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This text comprises eight questions and answers on the subject of whether or not science can or not be completely separated from religion. Some of the issues mentioned are if science and religion can coexist, when the division appeared between the two and if the two concepts can be completely separated one from the other.

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by Mehdi Golshani

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1. What is your definition of science and religion?

(a) Science

Science can be defined as the systematic study of the natural world. Such study is grounded in detailed experiments and observations of natural processes. These are then analyzed for patterns, regularities and laws. However, science involves much more than empirical observation and mathematical analysis. Science has also a large, more speculative, theoretical component. For example, scientists want to *extrapolate* beyond their rather limited set of observational data, in order to draw more general conclusions about the universe.

This requires various assumptions about the nature of the universe. A common conjecture is that of the

uniformity of nature; the physical laws and processes observed here and now are assumed to apply universally. Some of the sciences (e.g., cosmology, geology and evolutionary biology) depend strongly upon significant extrapolations of presently observed data back to the distant past. Furthermore, scientists seek also to *explain* reality. Particular events are explained in terms of physical laws; the physical laws themselves are explained in terms of more fundamental physical concepts and principles, and so on.

The basic, observational aspect of science I shall refer to as *science1*; the theoretical extrapolation and explanation of these observations I shall denote *science2*.

(b) Religion

Religion can be defined in various ways. Broadly, it can refer to any set of beliefs, values and practices that form a worldview. A worldview system will include beliefs about ultimate reality, epistemology, ontology, ethics, purpose, and so on. Everyone has a worldview, although many people have not explicitly formulated their worldview. I shall call religion in this broad sense *religion1*.

One currently popular form of religion1 is *naturalism*. It strives to interpret all of reality in terms of purely natural processes and entities. As such, it almost always incorporates an evolutionary process wherein everything in the universe--even man--is assumed to have evolved from primitive, purposeless matter/energy. Consequently, man is viewed as a complex machine that ceases to exist once his material body dies. Rational norms and ethical standards are considered to be mere human inventions, having no objective authority.

Naturalism often embraces a materialist metaphysics coupled with an empiricist epistemology. Materialist reductionism is particularly common among scientists. For example, Edward Wilson (*Consilience: The Unity of Knowledge*, 1998) believes that all truth can ultimately be acquired through the reductionist methods of natural science. Wilson argues that all our knowledge, as well as our appreciation of beauty and perception of right and wrong, can in principle be reduced to the laws of physics. Likewise, Francis Crick (*The Astonishing Hypothesis*, 1994) asserts that all our beliefs—even our sense of personal identity, purpose and free will--are mere illusions caused by our brain neurons. Such reductionism stresses the objective, physical realm at the expense of virtually emptying our subjective experiences of any genuine content.

More narrowly, religion is generally taken to mean the belief in and worship of God. In this sense religion refers to a specific worldview that affirms the existence of a supernatural being. Often it includes some form of divine revelation. Such revealed knowledge may form the basis of ethical values, knowledge of origins and eschatology, and so on. I shall call such supernatural religion *religion2*.

The specific form of religion2 that I shall be defending here is *theism* as formulated in traditional Christianity. Central to the Christian worldview is the notion of a sovereign, all-knowing, tri-personal

God, Who has revealed Himself through the Bible. This God is the creator of everything, including logical and moral absolutes. Everything that happens unfolds in accordance with God's eternal plan. In this divine plan man, who was created in God's image, plays a major role serving and glorifying God. Man was created good but, through his own choice, fell into sin. Through God's grace in Jesus Christ, some are redeemed. After physical death, our soul lives on, to be re-united with a renewed body on the Day of Judgment. Thereafter we receive our eternal reward.

2. Do you see any conflict between your definitions of these two concepts?

There is no conflict between these definitions.

Much of the perceived conflict between science and religion is due to the erroneous belief that science has no need of any metaphysical or epistemological assumptions. It is widely believed that science is factual, rational and objective, whereas religion is mythical, irrational and subjective.

