well known. Einstein acted as inspiring manager, creator etc, until the equation appeared in its final form. (That Hilbert derived it about the same time as Einstein is of little importance for us here, though some authors refer to the equation as Einstein-Hilbert expression.) As an admirer of Mach's approach to mechanics, more precisely of his epistemology, Einstein was eager to incorporate Mach's idea that the local properties within a finite part of cosmos are determined by the overall influence from the rest of the universe. In particular, Mach principle, as Einstein termed it himself, that the inertia of a massive body depends on the mass distribution and its gravitational force of the universe acting on the test object. It is this concept, which Einstein never incorporated fully into the theory that led him in 1917 to apply the same theoretical construct to the universe as whole. His model of a cosmos without boundaries, a sort of closed infinity, was the first fully scientific, mathematically rigorously determined, universe. With his model modern cosmology started its relentless march.

What might be the feelings of this modern cosmocreator when devising something that has ever been the domain of divine? Interestingly, his model was static one, a cosmos without (cosmic) time, devoid of a global evolution. Here a few words about this feature of the early Einstein's cosmos. At this stage of development of the cosmology as such, this choice was more a necessary zero-order approximation than a deliberate choice between various options. The static, eternal by implication, universe has been in air for long time before the last-century cosmological models. Abderian cosmology belongs to this paradigm (Grujić 2001, 2006), as well as Aristotle's and Kant's *mutatis mutandis* (Grujić 2002). Engels opted for this model in his *Antidüring* too. Early Cristian thinker Origen was somewhat ambiguous on this matter (Jaeger 1961), his choice being spanned between an eternal universe, as a sign of God's infinite goodness, and an "eternally temporary" cosmos, whose existence was dependent on the God's free will (see, e.g. Grünbaum 2000). The latter option had nothing to do, of course, with a rational choice, but was one of religious "eschatological warnings" to the believers, and thus a matter of politics. The concept of an eternal universe appears radically different from the biblical mythology, where the notion of "creation" plays the central role, with the same "political" aim – to make humans dependent of God and

thus Her debtors. It was this feature that made Fred Hoyl feel that his Steady-state cosmos was independent from divine presence, though later he retracted somewhat from this bold statement.¹ In addition, his idea of a universe as a creation of a supercivilisation does not appear incompatible with the notion of the hierarchical cosmos (Grujić, 2002).

Hence, Einstein could not be considered as a (human) Demiurge, in Platonic terms, or the first Mover, as Aristotle termed it. We shall come to this point later on and here we concentrate on the very notion of devising and describing the universe and possible psychological consequences on the theoretical (mortal) mind.

Einstein was the first to introduce mathematics into cosmology, but as for the physical aspects Kant could be considered the first scientific cosmologist (Kant 1968). What were Kant's feelings while interfering into divine business? He was fully aware of his delicate position in that respect and insured himself from both possible fronts of attacks. In the very dedication to the King of his famous tract, he apologized for his bold intrusion into forbidden divine domain, expressing his awareness of his humble position. In the very tract, on the other hand, he contrived protection from the inevitable assault from clerics, defending his concept of an infinite universe by alluding to God's omnipotence. This tactics, smart as it was, bore not negligible risks, as Galileo found himself when trying to interpret the Holy Scriptures to his advantage (better to say, to Copernicus' case) (Biagioli 1993). By the Einstein time, however, European emancipation has passed a long way from theocracy to secular society and contemporary cosmologists were not worried about harsh clerical response, certainly not about Inquisition. But a rational emancipation, at the conscious level, is but a part of story. The fear of divine, deeply rooted into human subconscious, acts as an archetypal barrier between liberal mind and traditional layers deposed by centuries, if not millennia. The famous accident that Omar Khayam experienced after a blasphemous shouting on God after the latter (*sic*) overturned his vase, is the case in point. It is this conflict between rational and irrational that shaped Einstein's attitude towards relation faith *versus* science, as we shall see in the following.

