NOEL MA. N. VILLAJIN

THE UNIVERSE AS A CREATION. THE ONTOLOGICAL PRESUPPOSITION OF SCIENCE

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Dr. Marianus ARTIGAS  Dr. Modestus SANTOS

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Since the birth of science, humans have been fascinated by the world where they live. Nonetheless, even before that singular moment in human history, human beings were intrigued by the phenomena that occurred in it. Questions of the what of things, their how and their why plagued the human mind. Marvelled with these questions, humans also feel fascinated by questions about themselves: who they are and what they are in the midst of the universe.

Humans in knowing the universe, know more about themselves. In doing science, humans know that they are not angels nor mere apes. We know that we are human beings whose nature is more than the nature of simians but is less than the nature of pure spirits. We discover then a new dimension aside from the material realm of the universe. We discover what reality is: that it is one and unique that it is not only limited to the material realm but also consists of the non-material dimension of reason.

One aspect of reality is certainly the material realm and humans know it through science. However, in doing science, humans take for granted some presuppositions that fall beyond its scope. There exist some presuppositions, philosophical and theological, in science without which science would be an impossible undertaking. Many authors affirm these presuppositions. Stanley Jaki is one of them.

Stanley Jaki, a Catholic priest with doctorates in theology and in physics, argues the existence of presuppositions in science. Taking a look at history, in particular at the history of science, he tries to derive some conclusions as regards to the nature of science. He believes that the history of science offers an objective ground to study the nature of science. Thus, it is through history that he proves the existence of these presuppositions on science. In particular, he points out the failure of science to thrive into existence in antiquity and its viable birth during the Mid-
dle Ages thanks to the Christian doctrine of creation as proofs of his claim.

Many of the publications of Stanley Jaki deal about faith and reason relationship. In these works, one finds abundant references about these philosophical and theological presuppositions in science. One of these presuppositions is the creation of the universe by God and its intelligibility. This presupposition which may be called the ontological presupposition of science implies the affirmation of God as the Creator of the universe who is not only its Ultimate Cause but is also its Ultimate Intelligibility.

The ontological presupposition of science is the topic of discussion in the following pages of this excerpt of the doctoral dissertation. Aside from this discussion, the following are also included: 1) the contents of the thesis, 2) abbreviations used, 3) the bibliography, and 4) the contents of the excerpt.

I would like to extend my deepest and sincere gratitude to Prof. Dr. Jaime Nubiola for all the valuable help he has rendered to me in writing the doctoral dissertation from where these pages are extracted. I also give thanks especially to Prof. Dr. Mariano Artigas for the intellectual encouragement he has given me and finally, to the Fundación RODE for the financial support I have received from them.
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This bibliography only includes those materials—books, articles and other publications—that have been explicitly cited in the work of investigation. Other references, that were also consulted and certainly contributed in some way in writing this dissertation but were not cited, are not included. Needless to say, it does not offer an exhaustive list of materials on the topic of investigation.

There are two parts in the bibliography: the main sources which are the principal works of Stanley Jaki that have been studied in the dissertation paper and a general bibliography. The general bibliography consisted of the following: a list of collected works and another list of monographic works. The lists are done in alphabetic order according to the author/s' last name. The abbreviations of the titles, if any, are placed at the end of each item enclosed in parentheses. Some monographic works form part of a collected work listed in the first part of the bibliography. Abbreviations, if any, of the collected works are used to make the necessary references.

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II. GENERAL BIBLIOGRAPHY

1. Collected Works
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MAYS, W., *Le Macchine Possono Pensare?*, in LMM, pp. 121-144.


—*Computational Psychology and Interpretation Theory*, in AICA, pp. 1-17.
—*La Mente e le Macchine*, in LMM, pp. 83-119.


SUPPES, P., *Can Psychological Software be Reduced to Physiological Hardware*, in PRS, pp. 183-198.


**ABBREVIATIONS**
(in alphabetical order)


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C&L  *Cultura & Libri*, Ediun, Rome.


CoR  JAKI, S.L., *Chance or Reality and Other Essays*, The University Press of America and The Intercollegiate Studies Institute, Lanham, Maryland 1986.


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<th>Code</th>
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<td>QSR</td>
<td>TANZELLA-NITTI, G.</td>
<td>Questions in Science and Religious Belief. The Roles of Faith and Science in Answering the Cosmological Problem</td>
<td>Pachart, Tucson</td>
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<td>RPh</td>
<td>JAKI, S.L.</td>
<td>The Relevance of Physics</td>
<td>University of Chicago Press, Chicago</td>
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<td>RSG</td>
<td>JAKI, S.L.</td>
<td>The Road of Science and the Ways to God</td>
<td>The University of Chicago Press, Chicago</td>
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<td>ScAm</td>
<td>JAKI, S.L.</td>
<td>Scientific American</td>
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<td>SCr</td>
<td>JAKI, S.L.</td>
<td>Science and Creation</td>
<td>Scottish Academic Press, Edinburgh</td>
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<td>SSc</td>
<td>JAKI, S.L.</td>
<td>The Savior of Science</td>
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Science, faith and philosophy are mutually intertwined in the thoughts of Stanley Jaki. Being distinct from one another, each has a specific scope and yet all point out to one and the same reality. A harmony of knowledge exists among them and a certain continuity can be traced that serves as a link with each one of them.

Science in its attempt to know the material reality relies on some truths that fall beyond its scope. It presupposes these truths in its undertaking. These presuppositions are mainly philosophical, or more specifically, metaphysical. Some are ontological; the others, gnoseological. These philosophical presuppositions lead to a truth that can be said to be absolutely beyond science but is within the range of human reason. This truth is the existence of God who, under the light of science and philosophy, is recognized to be the Ultimate Intelligibility of the created universe being its Creator. These presuppositions of science may be said to be a link that can be established between science and philosophy and between science and faith.

"Presupposition" is the nominative form of the verb "to presuppose". To presuppose can have the following meanings: «1) to suppose, lay down, or postulate beforehand; hence, to take for
granted or assume beforehand or to start with; to presume, 2) to suppose a priori, to think or believe in advance of actual knowledge or experience, or 3) to require as a necessary preceding condition; to involve or imply as an antecedent.\footnote{A presupposition therefore is that which is assumed as a basis of argument, action or simply a preliminary assumption. To affirm that science relies on some presuppositions means that science is not a self-explainable body of knowledge and that it requires for its full explanation some truths assumed beforehand. These truths lie beyond its scope and are not dealt with therefore in science and yet they should be considered in it since they constitute its very foundations.}

1. SCIENCE AND THE INTELLIGIBILITY OF THE UNIVERSE

Science is a knowledge of the universe. Though it may be surprising, science did not immediately exist when humans encountered phenomena that marvelled their inquisitive mind. Science only started much later during the Middle Ages when humans grasped the notion of the full intelligibility of the universe and when this notion had been fully integrated in human culture. This is what Stanley Jaki believes on. As what will be seen in the discussion, the intelligibility of the universe can only be achieved by affirming an ultimate intelligibility that transcends it. This, in other words, means the affirmation of the contingency of the universe and the fact of creation.

1.1. Creation ex nihilo and the birth of science

Ancient science achieved remarkable scientific feats in the antiquity. Through curiosity, humans acquired abundant ideas about the universe based on the phenomena that were observed and the changes that occurred in it. Some of these ideas were indeed scientific discoveries. Yet, in these ancient discoveries, a partial aspect of the universe was grasped by ancient thinkers. What started as a mere curiosity for them on the nature of the universe led to those discoveries that, in a certain way, answered that urge
to know the how and the why of things. Nevertheless, as history shows and what Jaki claims, science failed to reach that stage of a self-sustaining enterprise. He noted the scientific stillbirths in the antiquity in spite of some evidences of scientific ingenuity especially in the Greek culture.

The principal, and the more radical, reason for such a failure according to Jaki was a misconception of the universe, that is to say, a philosophical-theological error of attributing eternal cycles in the universe. He noted that this is a common trait of all ancient thoughts. He remarks: «The cycle (...) represented nature not as an inspiration but as a fearsome curse. In India and China of old the connection between the gradual withering of science and the ascendency of belief in eternal recurrence stands out in bold relief. The same is also plausible clear in the cultures of the pyramids, the Egyptian, the Babylonian, and the Maya. The evidence for the same in ancient Greece and among Muslim Arabs has its special instructiveness for any historian of Western science.»

From this perspective of reality, an insurmountable obstacle had been introduced in the early scientific endeavor in the antiquity. To affirm eternal returns in the universe is tantamount to an infinite regress of causality in it. In this panorama, no ultimate causality, and no ultimate intelligibility for that matter, can be reached. The universe would not be fully intelligible because its intelligibility is bound up with an infinite regress of intelligibility.

Though full intelligibility, the knowledge of the ultimate intelligibility, cannot be attained in an eternal cyclic universe, necessity can be attributed to it. The perpetual cycles occur necessarily. All processes in the entire universe occur necessarily that they would have to occur again and again in successive stages. The universe in the antiquity was taken as necessary, a trait opposed to contingency. A necessary universe can only be what it is, what it was and what it will be. A necessary universe at this view was also eternal. This was the dominant conception of the universe in the antiquity and which according to Jaki was the reason for the failure of science in that period of time.

Ancient thought then is, in a certain way, bound with a pantheistic notion of the universe insofar as the universe was considered as necessary. Necessity was needed by the ancient thinkers
to provide the base for their inquiries and satisfy the human urge to know the universe. They realized that knowledge and truth had to be rooted in necessity. If such were not the case, no true knowledge could be achieved and that no truth could ever exist.

However, lacking with the notion of a personal Creator, the Necessary Being in Itself, the universe, according to Jaki, was considered in the antiquity as being necessary and divine. This may not be explicit among the ancient philosophers. In fact, all of them seemed to make a distinction between the divine and the sensible beings. Nevertheless, it is certain that they failed to see the contingency of the universe and with the organismic thought prevailing during that time, the universe was viewed as necessary. An eternal recurrence of all generic things and processes was attributed to it and as a consequence, its form of intelligibility was necessary as well. Being eternal and necessary, the full rationality of the universe was impaired. No ultimate intelligibility could be reached and according to Jaki, science could not possibly thrive at this situation as what history attests in the antiquity.

Jaki writes on the failure of Greek thought in science as follows: «But since creation was the act of a rational Creator, the work of creation had to be fully consistent, that is, rational. (...) This is why science implies much more than the Greek way of looking at the world, a way which, however rational as long as it dealt with the abstractions of geometry, was not rational enough when it came to physical reality. In the end it became the prisoner of an irrationality which barred access to the novelty of a self-sustaining science, the only science worthy of its name.»

The Greeks were rational enough but their rationality was not adequate in terms of the physical reality. Thus, Jaki affirms that the Greek way of looking at the world as organismic was not adequate. More has to be said about a universe that is governed by purpose. It is certain that it is imbued with purpose but still one has to go on further. Jaki is of the opinion that one should affirm its rationality and this could only be affirmed if there is a rational being that serves as its ultimate intelligibility. Science could only be possible if full rationality of the universe could be achieved. This implies an ultimate intelligibility which could not be none other than God who created the universe and infused in it an intelligibility.
The Greek organismic thought only reached the intelligibility of the universe in terms of purpose but it failed to attribute full intelligibility to the universe. In an eternal cycle, an ultimate intelligibility is left out. For this reason, Jaki writes: «If there was to be a science of nature, then nature had to be liberated from all remnants of animism (…) Animism, which was always an essential feature of pantheism, was no match in the long run at least, for the impetus of the doctrine of creation when the doctrine was taken in terms of the New Testament.»

The Christian doctrine of creation played a dominant role in the birth of science. Its teachings invoke a rational Creator of the universe who being its Ultimate Cause is also its Ultimate Intelligibility. Affirming an ultimate intelligibility, it is affirmed as well the full intelligibility of the universe and the possibility to know it and do science.