This myth of scientific neutrality fails to properly distinguish between observational facts and theoretical speculations. It overlooks the highly subjective aspects of science. We note, first, that the same data can be explained by many different theories. For example, galactic red-shifts can be explained in terms of the expansion of space, motion through space, gravitational red-shifts, "tired light", and so on. As noted by Karl Popper, Thomas Kuhn and others, scientific theories are not simply derived from data. Rather, the construction of theories involves a large dose of creativity. Second, the same mathematical equations can often be interpreted in many different ways. Consider, for example, the various different interpretations of quantum mechanics (e.g., Bohr's positivism, Bohm's neo-realism, the many-worlds view, etc.). Third, assessing the veracity of competing theories involves the subjective application of subjective criteria for theory selection. We may prefer theories that are simple or beautiful but why should simple or beautiful theories be more likely to be true? Ultimately, we construct and choose theories that best reflect our basic beliefs about the nature of the world.

Every scientist has a worldview and the science that he does will inevitably be informed by that worldview. This is particularly so regarding the theorizing of science2. By comparison, science1, being at the level of observational data, is relatively objective. Yet, even our choice of what and how we choose to observe depends on our worldview.

In short, science is by no means worldview neutral. What is widely perceived as a conflict between science and religion is in actuality usually a clash between two opposing worldviews, generally naturalism versus theism.

3. Where do you think there may be a conflict between these two?

Conflicts involving science and religion can occur in the extrapolation, explanation and application of observational data.

A prime issue is that of epistemology. What can we know? In opposition to *empiricism*, which asserts that the only valid knowledge is sense data, Christianity asserts that God has revealed truth in the Bible. Christianity embraces the Bible as a trustworthy source of knowledge about God, history, the spiritual realm, moral standards, origins and eschatology. Hence, a Christian epistemology will acknowledge Biblical data in addition to sense data and logic.

Conflicts can involve also ontological questions regarding the ultimate nature of reality. For example, in opposition to *materialism*, Christianity takes God, a spirit, as the ultimate reality. Christianity takes the physical universe to be a creation of God and, as such, a mere subspace of a much richer reality that contains both matter and spirit.

Further conflicts can involve causation. For example, in opposition to *naturalism*, which admits only natural causes, Christianity affirms the existence of spiritual forces that interact with the physical universe. The universe, created by the word of God, relies upon God to sustain it in its continued existence. Normally, God lets the universe unfold according to the properties He as assigned to it. However, God is not bound by the natural laws that He has set. These are merely the regular manifestations of His will. God may sometimes act more directly, through His spiritual agents (e.g., angels) or miracles. Hence some natural events may have direct supernatural causes. In particular, God acts directly through the incarnation, resurrection and ultimate return of Jesus Christ.

Moreover, in opposition to the notion that some things (e.g., in quantum mechanics) happen by chance (i.e., without being fully caused), Christianity maintains the full sovereignty of God. God is the primary cause of everything. Everything that happens, happens in accordance with God's all-encompassing plan. Everything happens for a sufficient reason, given by God's purpose.

Such conflicts, to the extent that they involve science, concern primarily science2. At issue are generally not the *observational* data but only their *theoretical* extrapolation and interpretation. It is often not even specific theories (e.g., general relativity, quantum mechanics, etc.) that are controversial but, rather, their philosophical interpretation.

4. What have been the grounds for the development of conflict

between these two?

In the popular mind, the two greatest historical conflicts between science and religion have been those involving Galileo and Darwin.

The Galileo affair, in the early 17th century, was a complex dispute, inflamed by politics and personalities. It was primarily a family squabble within Christianity. Two different scientific research programs clashed, each program supported by its own group of Christian scientists. The central issue was the epistemological question of how to determine absolute motion. Should the absolute frame of reference be set by Biblical standards, by Aristotelian philosophy, by mathematical simplicity, or by other considerations? The difficulty was that the observational data in themselves can yield information only about *relative* motion. The question of *absolute* motion must thus be settled by extra-scientific definitions and considerations. As is now widely recognized, the resolution of this issue depends largely on one's worldview assumptions.

The conflict precipitated by Darwin concerns primarily origins. How did life, in all its manifold forms, come to be? The dispute is not so much about *observations* of living things, fossils, geological formations, etc. but how to *explain* how they came to be. As such, the conflict involves questions concerning the ultimate nature of reality (e.g., can mind be explained entirely in terms of matter?), eschatology (e.g., does man have a non-material soul that survives physical death?), and causation (e.g., does the origin of life require special divine acts?). Again, a central issue is one of epistemology: what role should divine revelation (e.g., the Bible) play in interpreting the results of observational science1, in choosing the theories of science2, and in informing our view of origins, etc? Here, too, it is clear that this conflict is rooted in a clash of opposing extra-scientific presuppositions.