The development of the biblical exegesis was dictated by the general evolution of the human mind, which met more and more difficulties in swallowing the biblical naive narrative, in particular that of the Genesis. This evolution took many aspects, but one may distinguish two principal lines: (i) abstractions (ontological aspect) and (ii) allegorical approach (interpretative aspect). As we saw before, philosophical minds, like Spinoza, adopted an abstract image of God, devoid of the human features. On the other hand pantheistic divinity, though retaining the designation of God, being omnipresent, allowed to humans to establish contacts with Her, the contact lost after Joshua's conquest of the Promised Land (Canaan), when Yehovah used to collaborate closely with his tribe. But this new opportunity to com-

municate with divine was not allotted to everybody, again. Only those endowed with a sufficiently penetrating mind are able to infer the secrets which divinity concealed in her Creation, the secrets which naïve scientist name laws of nature. But what use of revealing those secrets are to those chosen humans? As different from the Gnostic doctrines of salvation through knowledge, science offers personal satisfactions of sharing a profound inference into the "nature of nature". It was up to this point that Einstein indulged himself in revealing publicly his epistemological background, or philosophical motivations. His frequent mentioning of God made, however, impression that he was somehow familiar with divinity, which he claimed to fathom deeply. In a sense he seemed to play a role of a mediator, like the ancient prophets. The nature is the open book, but not everybody is literate enough to read it.

Buddha eliminated the gods from his horizon. As a result hundreds of thousands of his effigies are scattered around the world, with devotees adoring him before these corporeal images. Einstein played well with this point, becoming for the contemporary surrounding the eponym of superhuman.

7. EINSTEIN AND MICROCOSMS

Though he did not invent either of two formulations of Quantum mechanics, Einstein's contribution to development of Wave mechanics and subsequently to interpretation of its epistemological background can not be underestimated. But as the General Relativity ascribed to the previous theory of space and time the attribute *Special*, so the advent of Quantum mechanics, both Heisenberg's Matrix - and Schrödinger's Wave - mechanics dubbed the previous physics, relativistic and otherwise, *classical* theory. But despite his active involvement in the development of the new theory of matter, Einstein remained a classical physicist. The same thing happened to his generation as to the Pythagoreans who discovered the irrational number, discovery of which destroyed the entire ideological base of their philosophy. The stochastic, intrinsically probabilistic nature of new theory did not fit the classical mind, which experienced it as an epistemological failure to comprehend the deep layer of the nature of the microscopic world. Interestingly, the proverbial Einstein resistance to indeterministic interpretation of the Quantum physics came after his significant contribution (in 1905) to the description of the epitome of stochastic behaviour – Brownian motion. But here we shall be more interested in psychological aspects of his assertion that Quantum mechanics is an incomplete theoretical description of the microcosmical reality. Why he could not accept the probabilistic concept of laws of nature maybe speculated about, but here we shall just note that the motivation might stem either from epistemological or psychological sources (or maybe from both). From an epistemic viewpoint, the traditional wisdom was that probability comes

¹We are indebted to the referee for drawing our attention to this point.

in when the empirical evidence of the reality is deficient (ontological aspect). Generally, probabilistic approach is adopted when describing macroscopic effects the sources of which are supposed to remain at the microscopic, inaccessible level.

The psychological resistance to legalization of uncontrollable events may be traced to a need to defend the power of human mind to fathom the physical reality. Einstein was not the only one to express his skepticism concerning the completeness of quantum mechanical description of reality (Schrödinger himself was one of the opponents to the Copenhagen interpretation of the wave function, though he subsequently complied with the general view), but his opinion on the matter carried a particular weight, regarding his reputation at the time. After the confirmation of one of the principal effects predicted by his General Relativity in 1919 (the amount of light deflection in a gravitational field), "suddenly famous Dr Einstein" (as a newspaper described him at the time) was considered the highest authority on the subject. The more so considering that he personally contributed to the invention and rise of the new fundamental theory of the microphysical reality. It was an attitude of a human mind regarding its own abilities. But what about divine? If the outcome of an experiment can not be predicted, does it mean that it is inherently unpredictable to anybody, including God? And here we come to the crux of the matter, as illustrated the best by the famous Einstein-Bohr arguing on the issue.