The doctrine of creation offers to science the intelligibility of the universe and its contingency. The universe does not have to be necessary in order to be known as what the ancient thinkers believed on. Being organismic, the Greeks struggled 'to save purpose' but, in the process, failed 'to save the phenomena'. It was an effort to rally for purpose against the Presocratic mechanistic thought but it went too far beyond its limits. The Greek organismic thought led to a certain apriorism and a certain downgrading of the need for observation, that is, to look at reality at its brute facts, to experiment on them and to verify the results with reality. Jaki writes: «The sense of purpose, which is immediately evidenced through introspection, became, through its unwarranted generalization by Socharates, an invitation to reach truth through introspective mentation, the gist of apriorism and the worst pitfall offered by logic.»

Aristotle's organismic physics, as seen by Jaki, is partially aprioristic and subjective science because it is about purpose. In fact, it is all about purpose. It is panteleology. He affirms this as follows: «Being a projection of man's nature into the external world, the organismic physics as developed by Aristotle's physics is not a depersonalized analysis of the world but rather a subjective penetration of nature. Its parameters are those of the realm of human volition: natural, unnatural, violent, or restful.» From panteleologism, apriorism or subjectivism comes as a consequence.
All that matters is purpose and knowing it as one knows the nature of things, empirical observations and the need for experimentations are left out and fall into redundancy. All that is needed is intuition as Jaki writes: «Its (science’s) scope is not to find the correlation of things, but to achieve an intuitive insight into the nature of things, into their alleged strivings and affections. This is why in an organismic physics there is no place for mathematics, measurement, or experiments; and quantitative results can never negate the qualitative conclusions.»

It is important to take note that the Greeks were not aprioristic or subjective in the modern sense of the word. What Jaki seems to claim here is that the Greeks made speculations about the universe without sufficient basis on reality. It was an overconfidence on intuition more than on empirical observations. It is a subjective a priori penetration of nature without paying enough attention to reality.

Jaki writes on the failure of the Greeks to observe reality adequately. He says: «The idea of creation out of nothing was rejected by all who were known as dogmatists in late antiquity, namely, the Aristotelians, the Atomists and the Stoics. (...) The ways constructed by any of the dogmatic schools to reach God, that is, the ultimate in intelligibility and being, did not lead to anything transcending the world (...) With no transcendent intellect emerging on the horizon, with the world proved to be without intellect, all that remained was to fall back on the human mind, for which nothing was more natural than to settle with the customary. Such a mind could hardly be alert to deeper perspectives, to patterns of intelligibility very different from those it was accustomed to.»

The empirical data gathered by the Greeks were limited then according to Jaki only to the customary. It is another consequence of their view of the universe as necessary which only admits a one to one correspondence between the changes in the natural processes and the purposes to where they are directed at as what has been noted earlier. It is under this context that the Greeks were not that realists and resorted to a certain apriorism in their attempt to know the universe. They took for granted the customary empirical data as something necessary. No room was
left for other possibilities, or other 'status naturae' St. Thomas talked about in a contingent created universe.10

Sanguineti also notices the a priorism and the failure of empirical data in Greek science and affirms that the Christian doctrine of creation issued back the importance of empirical observations and facts in science. He says: «The Christian doctrine of the Creation contributed indirectly to put an end in the crisis of the Greek cosmology and with this revolutionized science. It emphasized the need for empirical investigations in science as if it were able to exclaim: let us not start from too much presuppositions and observe more the facts.»11

Jaki also affirms: «...creative science always presupposes, implicitly or explicitly, a world view which is anchored in the Christian dogma of creation. Science is possible only if the universe is both rational, that is, intelligible, and is also created, that is, contingent, and therefore to be understood through empirical investigations that exclude an a priori approach.»12

The Christian doctrine of creation affirmed the importance of empirical investigations for science. As Jaki writes: «...the very existence of a science that wants to retain empirical basis is based on the contingency of any and all. Otherwise there would be no need of laboratories and observatories but only of a priori minds.»13 Intuition or a apriori approach may certainly play a role in doing science but one cannot remain in it as such. Science has to look at reality and demonstrate whether the facts of reality correspond to the ideas of the universe. Success in science implies a harmony or correspondence between empirical investigations and intuition.

Summarizing what has been discussed above, we have the following ideas. The necessary character of ancient thought is ultimately rooted in its organismic thought. One consequence is a priorism or subjectivism and an overconfidence on intuition more than on empirical observations. Purpose was attributed to everything and it was seen to be infallible and necessary. This is certain though but what it failed to reach was that the purpose in reality is not necessary in itself but in another. This necessity in another was laid down by the Christian teaching of the doctrine of creation which was not present in ancient thought. The
Christian faith advocates a contingent universe insofar as it is necessary in another and depends ultimately on its Creator.

From this novel view of the universe as contingent, an ultimate intelligibility is attributed for the universe which is also its ultimate causality, its Creator, who transcends it but is within the reach of the human mind. The human mind in its search for the knowledge of the universe sees in God the ultimate intelligibility and affirms a contingent universe that has its reason in its ultimate cause. As Jaki writes: «The contingency of the universe as a whole serves as a pointer to an ultimate intelligibility which though outside the universe in a metaphysical sense, is within the inferential power of man’s intellect.»\(^{14}\) The ultimate intelligibility of the universe provides for the human mind the assurance that the universe is indeed intelligible. The universe is intelligible for there is an ultimate intelligibility. It is for this reason that ancient science failed. Their conception of the universe as eternal returns, that is, as necessary, resulted to an abortive effect on science: apriorism and its consequent downgrading of empirical investigations.\(^ {15}\)

Science and creation are closely linked in Jaki’s thoughts.\(^ {16}\) As what has been mentioned, science has its origin in the belief of the rationality of the universe. That rationality in the universe is rooted metaphysically in its contingency. The universe is contingent because it has its ultimate intelligibility not in itself but in another. If such were not the case, one falls into an infinite regress in the knowledge of the universe where no ultimate intelligibility can be talked about. It would be a universe that is not fully intelligible. A consequence of this would be the impossibility to aim at the knowledge of the universe and to do science.\(^ {17}\)

On the contrary, a contingent universe necessarily implies an ultimate intelligibility. In this set-up, it fosters that human urge to seek for the knowledge of causality until one takes that leap towards that ultimate causality or intelligibility of the universe and affirms the contingent existence of the universe. The former is to do science; the latter, metaphysics.\(^ {18}\)

Taking that step to metaphysics—affirming an ultimate intelligibility distinct from the universe—provides that assurance for the human mind to know not only isolated events or causalities in the universe but to know as well the universe in its totality,
that is, a physical reality where all causalities are mutually related with one another. This assurance can only arise if there is such ultimate intelligibility in the universe, that is, if the universe is accepted to be contingent.

A contingent universe can only be contingent if there is a necessary being distinct from it. The universe is contingent because there is a necessary Being distinct from it who created it. Or in other words, it is contingent because it is a creation of a personal Creator. Jaki writes: «Now if the universe is not necessary, that is, is not necessarily what it is, then it is contingent. If, however, it is contingent, its actual shape and its very existence are dependent on a choice which transcends the entire universe. That choice or power can only be the creative omnipotence of God. Such is the chain of events of reasoning which show that man's science is not only a view of the universe but also a view of creation and that ultimately we have to begin with God.»

Only by considering its Creator, the necessity in Itself, can one see the universe as contingent and as fully intelligible. It is of interest then for science to affirm the doctrine of creation, not to study it which falls beyond its competence, but to recognize it.

To talk of creation is to talk of a Creator. One is the thing created and the other is the One who creates. One is not the other as what emanationists or pantheists believe on, that the created reality is of the essence of the Creator and is therefore identical with the Creator himself. Another error would be to look at creation as an independent reality from its Creator separating the two realities completely once creation has taken place. This view is called deism.

These views of creation are incompatible with science which has been described above. Emanationism is, in the long run, pantheism; an affirmation of a necessary universe that denies the intelligibility of the universe and has been the obstacle for science to arise in the antiquity. Deism, on one hand, also fails in the point of view of philosophy of science. A total separation between creation and its Creator is untenable considering that only in view of the Creator can the ultimate intelligibility of creation be attained. It is clear, therefore, that a different notion of creation has to be considered.
A rationalist view of the universe, that which considers the universe as a creation of the subjective mind, is seen to be unscientific as well. The universe is considered as a projection of some a priori principles outside of the human mind. Everything in the universe at this rationalist view is a priori: its existence, its intelligibility, the causalities that occur in it, the phenomena that can be observed in it, etc. Everything in the universe is given by the subjective mind. It is given but it could not be said to be factual, objective and real. It is a universe that is non-contingent. It is rooted in a priori principles that are said to be necessary. In effect, it denies the contingency of the universe. As a consequence, just like in the case of emanationism and deism, no ultimate intelligibility of the universe can be known and the universe cannot be fully intelligible.

What science calls for is a creation that looks at the full intelligibility of the universe. It is a notion of creation that is not present in the views mentioned above but it is truly reflected in the Christian faith—a creation ex nihilo—contained in its creed: «I believe in God, the Father Almighty, Maker of heaven and earth.» and is constantly affirmed in its teachings.\textsuperscript{20}

Only a creation ex nihilo can truly reflect the origin of true science. This notion of creation implies a personal, free and rational Creator, who creates out of nothing with His infinite Omnipotence a universe by endowing its existence, or the act of being, and conserves that act of being by His Divine Providence.\textsuperscript{21}

A true creation can only be a creation from nothing. If God is taken as the «Ipsum Esse Subsistens», as it is known through revelation, it is only natural to affirm that all creation, distinct from its Creator, can only be existents, or beings, not by itself but by another. God creates by imparting the act of being but He also creates in a very specific manner to impart the nature or essence that delimits the act of being into a concrete and specific created reality. All creation, in the strict sense of the word, can be said to have these two co-principles: the esse or the act of being and the essence or the manner of being. Only the Creator is pure act of being, the «Ipsum Esse Subsistens». Only the pure act of being, God, existed before the moment of creation. Aside from Him, there was nothing and He created from nothing. God
created the universe by endowing to it the act of being and the manner of being out of nothing.

In the philosophical discussion of the notion of creation ex nihilo and its role in philosophy, St. Thomas Aquinas played a major role in it. He, who reconciled faith and reason in his philosophy, noted time and again that Christian philosophy rests on a notion of reality which derives from the doctrine of creation out of nothing. Though he could never be accused of being a fideist, according to Jaki, St. Thomas has the opinion that the creation of the world in time could only be known through faith (revelation) and not by philosophy. In spite of the «rationalism» of Scholasticism in matters of Christian faith, he refused to be carried away to conclude that the temporality of the universe can be demonstrated by reason.

Jaki moreover declares that the notion of creation ex nihilo does not only belong to faith. The natural light of reason can reach on the knowledge of God as the Creator by means of the created reality. Indeed, the fact of creation is a Christian dogma. It is not only because that this doctrine has been universally known through Christianity but also because it is closely linked with the truths preached by the Christian faith especially that of the Incarnation. As Jaki writes: «To call that dogma Christian just because it became universally known and widely shared through the spread of Christianity, is a failure to see beneath the surface. Christianity was able to carry this dogma far and wide only through the strength provided by faith in the Incarnation. Not surprisingly, it is again the dogma of the Incarnation which helped christians to unfold the full meaning of the dogma of creation by vindicating the true nature and dignity of created minds in the cosmos.»

In another occasion, Jaki affirms the relationship between the doctrine of creation and other Christian truths. He says: «Creator, God Incarnate, creation out of nothing, immortal soul and human dignity are notions that form a closely knit unit, a fact well attested by the dogma of creation.»

Christianity and creation for Jaki are therefore very much related with one another. The doctrine of creation acquires its full sense under the light of the dogma of the Incarnation in the person of Jesus Christ, the second Person of the Blessed Trinity
made man. The Incarnation sheds light to the immortality of the hu-
man soul, to the human dignity to know himself, the created reality
and the Creator of all. He writes: «It is still to gain broad awareness
that without the dogma of Incarnation, according to which only
the Son is begotten and therefore the world cannot be a begetting
or an eternal, necessary part of God, the dogma of Creation out
of nothing would have lost much of its incisiveness.»

Christianity and creation, science and creation, with this Jaki
ventures as well as to establish the connection between Christian
faith and science. By virtue of creation ex nihilo, that is, by vir-
tue of the contingency of the created universe and its affirmation,
science arose and prospered. The chain of consequences that have
been reached so far in this discussion goes like this: science —full
rationality of the universe-contingency of the universe— and final-
ly, creation ex nihilo. This is the view Stanley Jaki has of science
and of the universe.