5. What has been the role of religion in the development of science in the West?

In the West, Christianity played a large role in the development of science. Copernicus, Kepler, Galileo, Boyle, Newton and many other founders of science were devout believers in the Biblical God. Their science was constructed within the framework of a Christian worldview.

Various factors in the Christian worldview encouraged the development of science:

1. The Biblical conception of an omniscient and omnipotent personal God, Who made everything in accordance with a rational plan and purpose, contributed to the notion of a rationally structured creation.

2. The notion of a transcendent God, Who exists separate from His creation, served to counter the notion that the physical world, or any part of it, is sacred. Since the entire physical world is a mere creation, it was thus a fit object of study and transformation.

3. Since man was made in the image of God (Gen. 1:26), which included rationality and creativity, it was deemed possible that man could discern the rational structure of the physical universe that God had made.

4. The cultural mandate, which appointed man to be God's steward over creation (Gen1:28), provided the motivation for studying nature and for applying that study towards practical ends, at the same glorifying God for His wisdom and goodness.

6. Can we have a religious science?

We have already noted the subjectivity and epistemic limitations of science2. Since science2 must necessarily be based on extra-scientific values and presuppositions, all science2 is inevitably driven by one's worldview assumptions. Hence science certainly can--and indeed *must*--be religious in the broad sense of religion1.

Can science be religious in the stricter sense of religion2? It is evident that only on the basis of metaphysical assumption can one rule out the possible existence of a spiritual realm, of supernatural causation and of a reliable divine revelation. It follows that it *is* possible to have a science operating within the framework of a Christian worldview, with all the metaphysical, epistemological and ethical implications that this entails. For example, religion2 might insist that an additional criterion for theory selection be that of conformity with divine revelation (e.g., the Bible). Religion2 can further serve as a moral guide, helping one to prioritize and select research projects. Science informed by religion2 would impact particularly questions of ontology, origins, applications and eschatology.

7. Can science dispense with religion?

Science certainly cannot dispense with religion1. As we have already noted, extra-scientific presuppositions are essential for choosing research projects, selecting theories and interpreting the results.

Can science dispense with religion in the narrower sense? Does science need God?

Naturalists believe not. It has, however, become clear that naturalism falls short in providing a coherent worldview framework for science. For example, naturalism has offered no plausible explanation for the mathematical structure of physical reality, for the existence of a rational, causally effective human mind, or for the existence of absolute moral or rational norms. Indeed, materialism, an essential part of most forms of naturalism, denies the very existence of non-physical entities such as minds and norms. Even if such non-physical entities did conceivably exist, the naturalist's empiricism affords him no means of gaining access to them.

Naturalism is fatally plagued by a defective metaphysics and epistemology that have no room for moral

or aesthetic values, truth, purpose, meaning, love, goodness or beauty. Naturalism is a truncated worldview that has no place for precisely those aspects of man that make him human.

By undermining the reality of a purposeful self and the possibility of objective knowledge, naturalism undermines itself. To *rationally* defend materialism, one must necessarily presume the existence of rational minds and absolute norms. Since materialism rejects such *non*-material entities, it follows that the rational defence of materialism is self-refuting. The same holds for empiricism. The empiricist's assertion--that only sense data are valid sources of knowledge--is itself *non*-empirical. Hence empiricism, too, is self-refuting. Given these lethal flaws in materialism and empiricism, it is not surprising that naturalism has led to post-modern skepticism.

Any viable worldview must embrace an adequate epistemology that can transcend the stream of mere empirical data. It must include also an adequate metaphysics that has room for rational minds and absolute universals. A viable worldview must be able to account for science and common sense. For example, any scientist must assume that the universe has a law-like structure that is comprehensible to humans.

Theism, unlike naturalism or skepticism, provides a sufficiently rich metaphysics and epistemology that can credibly explain the full range of reality, including particularly the nature and condition of humanity. Theism can readily account for the rationality of the universe and our ability to function as scientists.

In short, a scientist may profess to be an atheist, but he can do his science only on the borrowed premises of an essentially theistic worldview.

8. Can one separate the domains of activity of science and religion completely?

No. As we have seen, science can function only within the parameters of a theistic worldview. Religion2 is needed to provide a sound metaphysical basis for science, to guide its research programs and theory selection, to interpret its conclusions, and to make ethical applications. Science, on the other hand, can help us in our religious quest to serve God as His earthly stewards, applying scientific knowledge for the benefit of man and the glory of God.

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