To Einstein's assertion "God does not play dice", Bohr responded "Who are you to decide what God is supposed to do?" Both arguments expose nicely the dichotomy, which Einstein used to retain during his mature and late phase of life, with regard to religious feelings as such. Despite his humble playing with mortal limitations, which we shall discuss later on, his human pride built upon remarkable intellectual achievements could not be concealed from an attentive listener. The ambivalence toward divine is even better expounded by his response to the (false) reports that ether was detected, by the famous phrase: "Subtle is the Lord, but malicious he is not" (Pais 1982). It is difficult to escape the notion that Einstein, at least on this occasion, treated God as his partner, whose loyalty he found necessary to defend. We shall return to this point later on, when discussing the parallel with Moses.

The issue of determinism *versus* indeterminism in microworld revolves around the meaning of "determinable". It has at least three levels of meaning. First, technical one, bound to the experimental feasibility. Second, epistemic one, which is an intrinsic feature of a particular theoretical frame, the Quantum mechanics in this case. The most abstract meaning transcends the sphere of a positive science, and implies the absolute attribute of a physical reality, irrespective of the human mental constructs, like a particular, even most general, theoretical scheme. It is here that the notion of divine power comes in. Einstein ultimately accepted that Quantum mechanics could (and should) be considered complete, but it does not mean that one might one day contrive a more general theory, which will be deterministic.

The question arises, then, whether the God's inference into the physical reality, the creator of which he is supposed to be, is equivalent to our possible possession of such an omnipotent theory. Or, to put it another way, is it possible that a creator is not capable of controlling his creation? Or, in view of Vico's argument mentioned above, that He does not comprehend his design? But is this a real issue at all? And here we come to the essence of religious *versus* rational thought.

Is there a genuine religious attitude bound to a rational mind, like Einstein's one? Einstein must have been be aware, at least subconsciously, that there is no, and there cannot be, anything outside human mind. One need not go back to Xenophanes and his famous dictum that it is not gods who created men, but the other way round. The issue that Einstein (and rational mind in general) was facing is the same as Eleatics put it - what are the human abilities concerning their own mental powers? (Kirk 1983). More precisely, can every *gedanken* problem, put forward by a particular (human) mind, be resolved by another (particular) human mind? Or, more abstractly, in Gödel's sense, can we hope to conceive a reasonably general mental construct that is devoid of contradictions, paradoxes, conundrums etc? The issue is all the time, not a confrontation of human and divine, but the completeness of human mentally constructed systems. It could be considered as well as a tension between archetypal, in Jung's sense, and rational (Jung 1978). The latter issue may be best epitomized by Jung's experience with Pauli's subconscious, as revealed by his dreams.

8. EINSTEIN AND JUDAISM I

Einstein's life and work were fully imbedded into the shrine of Science, as conceived by ancient Greeks and rediscovered by da Vinci, Galileo, Descartes, Newton and other European Hellenistic heirs. On the other hand, Einstein belonged to the small Jewish community, immersed into the large Christian European sea. In the above sections we dealt with intrinsic features of the tension between rational and religious, as emerged from these two principal pillars of European culture. Now we shall consider a number of external factors, which determined his attitude towards religion.

Albert Einstein was born in a German Jewish family, on March 14, 1879. His parents were not particularly religious and, although they never rejected their Jewish faith, they did not strictly follow traditional rites and never attended religious services. However, when Einstein, at age six, entered a Catholic public primary school in Munich, they hired a tutor to teach him about Judaism in order to counteract his compulsory Catholic instruction. During that time he gained a deep religiosity and started to follow religious prescriptions in every detail. In his 1949 autobiography (Schilpp 1979), Einstein states that his religious sentiment was originally initiated by the traditional education machine. Nevertheless, the fact that he was, even in such young age, strongly