Creation ex nihilo provides all the ingredients for science
—the contingency of the universe, its ultimate intelligibility in God,
its Creator, as well as its intelligibility of the causalities that occur
in it, the order, the purpose etc. Thus, if creation does serve science
right, it can only be creation ex nihilo and not the notion of crea-
tion adopted by emanationists, pantheists, deists or rationalists.

Sanguineti describes this new vision of science, a science that
looks at the doctrine of creation, as follows: «The new scientific
world (...) is not based on physical principles immanent from the
world but on the Creator, on His Omnipotence whose limit con-
sists of the principle of non-contradiction in such a way that
something that is non-contradictory can also be said to be possi-
ble.» With this text, Sanguineti affirms the contingency of the
universe and its relationship with science.

To affirm God as Creator of the universe, one does not fall
into the trap of necessitarianism. The universe could certainly be
said to be necessary for being only a creation, its necessity is not
in itself but in another. In other words, the universe can only
be contingent and being contingent, if it has God for its ultimate
cause and ultimate intelligibility. At this panorama, the universe is
considered as perfectly intelligible. It was at this atmosphere in
which science was born.
Before leaving this discussion on creation ex nihilo, it is deemed necessary to affirm the grandeur and significance of this truth. Jaki expresses this as follows: «About the act of creation one can meaningfully focus on its factuality, namely, that it happened, that it is an act whereby things that did not exist began to exist. This in a sense is not much. The doctrine of creation out of nothing is possible the starkest of all doctrines. It is like a huge infinite gap of which only the ramparts or edges can be seen. But those edges put us in contact with the infinite chasm of mere nothing on whose edge perches our puny existence, a gratuitous drop from the infinite richness of God’s existence that alone can arch over the infinite abyss of non-existence.»

Not all may realize and be impressed with the truth of creation. Some may even deny it. But for Jaki it occupies a very prominent figure in his thoughts.

1.2. The existence and intelligibility of the created universe

It has been said of science that it should know, at least, it should admit a certain grasp of the full intelligibility of the universe and only in such intellectual ambience that science was born and has grown to maturity. It is the purpose of this section now to discuss the full intelligibility of the universe in science which Jaki calls for and what it means for this human undertaking to know the universe.

Jaki affirms: «...true science was to provide full intelligibility about nature, and full intelligibility meant an insight into the cause and purpose of everything that existed and happened.»

It has been mentioned in the preceding sections that to admit full intelligibility of the universe is tantamount to attribute to it an ultimate intelligibility. To talk of an ultimate intelligibility in the knowledge of the universe entails a step beyond science. It is a step that leads to the affirmation of the existence of God and the fact of creation of the universe. Jaki considers that this step was indispensable for the birth of science and was the main reason why science failed to thrive in antiquity in spite that it came into existence during that period.
As it has been cited above from Jaki, full intelligibility has to reach everything that existed and happened, or in other words, it has to reach the totality. Full intelligibility then implies a consideration of the totality of the universe. The intelligibility of science is not only limited to a certain aspect of the universe but, on the other hand, it has to consider the organic teleological whole which Aristotle talked about in his organismic view of the universe but in a different sense. The purpose now is to discuss further the totality of the universe with regard to its full intelligibility.

The consideration of the totality of the universe is something prerequisite for science in Jaki's thoughts. It is only under the light of the totality of the universe that full intelligibility can be attributed to the universe. As what has been discussed in the previous section, Jaki claims that science was born thanks to the Christian faith that provided for it the full intelligibility, that is, the ultimate intelligibility that serves as the foundation for the intelligibility of the universe. This conclusion could only be reached if the totality of the universe is considered. To affirm an ultimate intelligibility of the universe is to attribute an intelligibility for every created reality in it, that is, for the totality of the universe. On the contrary, to talk of full intelligibility would not make sense. Jaki writes on this and contradicts Kant who denies the totality of the universe: «The validity of scientific cosmology implied the validity of our notion of the universe as the totaliy of all material entities interacting with one another (…) This had to be a deadly blow at Kant’s hollowed claim that our notion of the totality of things, or the universe, was not valid knowledge —the claim of Kant based from his contention that there is no way to God starting from the universe was reliable.»

The universe is a totality of mutually interrelated causalities in the physical reality. However, the totality of the universe is not merely the collection or set of all elements that comprise the universe. Though the universe can be said to be finite, one cannot still reduce the totality of the universe to a mere conglomeration of all the physical reality. It is much more than that. The notion of totality is not sensible. It is a metaphysical notion and is not limited with quantity. Sanguineti affirms this. He writes: «...the notion of the totality is intelligible since it is a metaphysical no-
tion and not only a logical-mathematical notion. The notion of the totality of the physical reality, that is, the idea of the universe is also metaphysical.» 32

The totality or the full intelligibility of the universe in science cannot be derived from science itself. It is only presupposed, that is, taken for granted. It is derived from philosophy, a more radical knowledge of reality and from theology, still a more radical knowledge of reality than science and philosophy. Sanguinetti states: «Philosophy (a creationist metaphysics) does not offer us the particular details and the specific principles of all things but it assures us a vision of an ultimate and genuine totality.» 33

The totality of the universe is therefore more than a physical totality. It lies beyond the physical realm. Ultimately, the totality of the universe in the thoughts of Stanley Jaki does not only consist of the physical realm but in a ‘queer’ way, opens the door to the metaphysical realm that reaches one to affirm the notion of God as the Ultimate Cause and Intelligibility of the universe. Affirming God as the Creator of the universe is to affirm its creation, that is, its existence. The totality then of the universe implies the existence of every created reality in it. The universe exists. It is only then that one can talk of the totality of the universe. Something that does not exist is certainly not of the universe. Only if it exists physically does it pertain to the universe.

The existence of the universe is the totality of the universe. It is in this sense that the idea of the universe, the totality of the physical reality, is a metaphysical notion. The idea of the universe as a totality implies its existence, that is, God in creating the universe constitutes it as a totality first and foremost with its existence and secondly, with the specificity and order He bestowed to it.

Full intelligibility as an insight into the cause and purpose of everything that existed and happened implies then the totality of the universe which consists primarily of its real existence. A deduction that can be made therefore is the following: the full intelligibility of the universe, that which science can and should affirm, is that reality exists. This can be restated as follows: the full intelligibility of the universe in science lies on the ontological
knowledge of reality. The knowledge of the existence of the universe constitutes the knowledge of the universe in its totality, in its full intelligibility. Full intelligibility of the universe implies knowledge of its existence.

Yet, it is an existence that is real and objective. The universe exists not by itself but by another because it is a creation of God. The existence that the universe has is only contingent. In effect, the universe is fully intelligible because it is known that it exists and it exists not in itself but because it exists through another being. It is a creation of God.

Full intelligibility of the universe for Jaki therefore is, in the first place, a pointer to the existence of God who has created the universe. Only then can one affirm that the real existence of reality constitutes the knowledge of the universe in its totality. God as the Creator is the Ultimate Cause and Intelligibility of the universe. Only then come the existence of the universe as a creation, its totality and its full-intelligibility. At any rate, one points out to the other. As Jaki comments: «...the recognition by the human mind of the existence of the Creator by means of created things implies a philosophical framework which makes no sense unless there is a totality of things, real, orderly and contingent, which is the notion of a universe proclaimed by the dogma of creation and claimed by science as well.»

Totality, universe, contingency, creation, God and full intelligibility in science point out to some presuppositions that lie beyond science. These presuppositions are essential for science as what Jaki claims. Full intelligibility of the universe in science points out to the presence of some presuppositions —philosophical and theological— that exceed the scope of science.

One such presupposition is the existence of the universe, a philosophical notion, that serves as the metaphysical presupposition for science; a presupposition which, in its turn, is rooted in theology, on the doctrine of creation. Science is only possible if the universe is intelligible, not only in its partial causality or essentiality, but also intelligible in its totality, that is, in its existence. Only with the grasp of the totality of the universe, the knowledge of its existence, can one have a knowledge of the universe and can do science. To know only the aspects of causality —its why and its how— fails to constitute science.
On one hand, to affirm science one has to affirm not only the intelligibility of the universe but also its full intelligibility that ultimately consists of affirming its existence and the affirmation of a Creator, its Ultimate Cause and Ultimate Intelligibility. It is for this reason that the intelligibility of the universe can only be seen under the perspective of the totality that, aside from affirming the existence of the universe, has to take into account its contingent character. This then leads to the doctrine of creation, a theological presupposition provided by the Christian faith.

The affirmation of existence of the universe is necessary in science for Jaki that only a realist notion of the universe, that is, an existence that is objective and contingent can benefit human beings. He remarks: «...no cosmologist can live without a realist notion of the universe as the totality of all interacting things (...) It is therefore most illogical to espouse science and at the same time avoid facing a fundamental question about the existence of the world.»

Science then is heavily loaded with philosophy. But in the final analysis, it is likewise loaded with theology. As Jaki remarks: «...man's science is not only a view of the universe but also a view of creation and that ultimately we have to begin with God.» Sanguineti also writes: «What allows that the universe, human beings, the entire history be known is God, the Creator of the essences of things and of history. This means that humans can certainly know the entire universe in a radical manner but not in an exhaustive manner.»

Science relies therefore on these presuppositions and this is true only if one considers the full intelligibility of the universe. This implies that humans do science in a limited manner, or in other words, science is not absolute. To rely on some presuppositions is indicative that science is only limited.

Science is not an absolute knowledge of reality. Science though a particular knowledge of the universe is founded on the notion of the totality of the universe provided by philosophy and, ultimately, by faith. It has to consider the totality although it falls beyond its scope. This is affirmed by Sanguineti. He even observes that present epistemology also calls for it. He writes: «At the present epistemology, there exists a holistic necessity that
determines the truth of the sciences: if the totality is not known, nothing is known with certainty.\textsuperscript{39}

This does not mean though that the truth of the sciences demand an exhaustive knowledge of the universe. What it calls for is that science cannot totally know the universe. It is a particular knowledge of the universe and it has to rely on faith and philosophy on some of its presuppositions. Only then science can be achieved and the totality which true science aims at as what Jaki proposes.

From this, one may finally deduce that the full intelligibility of the universe is an invitation to look at the unity and harmony of knowledge, that is, science, faith and philosophy are mutually related with one another that though being distinct from one another, there exists a harmony and continuity in them. Science is a limited knowledge of reality but it relies on some presuppositions—philosophical and theological—that provide for it a true knowledge of the universe, a full intelligibility of the universe as what Jaki calls for.

Science does not have to be an exhaustive knowledge of reality so that it can be considered scientific. On the contrary, it has to recognize its limitations: that it relies on some presuppositions that lie beyond its scope. Science is limited because by its very nature it deals only with the physical realm which is only an aspect of reality. There exist as well other aspects of reality that are not within the physical realm and therefore fall beyond science. These non-physical aspects of reality are properly dealt with in philosophy and in theology. Faith and philosophy consider a more transcendent reality than the material and physical reality. They do so however without separating from science, that is, always in consideration of the physical reality. It is in this sense that a continuity exists in the knowledge of reality.

Science, faith and philosophy are distinct dimensions of knowing reality. There exists a closely linked relationship between them but one cannot confuse one from the other. One can correctly affirm that each one is limited and is not absolute in its comprehension of reality. It is certain though that one can be considered a more comprehensive knowledge of reality than the other but not any of them can claim absolute comprehension of reality. One relies on the other to know reality in its totality.
Each one has its scope although, having its own scope, it does not impede that each one is mutually related with one another. Being distinct is not incompatible with continuity and harmony in the knowledge of reality.

Taking a look at science, one cannot fall therefore in absolutizing it to reach philosophy, or even, theology. One may venture to seek an exhaustive knowledge of the material reality but it can only remain as such: a knowledge of the material reality. An exhaustive knowledge of the universe cannot constitute philosophy. Nor does an exhaustive knowledge of philosophy constitute faith.

Sanguineti affirms the distinction of science from philosophy as follows: «...the truth of the philosophy of nature and of metaphysics does not lie in an exhaustive scientific knowledge. The totality which gives the ultimate perspective to everything does not pertain to material principles but to formal or essential principles.» Science is not philosophy and vice-versa. In the same way, philosophy is not theology and vice-versa.

One cannot confuse science from philosophy and philosophy from faith. Science, faith and philosophy are distinct realities. Philosophy is of another realm that transcends the physical without ever abandoning it or be separated from it. Faith is of another realm from philosophy that deals with some revealed truths of reality that are beyond human reason. It is certain though that science presupposes philosophy but this does not reduce it to philosophy. Philosophy may presuppose faith but in no way can the former be absorbed or be confused with the latter.

It has been seen the relationship between science, philosophy and the doctrine of creation provided by faith in the thoughts of Stanley Jaki. Science seeks a knowledge of the universe which can only give rise if the real existence of the universe is presupposed in philosophy. The Christian faith has given to history the fact of creation of the universe by a personal God who being its Ultimate Cause is also its Ultimate Intelligibility.

It is important to take note however that God, being the Ultimate Intelligibility of the universe, is not fully intelligible for human beings. As Jaki mentions, full intelligibility is only an insight and not a knowledge of ultimate intelligibility of the
universe. God is Intelligible in Himself but in no way can human beings can comprehend the Ultimate Intelligibility of the universe. Humans cannot know God as He is but they can know that He exists and that He has created the universe by reason. With this, they also know that the universe exists and that there is an ultimate intelligibility in it. Science, without comprehending its ultimate intelligibility, acquires the full intelligibility of the universe. It was then that science finally succeeded to exist. Science is to know, or better, to recognize and accept that there is an ultimate intelligibility in the universe. The attempt to know this ultimate intelligibility, God, pertains not to science but to philosophy and theology though only in a partial way.

Summarizing what has been deduced above from the full intelligibility of the universe in science. We have seen the following ideas: the full intelligibility of the universe is an affirmation that science has some philosophical presuppositions that point out to the totality of the universe (the universe exists) which ultimately point out to some theological presuppositions as well (the universe exists contingently and has its ultimate intelligibility in God, its Creator); science is not an absolute knowledge of reality, on the contrary, it is only a particular knowledge that relies on some presuppositions beyond its scope and is therefore limited, and; it expresses as well the mutual relation between science, faith and philosophy, that there is harmony and continuity in them in spite of being totally distinct from one another.

Before ending this section, it may be convenient to present a summary of what has been mentioned in the entire section. I deem it necessary for this purpose to cite what Jaki himself has written as a summary of a chapter of one of his books that corresponds to the ideas contained in this section. He writes:

«...it should suffice to recapitulate briefly the chief characteristics of the universe which make scientific work possible. First, the material entities observed by science must be real, that is, existing independently of the observer. Were not such the case, each observer would create his own facts, a result banishing each observer to solipsism, the strictest solitary confinement imaginable. No observer reduced to that confinement can lay a claim to an exchange of his views with other observers, who, at best, are, together with their worlds, the creation of his own mind. Second,
the material entities must have a coherent rationality. They must be governed by laws which can be formulated in a quantitative framework, and they must have a validity which transcends the limit of any particular time and location. Third, those entities, because they are governed by consistent laws, must form a coherent whole, that is, must be subject to a consistent interaction. The existence of any material entity which does not interact in a coherent way with the known world is utterly irrelevant for science. For science there is only one universe. Science has no room for island universes and multiple worlds if these stand outside the realm of physical interaction, be that interaction gravitational, electromagnetic, or of any conceivable kind. Fourth, the form in which that coherent wholeness, or universe, does exist, cannot be considered a necessary form of existence. It is only one among countless others that are conceivable. As to the question why such a universe does in fact exist, science has no answer. It cannot even answer the far less deep question whether the duration of that world is infinite or not.

These four features of the universe are indispensable not only for making the notion of the universe worthy of its etymology, the converging of many into unity, but also for making science possible. Neither is science conceivable without any of them, nor are they conceivable without one another as long as one aims at a rational discourse about the universe. Those four features form a single basic proposition which must be assented to unconditionally if any further proposition, that is, a message addressed from one human being to another, is to make sense. A proposition which demands unconditional assent has since long been denoted as a dogma. That basic proposition certainly functions as an initial dogma in that superbly articulated creed about the reality and rationality of the universe which is science. Not surprisingly, the ultimate justification of that dogma can be found, both historically and philosophically, only in that article of faith, the dogma of Creation, which is the basis of all genuine and reasonable dogmatic propositions.»\(^{41}\)

After seeing all these, I will now consider in more detail the relationship between science and creation, on how does the notion of creation provide for the full intelligibility of the universe, an indispensable condition for science. It will be seen that creation
implies specificity of the universe and it is this trait of the universe that science was made possible.

2. THE SPECIFICITY OF CREATION AND THE CREATION OF SPECIFICITY

The universe was created by God and He created it in a very specific manner. What is understood here as specific? «Specific» can be understood as follows: «having a special determining quality; specially or peculiarly pertaining to a certain thing or class of things and constituting one of the characteristic features of this, and; precise or exact in respect of fulfillment, conditions; definite, explicit.»⁴² What seems to be the more convenient definition of «specific» to be adopted in the context of creation by God is that of the second, that is, as a characteristic trait proper or peculiarly pertaining to a certain thing.

In the context of a specific creation by God of the universe, it can be said that God created the universe endowing it with qualities that are specially characteristic of it. It can be said therefore that the universe is specific because it was created. The inverse of this statement can also be validly said: the universe was created because it is specific. Specificity of the universe and its createdness point to one and the same thing: a personal Creator, absolutely free and rational.

God is absolutely free in creating the universe. There could be no other reason why the universe was created aside from the will of God. And God, being rational, also created the universe rationally, that is to say, creating every reality according to a specific manner of being and infusing in it a rationality in the form of a rational order that governs the dynamism of the entire universe.

It is by virtue of the rational order in the universe that one sees in its dynamism purpose and causality. With the order, purpose and causality in the universe, the universe behaves in a specific manner and not in any other way. Besides, every created reality is specific in itself by being what it is and only what it is according to its essence. For this reason, some special qualities that are particularly proper of the universe can be attributed.
2.1. The notion of specificity

Specificity can be attributed to the universe in two ways: first, in its dynamism or in its operations; second, in its static dimension or in its nature insofar as things are specific in its qualities by its essence or form. However, both specificities of reality are complementary. The universe is specific in its dynamism because, in the first place, its essence is specific.

Essence can be considered as nature or as form. Essence as nature is essence as the principle of operation; essence as form, is essence as principle of determination. The universe is specific in its dynamic aspect because of its nature; it is also specific in its static aspect because of its form.

It is now convenient to point out the relationship of the notion of specificity with other notions related to it to be able to understand it better in content and in extent.

Specificity implies in the first place the creation and the contingency of the universe. Creation is a determination and bestowal of the act of being of every created reality. It is for this reason that a rational order exists in the universe and it is not chaotic though it may seem to be. By being created, it is also contingent. It is by being contingent that it is specific. The specificity of the universe is said to be specific insofar as its specificity is not by itself but by another. Its specificity is contingent and not necessary in absolute terms.

Being contingent, the universe can be something else but God has determined it to be what it is in creation. It is contingent but not absolutely chaotic. It is also specific. There exists a rational order in it. With a specific order, there is purpose and causality in the changes that occur in the universe. The universe is intelligible because of the specific order in it. As it has been discussed in the preceding section, it is fully intelligible on account of an ultimate intelligibility that points to God as its Creator.

Another derivation from the specificity of the universe is its singularity. It is by being specific that the universe is singular. As Jaki writes: «Singularity diffuses through all things in such a manner to turn them into a universe of beings that interact with one another in an invariably consistent and most specific manner.» 43
The universe is singular, or in other words, unique because there exists a single purpose or order, a single rationality that governs all the causalties that occur in it.

Singularity though does not mean homogeneity of all created reality in the universe. It is meant as uniformity in the plurality or complexity of the universe. The universe is comprised of a great number of components. Yet in spite of the complexity of the plurality in the universe, it is most singular. There is only one universe: this universe. All created reality in the universe follows a specific course in their mutual interactions. A single order or rationality is obeyed by all in spite of its diversity. It is in this sense that the universe is singular. Regardless whether God had created other universes aside from the universe we know, it is certain that this particular universe we live in is specific and most singular.

Still another derivation would be simplicity. Being singular and specific, the universe can be said to be simple. A large number of constituents interplay with one another producing many diverse causalities and yet, one discovers that in all these interactions there lies simplicity. All these interactions point out to that specific and singular order that governs the universe.

Specificity, singularity, simplicity, contingency and creation are therefore closely knit with one another. What binds them all together is the intelligibility of the universe which, in the long run, has its cause in an ultimate intelligibility that, though does not pertain to the universe, is within the reach of the human mind. This ultimate intelligibility is God, the personal Creator of the universe.

2.2. Specificity in science

The universe is specific in the same way that it is singular, simple, contingent and created. All these characteristics point out to the fact that God has created the universe. In creating it, God has created it with an order and intelligibility that is founded ultimately, in Himself. As what has been mentioned earlier, the universe is specific because it is created and it was created because it was specific.
It is the specificity of the universe that Chesterton had in mind when he wrote the following words: «The world must be some shape, and it must be that shape and no other; and it is not self-evident that nobody can possibly hit on the right one.» Chesterton was totally convinced that the universe has a shape and not only that. It was also evident for him that the universe has a particular shape. This conviction is based on his belief of the specificity of the universe that is rooted in the belief of the creation.

Jaki likewise affirms that the universe is specific based on his philosophical and theological convictions. He writes: «...in the actual physical world specificity is the hallmark not only of each and every part but also of their totality, the universe.» Moreover, he also claims that specificity is attested by science. It is now the purpose to touch on his discussions on the specificity of the universe.

In spite of the evident complexities of the universe, modern science is proving that behind those complexities lies the simplicity of the universe. As Jaki observes: «As physics forges ahead, the physical world not only reveals more and more of its grandiose unity of plan, but it also gives us a closer glimpse of the staggering dimensions of its complexities. Past successes of science, of course, give strong support to the view that the human intellect will be able to cope with these complexities.»

Modern science is tending towards more simple and general equations that reflect the universe at a larger scale. Advances in science seem to disperse the mystery of the complexity of the universe. Scientific equations have become more comprehensive and yet more simple. There seems to be a clear trend that science goes into the direction of simplicity and specificity. Jaki remarks: «Whatever true progress has been made in the history of science, it was always an advance from one stage of specificity to a stage where things appeared even more specific.» In another occasion, Jaki affirms: «The more genuine success claimed by science, is the more specific the universe will appear. Of course, any aspect of ordinary reality is very specific, specific to the point of being queer.»

Science attests the specificity and simplicity of the universe. This is particularly true even in the fields of microphysics (quau-
tum physics) and macrophysics (scientific cosmology or astrophysics). Not only in the field of «day-to-day» mechanical physics does the specificity of the universe is demonstrated.\(^49\)

It is indeed quite evident that the universe is specific in terms of ordinary physics. That the sun rises at the east and sets at the west, that a moving body tends to maintain in motion while static bodies tend to be at rest, that what goes up goes down: all these indicate the specificity of nature, that physical observable processes occur following a specific order and are governed by strict rules that dictate the outcome or the result of such occurrences.

Stanley Jaki also asserts that even in the level of molecular particles and in the level of cosmic bodies, the specificity of the universe is demonstrated. The nuclear spins, the 2.7°K cosmic background radiation, the quantum physical constants, the equation \(E=mc^2\) of Einstein, etc. indicate that the universe is specific in nature. The same specificity can be seen in the microlevel and macrolevel of the physical universe. Just as things observe a specific order in ordinary physics, so do molecular particles and cosmic bodies. All physical bodies observe an order and follow a specific purpose.\(^50\)

Some irregularities may occur in the universe but this does not oppose the specificity of the universe. The universe is contingent and is therefore fallible. Hence, one can affirm the existence of chance but this topic will be seen later on in the next section (§ 2.3).

Science attests the specificity of the universe. However, the specificity of the universe is not given by science. It is only given to science. Science only discovers the specificity of the universe. This implies two things: first, that the universe is objective and that there exists absolute truth in it; and, ultimately, these point out to the contingency of the universe and the affirmation of God as its Creator.