influenced by nature and music (Jammer 1999) obviously made him suitable material for the acceptance of religious ideas. To understand Einstein's religiosity one must bear in mind this type of complex feeling emerged from the entangled mixture of nature, music and God (Jammer 1999). Later on, close to his 13th birthday, he becomes completely irreligious and refuses to go through with his *bar mitzvah*, but it seems that the feelings of reverence that he felt in contact with nature were present all his life (Dukas and Hoffman 1979). The origin of Einstein's conversion lies in novel ideas that he acquired through the reading of scientific books. This led him to the conviction that the stories in the Bible could not be true and, as he was an independent spirit, he became suspicious of every kind of authority. Since there is but one step from denying authority to replacing its position, we think that his attitude towards science and religion should be considered as starting from this instance. It should be noted that Einstein did not attend religious services, nor prayed at a place of worship of any kind. His civil marriage to Milva Marić, who belonged to the Serbian Orthodox Church, also shows Einstein's indifference towards religion affiliations. On the other hand, despite his refutation of Orthodox Judaism, he saw himself as a Jew. In his interview with Peter Bucky we find following statement through which he tried to clarify his position (Bucky and Weakland 1992):

"... Actually it is a very difficult thing to even define a Jew. The closest that I can come to describing it is to ask you to visualize a snail. A snail that you see at the ocean consists of the body that is snuggled inside of the house which it always carries around with it. But let's picture what would happen if we lifted the shell off of the snail. Would we not still describe the unprotected body as a snail? In just the same way, a Jew who sheds his faith along the way, or who even picks up a different one, is still a Jew."

9. EINSTEIN AND JUDAISM II.

Had good Lord consulted me while creating
World,
I could have given him some good advice.

Alphonso X

As his fame grew, the number of Einstein's texts concerning science and religion gradually increased. In his writings and interviews, Einstein's statements are sometimes ambiguous, even contradictory, but it is easy to recognize some key facts in his opinions. Einstein's starting point was refutation of the traditional concept of a personal God, a God who rewards and punishes his object of creation: . (Bucky and Weakland 1992).

"I cannot then believe in this concept of an anthropomorphic God who has the powers of interfering with these natural laws.... If there is any such concept as a God, it is a subtle spirit, not an image of a man that so many have fixed in their minds"

In his reply to one of the letters sent to him in Princeton, he was even more explicit: "I do not believe in a personal God and I have never denied this but have expressed it clearly" (Dukas and Hoffman 1979). On the other hand, after refusing to implement purpose, goal or anthropomorphic principle into Nature, Einstein introduced the notion of "cosmic religious feeling" through which he tried to summarize his beliefs (Einstein 1954)... Basically, cosmic religious feeling concerns his conviction in the rational structure of the world. By entering into the field of science, we are trying to grasp that "grandeur reason incarnate in the existence which, in its profound depths, is inaccessible to man" (Einstein 1941). This leads to the mysterious experience, which arises with an awareness of the insufficiency of human mind to fully understand the harmony of the Universe and it is the core of Einstein's religious feeling (Einstein 1952). Although, throughout these debates, Einstein tried to keep an autonomous position ("I'm not an atheist, and I don't think I can call myself a pantheist" (Jammer 1999), his religious views can be considered pantheistic. Some remarks about Spinoza, "I believe in Spinoza's God who reveals Himself in the orderly harmony of what exists, not in a God who concerns himself with fates and actions of human beings" (Schilpp 1970), or Buddhism; "The religion of the future will be cosmic religion, The religion which is based on experience, which refuses dogmatic. If there's any religion that would cope the scientific needs it will be Buddhism...." (Dukas and Hoffman 1979) can easily support the former conclusion. (Einstein 1933).

How can one elucidate underlying rationality of the Universe? Einstein directs us to mathematics:

"Our experience hitherto justifies us in believing that nature is the realization of the simplest conceivable mathematical ideas. I am convinced that we can discover by means of purely mathematical constructions the concepts and the laws connecting them with each other, which furnish the key to the understanding of natural phenomena. Experience may suggest the appropriate mathematical concepts, but they most certainly cannot be deduced from it. Experience remains, of course, the sole criterion of the physical utility of a mathematical construction. But the creative principle resides in mathematics. In a certain sense, therefore, I hold it true pure thought can grasp reality, as the ancients dreamed"

The origin of these ideas could be traced to Kant's "Critique of pure reason". Einstein was serious reader of Kant's philosophy. Besides scientific books, he had read "Critique of pure reason" in his early age, just before he refused to be bar mitzvahed (Jammer 1999). It is necessary to mention that Kant attempts to explain in his book, among other matters, how mathematics is possible in the first place (Tasić 2001). We can treat mathematical knowledge in two ways: as empirical in its essence, which could be, simplistically speaking, Hume's viewpoint, or as an outcome of pure reason (Descartes' viewpoint) (Tasić 2001). In the first approach, a priori truth-

fulness of mathematics is just an imagination through which nature rescues us from the lack of pure reason, and if we accept Descartes view, we must explain why this invention of our spirit, i.e. mathematics, is so successful in practice? To give an answer to this question one might obviously use an ontological argument (Tasić 2001). For that reason Kant turns to the notion of subject, which becomes a crucial point of his philosophy. He started with the well-known fact, that for each subject, the objects of the outside world are, actually, mental representations or phenomena. This does not mean that he took solipsistic position and denied the existence of object outside our senses (*Ding an sich*). Kant just tried to make the difference between the thing as it is and the thing as we know it (phenomenon). On the other hand, this introduces the problem of establishing something common to the mental representations of all subjects, something that could be called *knowledge*. Kant attempted to solve this problem (i.e. gaining knowledge and/or the existence of mathematics) by introducing notion of *a priori* intuition of time and space. However, his solution first induced reactions of romantic idealism and later on of the other schools of philosophy. Since this subject is still a matter of dispute, we will leave it aside and concentrate on Einstein's approach.

Obviously, Einstein assumed that mathematics can offer us knowledge about the Universe or, following the above discussions, a perspective that is independent from our mental representations. His view is platonic. It can be understood as a combination of the platonic school of mathematics, which claims that mathematical objects are not derived but possess an autonomous existence, and the opinion that they (i.e. these mathematical objects) can be directly realized in nature. The discovery of this hidden rational nature of reality should be the principal goal of humankind, as he pointed out at the end of his article from the Symposium on Science, Philosophy and Religion in New York 1941. (Einstein 1941):

"The further spiritual evolution of mankind advances, the more certain it seems to me that the path of genuine religiosity does not lie through the fear of life, and the fear of death, and blind faith, but through striving after rational knowledge. In this sense I believe that the priest must become a teacher if he wishes to do justice to his lofty educational mission."

Furthermore, Einstein considered the people who acted according to these principles as the "priests" of his religion (Einstein 1954):

"The religious geniuses of all ages have been distinguished by this kind of religious feeling, which knows no dogma and no God conceived in man's image; so that there can be no church whose central teachings are based on it. Hence it is precisely among the heretics of every age that we find men who were filled with this highest kind of religious feeling and were in many cases regarded by their contemporaries as atheists, sometimes also as saints. Looked at in this light, men like Democritus, Francis of Assisi, and Spinoza are closely akin to one another"

For this reason, it is not unusual that he, himself, took the task to continue the endeavors of these great people from the past. As a voice of novel spiritualization, he started to play the role of Moses, a prophet of the new faith manifested through cosmic religious feeling. As was mentioned earlier, a closer look at the history of religion and philosophy reveals that ideas about exceptional religious personalities are almost permanently present in the western or Judeo-Christian civilization. Besides obvious influence from the Torah, with prophet figures so immanent to Judaism, we can also find spiritual heresies present in Christianity since Joachim of Fiore (ca. 1132-1202). In these heresies (which sometimes include philosophers, for example, Hegel) the teachings about Holy Spirit are emphasized to such an extent that even incarnation, personification of God, becomes a continuous, at all times present and repeatable event (Gadamer 1976). Bearing this in mind, it can be argued that Einstein's prophet position is not completely unjustified. Sincerely speaking, if we adopt the above definition of knowledge as something common to our individual, phenomenological experiences, then Einstein has indeed created our world. His General relativity theory gives us knowledge about the Universe, a picture of the world that exists independently of our senses, which is, in fact, the maximum that we can grasp with our feeble minds. Therefore, we still might consider Einstein as a demiurge; a God creator. The question remains, of course, whether he was aware of this position and whether he played on this card, consciously or unconsciously. When he wrote *"When I am judging a theory I ask myself whether, if I were God, I would have arranged the world in such a way."* (www) it was not merely late reflection of the famous remark by Alphonso the Wise, since the Castilian king was a mere organizer of a compilation of astronomical tables, while Einstein was devising theoretical models, which should reflect the physical reality itself.