Jaki studies the science of Planck and Einstein —two of the greatest modern scientists— to prove his claim. He observes that both affirm a creative science, that which for Jaki implies belief on the real and objective existence of the universe and on its contingency. It is a science then that cannot be a priori but on the other hand, a posteriori in its attempt to get in touch with real-
ty. Moreover, it is a view of reality and its specificity as something independent of the human subject although it can be known by him. It is a science that is opposed to radical a priorism of subjectivism adopted by sensationism, rationalism and idealism.

Jaki cites the creativeness of Planck as follows: «...it is therefore possible for man to reach conclusions through pure speculation about those regularities (...) the external world represents something independent of us, something absolute which we confront.» For Jaki: «(Planck's) conception of the world in which all processes, forces and factors embedded in nature reflected one basic unchangeable law, independent of the scientist's culture and habitat. The world presupposed by science had to be one, consistent throughout, and objectively existing.»

In the case of Einstein, Jaki also observed the same creativeness. For him, Einstein also affirmed an objective and existence of the universe. The relativity theory is a misnomer. He writes: «His two theories were in a sense mislabeled with the word «relative» because both the special and general theories of relativity were more absolutist in character and content than any other scientific theory. Their starting point was not a positivist aggravation with experimental incongruities, but a burning desire to safeguard the beauty of nature and of laws which reflected that beauty.»

In effect, through Einstein’s relativity theories he made manifest «that the specific form of that order could not be derived a priori if the need for experimental verification was to retain any meaning. Einstein the philosopher-scientist, perceived that such a train of thought was not only a road of science but it also came dangerously close to turning at the end into a way to God. No wonder that he hastened to make it clear that he had not fallen into the hands of priests.»

In another occasion, Jaki writes on Einstein: «...the true physiognomy of (Einstein’s) creative science lies that those principles had to relate to an objectively existing totality of things, or the universe. Such a universe was not the creation of the mind, nor could its high degree of order be expected a priori. The orderly world was something given.»
The specificity of the universe as demonstrated by science has led to the so-called the anthropic principle which is now widely accepted by men of science as well as a number of philosophers. This principle states that the universe has evolved in a very specific manner that on account of its extreme specificity, it is inferred that only in such a universe could man arise, a being more specific or peculiar than the universe itself.\textsuperscript{56}

In effect, the anthropic principle, in the words of Haffner, «has put cosmic evolution on a very narrow track and (thus) the impossibility for the universe to have an evolution other than it had. The universe «had a very narrow escape in order to become what it actually is» (JAKI, S.L., Angels, Apes and Men).» Haffner concludes then that «the cosmos seems indeed to have been made for man.»\textsuperscript{57}

Jaki remarks on the anthropic principle: «At any stage, the slightest departure from the specificity would prevent the emergence of man and the formation of galaxies. This is the consideration which made so many cosmologists speak of the anthropic principle. The principle stands for the nagging suspicion that the universe may indeed have been fashioned for the sake of man. Clearly, cosmologists are, in the grip of a meaning which stretches from the universe to man and from man to the universe and beyond.»\textsuperscript{58}

Yet, some deny the anthropic principle and that the universe is specific. There are several variations of this denial: some, in denying this trait so proper of the universe advocate chance as the governing principle of reality (this will be discussed in the next section, cfr. § 2.3); others, though they do not deny that the universe is specific, maintain that specificity is merely quantitative, a view that falls short of real specificity and, as will be discussed now, is a terrible blunder as in denying completely the specific character of the universe.

The universe may be said to be specific because it may be finite. Being finite, it is limited in quantity. Physics may therefore assent to the fact of the specificity of creation. However, what has to be referred here is much more than physical specificity. Thus, though the universe were not finite as what some physicists presume, specificity should still be affirmed.\textsuperscript{59}
To affirm solely the physical specificity of the universe falls short of real specificity according to Jaki. Though it is certainly a step towards that specificity, one should venture that leap towards a more radical specificity and not remain in the physical quantitative specificity by giving exclusive attention to the realm of quantities. The specificity of nature is not only quantitative but it is also specific in its features.

As Jaki points out: «One should not, however, think that man’s scientifically reliable mental grasp of the totality of matter is possible only if that totality is finite. That grasp has for its real target the specificity of matter as it exists, a specificity which is even more striking for an infinite amount of matter conceived in a distribution amenable to scientific treatment» 60 (italics mine). The specificity that has to be attributed to the universe then should not only be in terms of quantity, that is, in terms of its finiteness. On one hand, human understanding should grasp that the universe is specific in its features, the most basic of which is its existence.

It is necessary then to leap towards that metaphysical specificity of the universe. The universe is specific quantitatively may be certain but it is also specific in other terms that physics cannot account for. How can physics explain the specificity of the order in the universe? that is, to explain the question why this order and not a different one. As Jaki remarks: «that simplicity (of order) would not lack stark specificities which then would provoke the question why those specificities are of this and not of some other magnitude.» 61 This specificity escapes the reach of physics and should be attributed to another realm aside from the physical.

Jaki reasons out that since physics can only deal with shapes or quantitative specificities, it cannot account for the specificity of the universe on its own. If it is ever valid to talk about quantitative specificity, it is only from the point of view of the metaphysical specificity. The latter accounts for the ultimate specificity of the universe. It is for this reason that Jaki adds that no such quantitative specificity exists on its own and that he writes: «the quantitative specificity of a particular state (or phase or shape) of matter can be traced only to another state no less specific in its quantitative characteristics.» 62
The quantitative specificity is ultimately based not in quantity but in something which metaphysics provides for. The physical, or the material, is always characterized by unspecificity. Jaki expresses this idea with the following: «A universe, which science shows to be real and specifically so, will not fail to point beyond its specific phases to an origin which has to be a factor metaphysically beyond the universe.» 63 He goes on to say the alternative if only the quantitative specificity is affirmed: «The alternative is to be trapped in regress to infinity and to use the word universe without meaning by it the very totality of consistently interacting things.» 64

In another occasion, he writes: «The cosmologist disdainful of metaphysics will be left with a formidable if not frightening array of singularities, and the only scientific thing he can do about them is to trace them to another array of singularities, a most satisfactory and safe pastime as long as one remains oblivious to the fallacy of infinite regress.» 65 With these words, Jaki insists on leaping beyond the quantitative specificity of the universe and look for its ultimate specificity in metaphysics.

The universe may be quantitatively specific but it is not the radical specificity that it has. Ultimately, a step has to be taken towards that radical specificity that can be encountered in metaphysics. The specificity of the universe has to point out to the ontological existence of reality and to the acknowledgement of a Creator as Jaki realizes. He writes: «The primary purpose of the specificities of things is not to make possible mere quantitative games with them, but to help one recognize the very reality of things and the Reality that makes them real.» 66

Still, some insist on avoiding that metaphysical leap that Jaki talks about on the specificity of the universe. They affirm that the universe is homogenous and perfectly symmetrical. For them, specificity is equated with homogeneity and symmetry. The equality would «provide a semblance of ‘perfect’ symmetry or homogeneity that in turn might seem to dispose of further questions that are troublesome for being plainly metaphysical.» 67 Against this claim, Jaki argues that nature is not simple in a trivial sense. It is simple in a sense that «an all-pervading uniformity underlies the manifold complexity of natural phenomena as they appear to the ordinary observer.» 68
The simplicity then which the universe is characterized is not homogeneity but an uniformity in the complexity. One such complexity is a slight assymetry, a very specific imbalance, demonstrated by science. An example of an assymetry in the universe is the proton-antiproton imbalance. Matter can only exist if there is such imbalance on particles and antiparticles. If there were homogeneity or perfect symmetry, those particles would have continually annihilated one another and matter would never have existed. Jaki writes about this specific imbalance in the universe as follows: «All these «cosmic imbalances» attest that the universe is a most specific entity limited to a relatively few possibilities. Even more important, over such a universe there looms the enormously high probability of its not being at all in the very form as we know it.» Thus, although science manifests a certain imbalance this imbalance is still specific. Being specific, it also calls for something, which is more than the physical, that accounts for this specific imbalance in the universe. Being specific, it calls for more than the physical.

It has been expounded above the arguments on the specificity of the universe. The universe, from its microlevel up to its macrolevel, follows a specific order and purpose. The quantitative specificity of physics is not adequate to explain this particular trait of the universe. Only by proceeding to what lies beyond physics can the specificity of the universe be fully and truly explained. Denying this step, one is led to an infinite regress as Jaki remarks: «Those unwilling to admit cosmic contingency can, for a while, take refuge in the dream that has regress to infinity as its cherished object.»

Specificity does not only concern with quantity but, first and foremost, it concerns with the very reality of things, that is, its existence and its existence due to a Creator. Only then that the universe will not appear as nebulous and proper of science. Jaki affirms: «...even in its earliest stages the universe was what a universe had to be: a most specific totality of all things that, because they were things, could only be specific.» The universe is specific, first and foremost, because they are things, that is, they form part of creation. Only then that the universe is indeed specific. Again, we see the connection established by Jaki between science, philosophy and natural theology.
2.3. Specificity and the forms of reality

The universe is specific not only quantitatively as it has been argued in the preceding discussion but also in its features. A certain specificity is admitted in science but only in terms of quantity which cannot account for the real specificity of the universe unless one transcends quantity and the physical realm and affirm an ontological or metaphysical specificity.

One thought that denies completely specificity is to advocate chance as the governing principle of reality. This will now be the topic of the discussion. It will be seen that though chance may be attributed in the universe, no absolute chance can exist. The existence of the forms of reality points out to the specificity of the universe that leaves no possible room for absolute chance in it.

One thought that advocates chance as the governing principle of reality, and therefore denies the specificity of the created universe, is evolutionism. There are several degrees in which chance and purpose are considered in it. Thus, evolutionism has branched out into several forms. Some advocate a moderate evolutionism, a movement that started as a reaction to the rigidity of the teleology of old but did not fall into the extreme of denying any purpose in reality. Others were led to adopt a radical stand of evolutionism that denies any purpose and order in reality. This radical stand that considers pure chance is unacceptable in science.

Science cannot be governed by pure chance. As Jaki writes: «That nothing happens by accident, —that is, by sheer chance, that is, really without a cause— is also a chief tenet of science about the material universe. For if anything were truly accidental, there could be no consistency, and without consistency there could be no laws.» Without consistency, no order could be established. All would be pure whim. Science could not possibly thrive at this intellectual inconsistency.

It is certain that the universe is intelligible because there is order, determination in its causality, in it. But it is also certain that chance and indeterminism also exist in the universe. These are not incompatible as Artigas remarks: «The principle of causal determination does not exclude the existence of a certain margin for indetermination in the natural processes of the universe. There
is an indetermination in the perfection of an operation and another in the possibility of a defect in it.» This indetermination is attributed to the contingency of the universe, that is, God its Creator and its Ultimate principle of causality, has created it in His own ways.

Artigas, like Jaki, conceives chance from the point of view of the contingency of the universe, that is, from the consideration that God created the universe in a specific form but also in a contingent manner. By being contingent, the universe is defective. It is for this reason that chance exists in the universe. Nevertheless, the chance that exists in the universe does not escape the Providence of God, its Creator, and is therefore specific. Jaki would call this as a designed and purposeful chance. Artigas writes: «...from the point of view of the supreme causality of God, nothing happens in the world in a casuality. Nothing falls beyond the Divine Providence. The casual event can be referred to as a proximate contingent cause.»

Chance is not incompatible therefore with the specificity of the universe. Things may happen by accident in the universe but it cannot be affirmed absolutely that these events happen irrationally. «The existence of chance is not irrational (...) It only implies that the order in the universe is compatible with disorder, that is, that the physical world is contingent: some events could not have happened and others, on one hand, could have happened. The universe admits in its course a great number of possibilities, several particular possible order and not only a single predetermined one.»

What chance only implies is the contingency of the universe. It does not imply the negation of the specificity of the universe and its rationality, order and intelligibility. The universe is contingent and for this reason there exists in it a necessary being that accounts for its contingency. God, as its Creator and Providence, provide for the universe its intelligibility —its full intelligibility as what Jaki claims— in spite of its apparent disorder and irrationality in some cases due to its contingency.

Being specific, things that happen by chance are rational. These chance events are rational in a sense that they are directed towards a finality. They are directed towards a finality because there is also causality in them. It is in the finality and causality,
though contingent, where its specificity lies. As Artigas explains: «Chance calls for the existence of a previous order of beings endowed with potencies and directed to some ends. The fact that some events came out ‘by chance’ does not mean that they have occurred only by virtue of chance. On the contrary, these events proceed from contingent and potential causes that did not have to be actualized necessarily. In the same manner, chance does not imply a total absence of finality but only the existence of a contingent finality that is open to several possibilities.»

Summarizing this discussion on chance in the universe, one can make the following conclusions: 1) Chance implies causality as Artigas comments: «If chance means «an event without cause», one has to affirm that it does not exist and that it is reduced to human ignorance.» 2) This causality is attributed to a contingent cause which, by being contingent, is open to several possibilities that do not have to be actualized necessarily and is not restricted therefore to a specific and determinate order. It is in this sense that chance may seem irrational and contradicts the specificity of the universe. 3) Lastly, all causality in the universe, even the contingent ones, are directed towards God, its Ultimate Cause. It is for this reason that the irrationality that appears in chance is only apparent since it has its rationality, and its specificity, in God. As Artigas writes: «The order that exists in contingent causes, that is, in chance is also a marvellous order. The ultimate cause of this order can be found in a superior Intelligence (God) who has bestowed such contingent order with all its possibilities.»

A certain chance or chaos may therefore be admitted in the universe but it has to be taken under the right context. It cannot be denied that chance exists in the universe. This is evident from the fact that there is also indeterminism in it. Chance and indeterminism go hand in hand. This indeterminism in chance may give the impression that the universe is not specific. But it only points out to its contingent nature. Being contingent, the universe is also specific. Specificity and contingency are mutually related. The universe is specific because it is contingent, that is, created by God and it is contingent because it was created by God in a specific manner. This will be seen later on in the next section (cfr. §2.4).
Now leaving behind the discussion on chance and going back to the main discussion of this section on the specificity of the universe, it has been argued that chance exists in the universe and that evolutionism has the right to affirm it. Evolutionism has certainly grasped that «the teleology of old, with its almost invariable and always unfortunate ties to the fixity of each species, had too many pointers toward purpose, which like so many trees could obliterate the vision of the forest.» 82 Too much insistence on purpose in the universe may obscure, as Jaki says, the vision of the forest. One danger that could present is to attribute purpose to all and in all as in Greek panteleology. From this posture, one can easily lose track of the right way and be converted as a pantheist who considers the universe as self-governing and necessary.

Contrary to the «teleology of old», one should affirm chance in the universe. It should only be since the universe is contingent and being contingent, there does not exist a perfect and ideal order and determinism in it. It is for this reason that chance exists in the universe. As Artigas claims: «Chance implies a defective or contingent causal process that lacks an immediate finality. In the physical world, there does not exist a perfect and ideal order as it was usually adopted in classical physics. On the contrary, there exists a contingent order, a disorder, that is a relative privation of order in the universe.» 83

Jaki also explains what it is to accept chaos or chance in the universe. He writes: «The only kinds of chaos which are helpful to science are forms embodying singular specifics expressive of a design which in turn points to purpose.» 84 A designed and purposeful chaos: that is what it has to be. A chaos that is present in the changes that occur in the universe —however chaotic these changes may be— is founded on the coherence, on the design and purpose that accompany these changes.

Coherence, design and purpose: these are some pointers that no absolute chaos can possible exist. Absolute chaos is erratic, vague and unintelligible. On the contrary, the universe, in spite of its complexity and apparent mysteriousness, points to its intelligibility and specificity. Now we will venture to take a look at the principle of specificity of the universe. As what will be seen, the principle of specificity of the universe are the forms of reality.
The form is what makes an existent to be what it is. The matter is the indeterminate principle that receives the form. Matter and form constitute the hylemorphic composition of reality according to the aristotelian doctrine. It is only of interest in the present discussion to consider the forms of reality which, by being that principle that makes an existent to be what it is, is said to be the principle of the specificity of the universe. Being the principle of specificity, the forms express design and purpose in an apparent chaos in the universe. These forms are the basis of coherence of reality. Forms, coherence and specificity: all these three notions are mutually related.

Some views that deny the existence of forms are empiricism, physicalism and mechanism. These views of reality look at the created universe as a mere conglomeration of sensible properties that are not founded on any coherent base. A real entity is considered here as a jigsaw puzzle consisting of various pieces joined together but no principle of unity or coherence is attributed to it whatsoever. Motion or change takes place as a variation of those pieces or properties. What exists here are sensible properties. Things do not exist at this framework. What is left out here is the existence of things.

Against this view, one may argue that change is not a mere variation of properties. It may certainly accompany some modifications in its physical properties but not all of it changes. There remains something that does not change. Things exist and things change. Reality cannot be made up solely of physical sensible properties that change. Aside from the sensible properties, reality first and foremost is real, that is, it exists in a very determinate way. As Artigas writes: «no existent is a mere collection of properties and that an existent has to be real and a determinate manner of being; the classical definition of form expresses both.»

Besides, there is a principle that dictates the nature of change. This principle is geared towards a specific nature. It dictates the specific manner of being that delimits the change that could take place in reality. Reality can certainly change but it can only change according to what it is, that is, according to that principle which is expressed by the classical notion of form.

It is precisely through forms that the world of change secures the coherence and permanence needed for a scientific investigation
and philosophical interpretation. It is through forms that coherence is given in all changes in reality. It is what gives specificity to reality making that reality what it is (the essence as form) and it is also what gives specificity of purpose in change. Through the forms, reality changes only in accordance to what it is and thus, it changes coherently.

As it has been said earlier, only with the specificity or coherence of change can knowledge of the universe is possible. Being the principle of the coherence of change in the universe, one can see that forms are relevant in science and in the knowledge of the universe. Artigas takes note of this. He remarks: «The concept of form is rooted with the intelligibility of nature since it represents those dimensions that refer to the manner of being of natural existents.»

The classical definition of knowledge or intelligibility as the intentional or immaterial possession of forms proves the relationship between forms and the intelligibility of reality, between forms and its specificity. It is through the possession of forms that one knows the universe. Or, in other words, the intelligibility of the universe is contained in the forms, that which establish the coherence and specificity in the things themselves and in the change of things.

It is also important to take into account, though by now it should appear obvious, what Artigas also observes with regard to forms: «To affirm that existents do not vanish in pure flux of accidental changes and that they are intelligible, it is not necessary in any way to affirm the eternity of the forms.» To affirm forms, one has to consider that they are contingent, that is, created by God otherwise one falls to Plato's eternal forms. To affirm that they are necessary is to affirm likewise that the universe is necessary. But it has been repeatedly argued that to fall into this conclusion is to get rid of science. Essences, or forms, are contingent as all other created reality. This leads the discussion on contingency.

### 2.4. Specificity and contingency

Now let us take a look at specificity and contingency. As it has been mentioned, the universe is specific because it is created
and that the universe could only be created —and not something that came into existence by pure chance or by other similar reasons that do not affirm a personal Creator— because it is seen to be specific. A consequence of this is to affirm the relation specificity and contingency of the universe. If the universe is specific, it can only be created. It can only be contingent and not necessary. Specificity implies the contingency of the universe.

Hints have been made of such relation in the previous paragraphs. That the forms of reality establish the coherence or specificity of the changes in reality, that these forms are contingent and that the specificity of the universe points out to a more radical specificity than the physical quantitative specificity: these statements on the specificity of the universe give way to its contingency as well, that is, the existence of God who created the universe in a very specific manner. In other words, the ultimate consequence is to affirm a free and rational Creator, absolutely free from all necessity even from the very specificity of creation. He could have created different specificity from that which is present in the universe. It is of interest now to spell out the relationship between these two particular traits of the universe and to derive some possible conclusions related with the discussion.

Science attests the specificity of the universe (cfr. § 2.2). Indirectly but necessarily, it also attests its contingency. It is by being contingent that the universe is specific. However, the inverse of this statement is also true: it is by being specific that the universe is contingent. As Jaki claims: «...modern science also shows the universe, (...) to be exceedingly specific in its totality as well as in its very constituent particles and forces. Such a specific universe reveals its contingency by its being limited to a specific form of physical existence (and) that specific form of existence certainly cannot be taken, on scientific grounds, for a necessary form of existence. The specificity of the universe, which is an evidence of its reality, is also the evidence of its contingency, namely, that it is but one of many possible universes.»

In another occasion, Jaki manifests the relationship between specificity and contingency. He remarks: «Now if an infinitely perfect Being is postulated as the creative cause of the universe, then his choice must have built-in consistency. A true God cannot play dice with the universe by changing its laws, its parameters,
at the spur of the moment.» Specificity and contingency, contingency and specificity: one points out to the other, that to affirm one is to affirm as well the other.

Being specific, the universe could be different from what it is, that is, that there exists other possibilities aside from what it is. As Jaki comments: «Like any specific thing, the specific universe, too, has to be the result of a choice among a great many possibilities.» Being a choice among a great many possibilities, «the specificity of the universe will remain the kind of specificity which keeps reminding any sensitive mind that it is not a necessary but a contingent feature, a specificity which does not have its raison d'être in itself, but must depend on a choice external to the universe.» Thus, specificity implies the affirmation of God, that is, the contingency of the universe.

Thus, Jaki writes: «Specificity is the basic and essential guidepost toward two fundamental philosophical points. One is that things can be recognized as real insofar as they are specific (...) The other is that next to being a pointer to reality, specificity is also the mark of its contingency, that is, a disclosure of the fact that it could have been otherwise» (italics mine).

The specificity of the universe is therefore contingent. It could have been otherwise as Jaki affirms. However, there may be a confusion equating specificity and necessity. Being specific, it is certain that it has to be what it is necessarily. But in no way does it mean that it is necessary as opposed to being contingent. Humans realize that the universe is specific because it points out to an absolute necessary being who has created it in a very specific manner, that is, it points out to its contingency. The specificity of the universe cannot otherwise be contingent. Jaki expresses this as follows: «The view given by science about the universe is a very special view. In that view, the universe appears to be a most peculiar, most specific entity. Being very specific, (...) it reveals that it could be different from what it is. In other words, specificity always reveals the non-necessary character of a thing or anything.»

Humans are not only mere scientists but are also philosophers to realize that the specificity of the universe is necessarily contingent. As Jaki remarks: «Man has to be a philosopher to realize that if a thing is found to be what it is,
because it was produced by another specific thing or state of affairs, the point of contingency has thereby been pushed only one stage back. As a good philosopher, man will realize that there is only a limited number of such stages available in a universe limited to one overall specificity which reveals its contingency.”

A necessary specificity, something that happens for example in affirming solely the physical quantitative specificity of the universe, is untenable from the point of view of science. Being necessary, it would imply that no ultimate intelligibility could be found in the universe, that is, that the knowledge of the universe would imply a knowledge of an infinite regress. Or, in other words, a necessary specificity of the universe would imply that the universe itself has its own explanation, that it would only be self-explanatory. At this situation, there could be no science and no true knowledge of the universe could be achieved.

Specificity then has to be contingent. The universe is specific not because it could not have been otherwise, that is, necessary; but because it is contingent, that it could be perfectly otherwise. It is specific because there is an absolutely necessary Being in Itself that has determined a specificity for the universe. With the specificity of the universe, a certain necessity has been introduced but a necessity that is not necessary in itself but in another.

Neither it is true that the universe is pure contingency in a sense that it could be different from what it is by itself and in itself. This would be equivalent in affirming absolute chaos in it. A certain necessity has to be affirmed in the universe. It is a necessity of a specificity which in itself is not necessary. Only in this sense can the specificity of the universe be understood as necessary: the necessity of a non-necessary specificity or as a necessity in another, in God, the absolute necessity in Itself.

The question therefore why it is as it is and why it exists at all is a «metaphysical question about the existence of a Creator who, by choosing one specific world, decides why the world becomes what it is, which is the reason why it exists at all.»