The reverence which his eminent colleagues felt with regard to Einstein's scientific achievements surely added additional weight to his feelings of self-respect. Here it is what Paterniti wrote in his book (Paterniti 2001).

Another contemporary of Einstein, Erwin Schrödinger, claimed that Einstein's theory of relativity quite simple meant "the dethronement of time as a rigid tyrant", opening up possibility that there might be an alternative master plan. "And this thought", he wrote, "is a religious thought, nay I should call it the religious thought." With relativity, Einstein, the original cosmic slacker, was himself touching the mind of a new god, trying to wriggle through some wrinkle in time. "It is quite possible that we can do greater things than Jesus," he said.

The dethronement of time, with the latter being the most fundamental (and elusive, for that matter) entity within the physical world, meant at the same time "overruling" the most reverent Hellenic god, Chronos. And when Kurt Gödel finds in 1949 that Einstein's GR allows for the so-called time-like curves, the "rigid tyrant." was not only overthrown, but killed altogether. (It turns out that Alice's cry in the Wonderland "He is killing the time!" was a

prophetic warning to unrestrained scientific speculations.). It must be emphasized here, however, that Einstein himself did not dare to go so far with this interpretation of Gödel's solution and did not renounce the reality of time as such.² (In fact he might well have felt Gödel's contribution as undermining his relativistic building "from inside").

The last sentence in the above quotation was an obvious allusion to Jesus' "tunneling" through the "spatio-temporal barrier" between the Crucifixion and Resurrection, and the so-called "wormhole" in the four-dimensional space-time manifold (the ideological background of the modern time machines). The mild irony, so characteristically present whenever Einstein referred, albeit indirectly, to the religion, reminds us of his ambiguous attitude to the subject. We shall return to this sentence later on, when discussing his relation with Christianity.

Apart from these analogies, we cannot overlook Einstein's late age manners and behaviour. His unorthodox clothing, avoidance of sockets, using rope instead of a belt, his general appearance resembling Chaplin's dressings, etc all this points toward hermitic lifestyle. True, this could be equally interpreted as a disregard (even demise) of *petit bourgeois* conformism, the latter being so far from his anti-traditionalism in every respect. But one may equally assign it to his prophetic self-image, more precisely at least a subconscious awareness of being a law-giver. The latter is particularly indicated by Einstein's prominent hair, which inevitably reminds one of Samson and other biblical symbols of might (which, in its turn, was borrowed from lion's mane paradigm). Moreover, if we recall the death of Moses in the way Bible presents it (Deuteronomy 34:5-6) :

"So Moses the servant of the Lord died there in the land of Moab, according to the word of the Lord, and he buried him in the valley in the land of Moab opposite Beth-pe'or; but no man knows the place of his burial to this day"

a strange parallel to the destiny of Einstein's whereabouts arises. After his death Einstein was cremated according to his will and his ashes were scattered at a secret spot on the Delaware River (probably into water) (Paterniti 2001). It seems that he was ready to play the role of his great ancestor to the very end. (The analogy between Mileva Marić and Agar (Hagar) cases comes to mind, too, but we shall not dwell on it here).