Specificity is very much linked with contingency. The recognition of science of the specificity of the universe opens the path towards the road to the existence of God. As Jaki remarks: «(The specificity) which is the hallmark of the cosmos both in its entirety and in all its details calls for a Being capable of an act which
is creative in the strictest sense. Such an act implies a selection demanded by the singularity of the actual cosmos, one of the infinitely many worlds that are conceivable.»

Men of science, in their knowledge of the universe, at times are faced with the question: «Why it is as it is and why it exists at all?» The question is quite relevant in their scientific endeavour to know the universe. Discoveries were made and explanations were given to the why and how of things but they realized that there was still something more than that. Science opens a panorama that leads to another dimension: the metaphysical dimension which offers a more comprehensive view of the universe.

Specificity and contingency cannot be limited to science: both are philosophical as well. As Jaki states: «The contingency of the universe is a philosophical and, indeed, very metaphysical topic (...) (that provides) the kind of understanding that can only be had if it is possible to do metaphysics, that is, to go beyond the entire physical realm, or the universe, without leaving it physically that possibility is the very condition of true metaphysics.»

A true metaphysics however according to Jaki is a realist metaphysics, a metaphysics that looks at the real and objective existence of the universe independent of the human mind. This points out to the doctrine of creation, a truth that opens to the acceptance of God the Creator who bestows existence to creation. It is in this sense that Jaki stipulates: «...man’s science is not only a view of the universe but also a view of creation and that ultimately we have to begin with God.»

Against this view, there are some who insist on denying anything related with metaphysics and much more with anything related with ‘theology’, that ‘confusion’ between science and faith (cfr. § 2.2). In this attempt, they «speak of their urge to construct an all-encompassing physical theory which, because of its beauty or simplicity, makes the universe appear self-explaining.» But as Jaki observes that many times «such is their excuse, steeped more in rhetoric than in logic, not to look for a cause of the universe.»

Science attests specificity; and specificity, contingency. As Jaki insists: «The contingency of the universe as a whole serves as
a pointer to an ultimate intelligibility which though outside the universe in a metaphysical sense, is within the inferential power of man’s intellect.»

In another occasion, he writes: «(The specificity of the universe) is a gigantic springboard which can propel upward anyone ready to exploit its metaphysical resilience and catch thereby a glimpse of the Ultimate and Absolute in the form of a unique inference. Catching that glimpse is always transitory. Our need and hunger for the sensory quickly pulls us back to things tangible which, when properly touched, will again propel our minds toward the Absolute as the explanation of what is singular and contingent.»

Humans can know God, the Ultimate Intelligibility, and humans, being scientists, have to admit that the universe is specific and contingent and that God has a role in science. Jaki affirms both science and God, two realities that are not contradictory.

Haffner comments on the role of God in science from the point of the contingency of the universe. He writes: «The Christian concept of God’s freedom to create was therefore, as Jaki argued, a stimulus for scientific investigation of contingent scientific laws, namely only one among an infinitely large number of possible sets of laws. Clearly, Jaki argues that monotheism, or its doctrine of creation, implies a world that has to be investigated in a non-apriori manner.»

The ultimate reason then for the specificity of the universe is God’s freedom in creating it. The question then of why such and not something else is answered by God. As Haffner writes: «...God is free not to have created anything. God could have created the cosmos otherwise and that therefore the world could have taken on any number of possible forms. Thus the present particular form is highly specific, differing from other possible forms of the cosmos.»

Jaki strongly defends that the roads of science lead to the ways of God. He claims: «That (a non-metaphysician cosmologist) arrives at a metaphysical conclusion (that the product of creation is singularity) on the basis of this appreciation of science, which is a singularly specific discourse about a bafflingly singular existence, should surprise only those unmindful of the very same logic which directs the road of science no less than the ways to God.»

For Jaki, venturing the road of science, that human undertaking to know the universe, one is led to discover that reality
is not only the entire universe, that reality is much more than the physical sensible quantity. One is led still to a wider perspective of reality that includes the physical but transcends it as well to a non-physical aspect of reality. In this amplified view of reality, the universe is now seen to be specific and contingent that ultimately points out to God, its Creator.

3. CONCLUSIONS

Stanley Jaki argues the philosophical presuppositions of science. One of these presuppositions is the creation of the universe by a Rational Creator which may be called the ontological presupposition of science.

This presupposition implies the rationality of the universe, that there is an order in it that though contingent is rational and very specific. This calls for a creation by God who being its Creator is the Ultimate Intelligibility and not only its Ultimate Cause. Affirming God as the Ultimate Intelligibility of the universe being its Ultimate Cause, the universe can be considered as fully intelligible. It is in this perspective that faith and science are mutually related in the thoughts of Stanley Jaki. He proves the intimate relationship between them considering the history of science, and in particular, the «scientific abortions» in all predominant cultures in antiquity due to a philosophical-theological error in the way of looking at the universe that resulted to a non-contingent view of it; and, its viable birth in the Middle Ages thanks to the Christian dogma of Creation that provided the adequate cosmovision and the proper intellectual context in the attempt to know the universe.

Affirming the creation of the universe by God leads to the following conclusions: its real existence which is the root of its full intelligibility, its specificity and its contingency, and the impossibility of pure chance as the governing factor in the changes that occur in it. These are the basic ingredients provided by the ontological presupposition of science that made possible the birth and progress of science according to Stanley Jaki.

The main conclusion that can be derived from the consideration of creation in science is that science is not absolute. It is
limited to the material realm. However, reality does not only consist of the material realm. The non-material realm of reality is considered in science through its presuppositions. Science though limited is the door to other realms of reality.

In doing science and affirming its presuppositions, one also discovers the richness of human nature, that humans are not only scientists but they are also philosophers and believers. In effect, humans can know the universe and what lies beyond it and can also have faith and have a personal relationship with God.

Thus, a second principal conclusion is the mutual relationship between science, faith and philosophy. Such relationship can be said to pertain to human nature. Faith and reason form a unity and continuity of knowledge that, though being distinct and autonomous in a certain sense, one co-implies the other.

This topic of faith-reason relationship has been dealt with extensively many times by different authors from different perspectives. What is original in Stanley Jaki is in adopting the point of view of the real course of the history of science in showing the relationship between them. It is not the concern of Stanley Jaki to define an exact relationship between faith and reason. He only argues the mutual link in their frameworks and he does this through history, and more concretely, through the history of science. Faith and reason are intertwined in human existence throughout history and this is particularly true with regard to the birth and progress of science.

It seems to me that Jaki could be misinterpreted as a zealous apologist of the Christian faith who confuses faith from reason in his discussions of their mutual relationship. It is necessary to exert some effort to understand his point of view and take him in his real context. If not, one may think that he is being too dogmatic and very narrow in his perspectives. But the contrary is closer to the truth. In fact, what Jaki pretends to in his works is an openness to reality that considers its totality. He is notorious for his campaign against any reductionist point of view of reality. His main concern is how to safeguard the totality of reality. He does this by focusing his attention to the fact of human existence, and more concretely, to the fact that humans do science.

Faith and reason then are mutually related in the consideration of human history and human existence. Historical facts and
scientific findings go hand in hand to point out to faith. Jaki admits that the link is established by philosophy but perhaps some philosophical arguments may be lacking in his arguments. It is for this reason that Artigas and Sanguineti have been widely cited to supplement or back up the arguments of Jaki which, as it has been said, consist mainly of historical facts and arguments that are scientific in nature.

There is no doubt that Jaki has a certain dominion of philosophy, especially of history of philosophy, as it can be seen from his works. Yet, he falls short of philosophical arguments in his discussion on faith-reason relationship. Not considering philosophy in depth to prove his claim, some think that it is a drastic step to take to jump from science to the knowledge of God, that is, some doubt the validity of his natural theology.

The reason why Jaki does not concentrate in philosophy is a personal matter. His style of doing philosophy is by history. «Teach with examples», he says. History is philosophy teaching with examples. Jaki admits the limitations of this manner of doing philosophy—he admits as well that his specialty is history of science—and yet, he opted more for effectiveness. He deems that through examples and historical facts, he can convey better his ideas on the philosophy of science.

In spite that philosophical arguments are lacking in Jaki, his reasonings are consistent. He openly wages war against those who fall into scientism or reductionism. What seems to be surprising is the silence that reigns in the opposite camp. They never dare to attack and question him in the same line of reasoning because they cannot find any loophole in it. Most often his critics invoke the name of science to prove Jaki false and yet, it seems that they could not do so successfully. Many times, their arguments consist of speculations that have no real solid basis at all. Jaki is confident that they could never disprove his claim. His confidence on the truth—which is ultimately rooted in God—serves as his defense. On the contrary, many of his worst enemies are agnostics, those who do not have faith in the truth on God. Their resistance may perhaps be the result of some prejudice more than rational conflict.


5. JAKI, S.L., SSC, p. 41.

6. JAKI, S.L., RPh, p. 31.

7. *Ibidem*.

8. The Greeks were not rationalist. They were inclined more to a realist philosophy and in fact, as what Sanguineti points out, the necessity which they attributed to the universe due to their organismic thought was not logical but real. He writes: «The Hellenic science does not view necessity as a product of thought as it is viewed in a rationalist manner. A certain rationalism may be encountered in Parmenides (...) but its posterior development in Plato and in Aristotle no such rationalism could be traced. There is nothing in them a search for an analytic necessity of thinking. On the contrary, they start from the premise that the real principles of the universe are necessary.» (SANGUINETI, J.J., CyM, p. 51). The real and natural necessity of the universe in Greek thought is also noted by Jaki. This is what led him to affirm that Greek thought is pantheist. It is not that they equated the divinity with the universe but insofar as they considered the universe as necessary, real and not only logical, Jaki considers it as pantheism. Lacking with the notion of a personal God who created the universe, it was absolute necessary that the Greeks were talking about in their affirmation of a necessary universe, a trait that is only proper of the divinity.

9. JAKI, S.L., RSG, p. 31.

10. The Greek view of the universe as panteleology established a necessary one to one correspondence between purpose and change. It is a consequence of their aprioristic thought: the universe is necessary and its dynamism tends necessarily to a certain purpose in a very unique manner. Sanguineti argues that such is not the case in reality. He writes: «We have to start from experience and discover how the ends (purposes) are attained knowing that many of them can be reached in several ways and not only by an obligatory unique manner. (Thus) St. Thomas Aquinas affirms that «in material operations there does not always exist a necessary link between the previous and the posterior stage but only in the case when an end cannot be attained through a unique manner» (Summa Contra Gentiles, III, 97).» (SANGUINETI, J.J., CyM, pp. 59-60). He continues to affirm then the
contingency of the universe. In another occasion, he remarks: «the universe can be manifested in diverse states (status naturae) or stable and unchangeable configurations that depend ultimately on the will of God.» (Ibidem, p. 58).

13. JAKI, S.L., CSS, p. 98.
15. Haffner also claims: «Science could not take off as a self-sustaining enterprise without a notion of time congruent with the real world. By breaking the bondage of eternal cycles, the Christian doctrine of creation in time also provided a unidirectional view of time, most useful, as has been shown, by the prospects of the scientific enterprise.» (HAFFNER, P., CSC, p. 41).

16. Science and creation are related with one another not because science can affirm creation. Creation clearly falls beyond the competence of science especially if a creation is understood as a creation from nothing. Creation pertains strictly to philosophy and to faith. Jaki affirms the following: «Science can trace one physical stage of this physical universe only to another physical stage of it. No law of physics can ever be construed so as to have for its reference point that very nothing which is implied in that only true creation which is creation out of nothing. This is the principal reason why physical science can never prove that kind of creation. To be sure, science cannot disprove it either.» (JAKI, S.L., The Intelligent Christian Guide to Scientific Cosmology, in Cath, p. 148).

17. Haffner however comments on Jaki’s views on this. He writes: «As Jaki argued, explicit theism need not be part of the scientific enterprise once it has arisen from a realist as well as explicitly Christian epistemological matrix. This is why non-Christians can be metaphysical realists in their science at least.» (HAFFNER, P., CSC, pp. 104-105).

18. The universe then for Jaki is the «penultimate reality». It is contingent and there is something else that lies beyond its materiality. Thus, science should consider the universe as such and endorse that realm beyond its scope. Jaki comments on this. He writes: «Modern physics, which is to be carefully distinguished from its prevailing philosophical interpretation, offers a grasp of the universe insofar as it is the true penultimate entity. Such a grasp implies the endorsement of a realist epistemology or metaphysics.» (JAKI, S.L., Physics and the Ultimate, in OCE, p. 228).

20. As Vatican I proclaims: «The Holy Catholic Apostolic Roman Church believes and confesses that there is one true and living God, Creator and Lord of heaven and earth (...) This one only true God (...) created out of nothing, from the very first beginning of time, both the spiritual and corporeal creature.»

21. The fact that the universe is governed by the divine providence does not violate its contingency. Artigas points out the arguments of St. Thomas on this point as follows: «Santo Tomás afirma la universalidad de la providencia que se extiende a todo lo que existe. Sin embargo, afirma también que
la causalidad no repugna a la providencia (...) en definitiva, la causalidad se encuentra intimamente relacionada con la contingencia, y la contingencia no se opone en modo alguno a la providencia divina. En efecto, afirma que es congruente con la providencia divina que no todo suceda necesariamen-

te.» (ARTIGAS, M., HLC, p. 209).

22. Jaki writes the importance of St. Thomas Aquinas on the development of the doctrine of creation in spite of the fact that others preceded him. He claims: «(Thomas) was not original in saying that the universe was created out of nothing and in time, that God could have created a better universe, that creation implies infinite power which was therefore not communicable to any creature (...) But Thomas, said all these things with extraordinary incisiveness and with an unfailing awareness of the fact that the truth about the universe is also a truth about God.» (JAKI, S.L., Thomas and the Universe in «The Thomist» 53 (1989) pp. 561-562).

23. Cfr. JAKI, S.L., C&C, p. 79. The divine revelation of creation can be seen in the biblical accounts of the book of Exodus which narrates the revelation of God of His name: «Ego sum qui sum.» St. Thomas sees in this passage, God as «Ipsum Esse Subsistens» who created the world from nothing, a creation ex nihilo of the world in time.

24. JAKI, S.L., G&C, p. 77. A quotation as regards the relationship between the Incarnation and Creation is as follows: «It should be easy to see that if a flesh and blood being, Jesus of Nazareth, is viewed as the only begetting from God, that is God’s only begotten Son, an all too concrete barrier is set against the lure of viewing the cosmos as an emanation, a sort of a begetting, from the divine.» (JAKI, S.L., The Hymn of the Universe, in OCE, p. 242).

Another text that relates Creation from the Incarnation is the following: «...there is no salvation without a universe on hand. The Savior always presupposes the Creator, and a Creator of all makes sense only if there is on hand that all or totality which is the universe.» (Ibidem, pp. 238-239).

25. JAKI, S.L., C&C, pp. 77-78.


27. SANGUINETI, J.J., CyM, p. 57.

28. Necessitarianism was the reason why science failed in the Eastern civilization failed. According to Jaki the East did not confront Greek necessitarianism in the same systematic way as was the case with medieval Latin scholasticism. Cfr. JAKI, S.L., RSG, p. 35.

29. JAKI, S.L., SS, p. 199.

30. JAKI, S.L., RSG, p. 19.

31. JAKI, S.L., RSG, p. 191.

32. SANGUINETI, J.J., CyM, p. 68.

33. SANGUINETI, J.J., CyM, p. 68.

34. JAKI, S.L., C&C, p. 86.

35. As Jaki writes: «Science in capable of delivering superbly valuable quantitive statements about material reality but is incapable of delivering that reality itself. Rather, in order to exist, science must presuppose the ex-

36. JAKI, S.L., RSG, p. 276.
37. JAKI, S.L., God and Man’s Science, in ABR, p. 67.
41. JAKI, S.L., C&C, pp. 54-55.
43. JAKI, S.L., RSG, p. 279.
44. CHESTERTON, G.K., All is Grist, pp. 7-8 cited in JAKI, S.L., CSS, p. 109.
45. JAKI, S.L., CSS, p. 110.
46. JAKI, S.L., RPh, p. 347.
47. JAKI, S.L., CSS, p. 111.
49. JAKI, S.L., G&C, passim.

50. This observation was also present in Aristotle. The universe was seen to be organismic, that is, everything is purpose. Aristotle affirmed as well that purpose is in a sense specific. Being specific, it is necessarily fulfilled (cfr. § 1.1).

51. JAKI, S.L., RSG, p. 167.
52. JAKI, S.L., RSG, p. 175.
53. JAKI, S.L., RSG, p. 188.
54. JAKI, S.L., RSG, p. 193.
56. Artigas and Sanguineti restate this as follows: «(el principio antrópico) afirma que el universo posee las características que de hecho conocemos, porque en caso contrario no podríamos existir y no las conceríamos. En este sentido, nuestra existencia pone unos límites a las propiedades del universo, al menos como condición teleológica y gnoseológica.» (ARTIGAS, M. and SANGUINETI, J.J., FDN, p. 337).
57. HAFFNER, P., CSC, p. 44. Haffner, in commenting Jaki’s thoughts, affirm creation as a derivation of the anthropic principle. One quotation of Jaki that clearly manifests this idea is the following: «Modern scientific cosmology provides two holds for anyone interested in transcendence. One is the validity of the notion of the universe as a totality of consistently interacting things. The other is its breathtaking specificity or limitedness to a narrow set of physical parameters. It takes no expertise in science (but philosophical in a very elementary sense (...)) that would make one infer the existence of a Creator, an infinite being (with respect to intellect, power and will) that alone can account for the existence of the specific totality of specific things. The reason for making that inference is an appreciation of the principle of unrestricted rational resolve to account for existence.» (JAKI, S.L., Teaching Transcendence in Physics, in OCE, p. 207).
59. Jaki writes on this as follows: «Nor does the physical world allow such a postponing of a final answer for its overall specificities. Even if that universe contains infinite matter, which in all evidence it does not, it can
contain that infinite amount of matter only in a most specific arrangement. The great question mark posed by specificity, which is limitation to a most particular shape, remains therefore large on the horizon (...) Why this and not another limitation and why a limitedness at all? « (JAKI, S.L., *The Hymn of the Universe*, in OCE, p. 287).

60. JAKI, S.L., RSG, p. 263.
62. JAKI, S.L., G&C, p. 43.
63. JAKI, S.L., G&C, p. 52.
64. Ibidem.
66. JAKI, S.L., G&C, p. 43.
67. JAKI, S.L., G&C, p. 44.
68. JAKI, S.L., RPh, p. 350.
69. JAKI, S.L., G&C, p. 46 ff.
70. JAKI, S.L., CSS, p. 107.

71. Still another opposition to qualitative specificity is voiced out by Huxley who confront theists with the positivist call: «Sit down before facts as a little child, be prepared to give up every preconceived notion, follow humbly wherever Nature leads, or you will learn nothing.» Jaki, however, appeals to objectivity, in particular, to philosophy and to history. He comments: «...the facts of nature can lead only insofar as they become the facts of philosophy, and second, that unless one sits down as a little child before the facts of science embodied in its history —prepared to give up preconceived notions about it offered by positivists, idealists, historicists, and agnostics, and ready to retrace in full the actual historical road of science— one will never learn the fundamental truth that real science of a contingent universe.» (JAKI, S.L., RSG, p. 324).

72. JAKI, S.L., G&C, p. 56.
73. JAKI, S.L., G&C, p. 41.
76. ARTIGAS, M. and SANGUINETI, J.J., FDN, p. 278.
78. Artigas writes on the view of Aristotle on chance that failed to attribute causality in a strict sense. He writes: «Para Aristóteles, el azar existe pero no se trata de una causa propia, que produciría los efectos correspondientes a su naturaleza, sino de una causa impropia o accidental, debida a la coincidencia accidental de varios factores. Por tanto, así como los efectos de las causas propias son determinados, los efectos del azar son indeterminados.» (ARTIGAS, M., HLC, p. 208).

82. JAKI, S.L., RSG, p. 287.
84. JAKI, S.L., RSG, p. 287.
85. For a brief reference of matter and form, I quote Artigas’ definitions. Artigas defines matter as «las condiciones espacio-temporales en las que se despliega el dinamismo natural (...) más que un tipo de «entidades» ese concepto designa unas «condiciones» materiales, espacio-temporales, desde los átomos hasta el hombre.» (ARTIGAS, M., CyF, p. 179). On one hand, he describes form as «...la forma se refiere al «modo de ser». Todas las entidades, e incluso las propiedades y los procesos, tienen un modo de ser. La forma no es una parte de las entidades naturales: es su modo de ser propio. En el mundo material, la forma no es una entidad subsistente, pero es algo real, como lo es el modo de ser de las entidades. Expresa que las entidades poseen un ser real, y que ese ser se realiza según un modo de ser concreto.» (ARTIGAS, M., CyF, p. 186).

86. ARTIGAS, M., IDN, p. 339.

87. ARTIGAS, M., IDN, p. 340. Although he only mentions here that forms are conceptual, he affirms its real existence, though not on its own, insofar as they are basic aspects of existence. He writes: «...las formas naturales son materiales porque existen en condiciones materiales. Las formas indican una cierta inmaterialidad en cuanto expresan dimensiones ontológicas o modos de ser que no se agotan en la pura exterioridad.» (ARTIGAS, M., CyF, p. 179).

88. ARTIGAS, M., IDN, p. 343.

89. JAKI, S.L., G&C, p. 53.

90. JAKI, S.L., Teaching Transcendence in Physics, in OCE, p. 208.

91. However, these two notions are not synonymous. Haffner distinguishes them as follows: «The quality of specificity lies at the level of the relationship between matter and form, while the quality of contingency concerns the level of the connection between essence and existence. The road of contingency is therefore one which cannot be traversed by science alone: the use of philosophy is required. In particular, the key step in this road is the Thomistic principle that the existence of beings grounds knowledge (Cfr. Summa Theologiae, I, q. 16, art.1).» (HAFFNER, P., CSC, p. 95).


94. Another quotation that shows the relationship between specificity and contingency is the following: «...since the universe is the totality of things, the choice for its specificity can only be looked for ‘outside’ that totality where only God can be found.» (JAKI, S.L., Thomas and the Universe in «The Thomist» 53 (1989) p. 571).

In another occasion, Jaki expresses the same idea: «...the reality of the universe, if physically real must have a shape, the very pointer to its reality. Shape in turn means limitation. The real universe, being an overall limitation, provokes the classical question of metaphysics: why such and not something else? The question is the question about contingency, which means not haphazardness or chance but the ontological quality of being contingent, that is, dependent on a choice outside the entity in question. Since in this case the entity is the universe or the totality of things, the choice can be referred only to God, the sole entity ‘beyond’ all things.» (JAKI, S.L., The Only Chaos, in OCE, p. 11).
95. JAKI, S.L., SSc, p. 197.
97. JAKI, S.L., G&C, p. 56.
98. Jaki insists that contingency does not necessarily mean affirming chance. On the other hand, it invokes the creative act of God. He writes: «...contingent qualifies an occurrence as dependent on something that is not known at the moment. In this conditional sense it is all too often implied that the condition can never be ascertained. Hence an event is contingent when it happens without a 'known' cause; hence the equating of contingent events with chance or fortuitous events that are all too often taken for events outside a causal chain. Contingent can, however, also mean the dependence of something on a free choice. Thus the universe is said to be contingent on account of its utter causal dependence of the free creative act of God.» (JAKI, S.L., *The Cosmic Myth of Chance*, in OCE, p. 24).
100. JAKI, S.L., RSG, p. 279.
101. JAKI, S.L., G&C, p. 84.
103. JAKI, S.L., G&C, p. 89.
104. *Ibidem*.
105. JAKI, S.L., RSG, p. 38.
106. In one occasion, he remarks: «The createdness of everything, or a created cosmos, proved to be the best assurance for the cohesion of all and for their being on essentially the same level. The oneness of that level assures the oneness of all laws of physics and their universal validity throughout the cosmos.» (JAKI, S.L., *The Hymn of the Universe*, in OCE, p. 243).
108. *Ibidem*.
109. JAKI, S.L., RSG, p. 278.
110. JAKI, S.L., RSG, p. 273.
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