Another, equally valid, interpretation would be to conceive the act as a religious ritual of unifying with Nature-God. The choice of water is indicative, as a generic dissolver in many religions. It is a primeval element as well, as with Thales, then the substance that washes our human sins, albeit in a symbolic manner, also in numerous religious movements, like with Essens (Veyne 1983), Hindus, Christians etc. The choice of river waters is not insignificant too, for the water flow epitomizes the everlasting change in Heraclites' sense, and reminds us of the

transient nature of our life. That all these motives appear disjunctive, if not contradictory, taken altogether, should not bewilder us, since the very concept (and phenomenon) of death is counter-intuitive in itself.

It is interesting, in this regard, to comment on Einstein's attitude towards political power. His refusal to take the post of the president of Israel may be interpreted in many ways, but we shall consider here only one aspect, which one might term prophetic one. It is a well known Old Testament tradition that prophets considered themselves as messengers of God and never engaged in fighting for layman power, in particular for the position of a sovereign. For good reasons. Firstly, they did not have to share political responsibilities, if the things turn bad, while retaining their right to criticize the government (position which modern heads of churches hold until now). Secondly, they are protected in their activities by the Supreme Being, and thus keep their august position relative to the earthly power (Coogan 1998). Thirdly, they retain their independence from the mob, for the ruling implies a mutual dependence between the dominating and dominated. Last, but not the least, these wise men knew that it is the balance between spiritual and political power that keeps a society stable and functioning. Einstein used to distance himself from his environment, both familiar and social (even scientific), since his fame took global dimensions. Engaging in any sort of public official activities would break his "splendid isolation". And surely spoil his self-image of somebody who is "above everything". And here we come to the last point of our discourse.

10. EINSTEIN AND CHRISTIANITY

So far we have been dealing with Einstein's link to the Old Testament tradition. We shall finish our analysis of his religious attitude by considering briefly his relations with the faith that was prevailing in his immediate environment, the Christianity. The latter has been involved in Einstein's development regarding religion in many ways, albeit implicitly. It helped, first of all, young schoolboy, while attending parallel religion lessons in Mosaic and Christian dogmatists, to realize the naivety of religion as such. At a more mundane level, early Christianity tradition, first of all its ascetic aspects, surely did not fail to influence Einstein's manners, both concerning his way of life (clothing etc) and attitude towards fame he used to be the object in the second half of his life. Those manners oscillated between subtle arrogance and humble modesty, just as Christ's attitude towards environment used to jump from servitude to (godly) warnings of (the) Lord. One is tempted to deprive his modesty of sincerity, but there is no reason to disbelieve Einstein's honesty. After all, was not the humiliation syndrome that secured both Jewish survival and Christian victorious march through numerous persecutions?

²We are indebted to the referee for pointing out this instance.

One might object to this interpretation to be redundant in view what was said on Einstein's Prophet's simulations, but we know that the Christian way of gaining dominance was contrived according to the Old Testament religious strategy, too.

Concerning the very personality of Jesus of Nazareth, Einstein shared the common attitude of his "apatrid compatriots". As he confessed himself, he did not doubt Jesus' existence as a real man, whose life was so vividly described in Gospels. As for Jesus' miracles, divinity and other religious and mythical overlayers, he did not have to be particularly explicit, in view of his general attitude concerning the concept of a personal god. He occasionally made allusions on the matter, as in the aforementioned quotation on Jesus' achievements according to New Testament.

As somebody who was not committed to any particular religious faith, being aware of his Jewish heritage and at the same time imbedded into quasi-Judaistic (Christian) sea, Einstein was occasionally exposed to temptations to deal with intimately delicate and socially risky situations. In his letters to his future wife, Else, he used to refer to his still official wife, Mileva, marking her simply by a cross, omitting her name. Whether he referred to Mileva's Serbian-Orthodox origin, or it was a mere allusion to her as a "burden" in his actual life (Albert was about to divorce Mileva), or both, is a matter of choice (or taste).

Talking about his first wife Mileva Marić, it is interesting to quote a passage from (Krstić 2005), related to Albert's and Mileva's stay at her father's cottage at Kać (Vojvodina, then in Austro-Hungary). (It was just after submitting his "Special relativity" paper to *Annalen der Physik*, and Mileva told proudly her parents that the paper will make her husband famous).

"He liked the most riding a donkey. He noticed soon that wherever he rode a flock of sheep used to follow him, even when they were rather faraway. He asked Rada if it was he who trained the sheep to follow the donkey, but the answer was negative. Albert was quite curious about the sheep behaviour and started analyzing the influence of the mutual distance and velocity between the donkey and sheep on the "attraction" on the latter. Workers on the estate found Albert's "investigations" quite odd and used to refer to him as 'that crazy Marić's son-in-law'."

One could not help thinking, reading this passage, that if Somebody wanted to arrange an allegory on the famous New Testament episode of Jesus entering Jerusalem (or even on the entire New Testament mythology), he could not have done it more picturesquely.

On a more ideological level, one is tempted to see in Einstein's insistence of impersonal God and his secrets imbedded into Nature, to be revealed by human mind, a kind of Gnosis. Though the latter was in all probability developed somewhat before Christian faith appeared on the religious stage, it has always been linked with Christianity, as one of its specific heresy (Jung 1978). But surely Einstein was

not a mystic and in his case one might better think in terms of Spinozian pantheism with a scientific curiosity overlayer. On the other hand Einstein never considered scientific inquiries as natural human impulse, devoid of any external or internal motivation. In this respect he lacked Hellenistic (hedonistic) experience of intellectual activities as autonomous human sector. Or, he did not show it in his personal communications with the environment, at least.

11. EPILOGUE

Einstein was not a religious thinker and it would not do justice to him to judge his opinion and attitude toward religious in terms of self-consistency, or even intellectual evolution. But one can certainly discern in his addressing the issue an endeavor to fuse two principal sectors of human life, religious (irrational) and scientific (rational) ones. Though he never said it explicitly, his motivation was to formulate a unique point where these two aspects merge again, being separated in archaic times, as the Biblical narrative on the Original sin informs us, albeit in allegorical terms. Just as he was striving during the second part of his life to formulate what one would term it today as Theory of Everything (TOE), trying to fuse his theory of gravity with Maxwell's electrodynamics.

Einstein was not an explicit atheist, unlike Marx and Freud, for example, but he was an orthodox believer neither. He failed to unify gravity and electromagnetism, since, in all probability, they are incompatible, in the sense that gravity is not a force at all (as Einstein considered himself). Likewise, to know and to believe will most probably remain forever in separate spheres of human mental space. Even as powerful mind as Einstein's could not overcome this dichotomy.

Acknowledgements – We would like to thank Dr Gillian Peach for the critical reading of the manuscript. We acknowledge with pleasure useful conversations with Dr Zoran Stokić. Thanks are due Dr Milan Ćirković for his useful suggestions and comments. We also wish to thank Milica Manojlović for her assistance in the literature search. One of us (P.G.) expresses his gratitude to Professor Ljiljana Dobrosavljević-Grujić for her invaluable help and support. This work has been partially supported by the Ministry of Science and Environment Protection of Republic of Serbia (Project No 146022 "History and Epistemology of Natural Sciences").

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АЛБЕРТ АЈНШТАЈН, КОСМОС И РЕЛИГИЈА

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УДК 524.8

Оригинални научни рад

Разматран је Ајнштајнов однос према религији као таквој, са космолошког и епистемолошког гледишта. Направљен је покушај да се овај однос стави у шири социо-историјски оквир, са нагласком на етничу и религиозну позадину. Показује се да велики научник није био ни верник ни атеиста у ортодоксном смислу и да би најпогоднија етикета која би му се могла ставити био пантеизам-космизам (онтолошки аспект) и агностицизам (епистемолошки аспект). Његова концепција божанског могла би се сматрати наставком

линије зацртане од стране Филона Александријског, који је сам следио грчке Стоике и (нео)Платонисте и нарочито Баруха Спинозе. Излази да је Ајнштајнова мисао, како научна (рационални аспект), тако и религиозна (интуитивни аспект) била дубоко укорењена у Хеленску културу. Његови напори у откривању тајни свемира и корена космичког уређења потсећају умногоме на старе идеје о улози знања у разумевању божанског као таквог, како се то приписује Гностицима.