

## Science and Religion in Ten Minutes

Gale Rhodes

In the next ten minutes, I intend to convince you that the potential conflicts between science and religion are very limited in scope, and that resolving them entails a straightforward choice.

First, what is science?

Science is a process for discovering the truth about nature.

More modestly, it is humanity's collective effort to observe, measure, and experiment, and then to interpret the results, which means to reason from the results to reliable knowledge about the physical world -- knowledge on which we can base decisions and actions. This knowledge takes the form of laws (descriptions of patterns in our observations) and theories (models that explain why laws hold). In science, we try as hard as we can to see the physical world clearly, despite the limitations of our senses and brains, and despite our wishful thinking and other biases about what we hope is true about nature and ourselves. Some biases are obvious, some are subtle, and undoubtedly, some are still hidden from us, but we DO know that we must worry about them.

I must add that science is a process, not a system of beliefs like a religion. Followers of a religion share a system of beliefs. Scientists share only a tool, this powerful process of rational inquiry, but they do not share a specific set of beliefs about nature. They do share one belief: nature is accessible to observation and reason, and rational thinkers can agree on findings about nature.

Conflicts arise when religion teaches a belief that contradicts or is incompatible with beliefs based on reliable findings from science. So conflicts are between beliefs.

I believe that I can place all my personal beliefs into one of three categories -- three realms of belief (See Figure).

First is the physical realm, my beliefs about nature. I might believe that our sun and all stars are atom-fusing nuclear furnaces, powered by gravity. I might believe that matter is composed of atoms, most of which were formed in stars. I might believe that I am the product of an evolutionary process, in which mutations and other random events produce varied offspring and opportunities, resulting in adaptive traits becoming the most common traits. All of these beliefs lie in the physical realm.

Second is the spiritual realm, my beliefs about things that do not give reliable physical evidence of themselves. I might believe that the world was created by an intelligent designer or a god. I might believe that my soul or spirit inhabits this physical body now,

and will continue to exist after my death. I might believe the God revealed truths to Moses or to Muhammed. All of these beliefs lie in the spiritual realm.

Figure

| Belief            |   |  |  |
|-------------------|---|--|--|
| Realms of Belief  | Physical Realm  | Spiritual Realm  | Moral Realm  |
| Subject of Belief | What IS true, in material world (nature)                                  | What IS true, in spiritual realm   | What OUGHT to be   |
| Sample Questions  | How has the universe evolved?<br>What is life?<br>What is matter made of? | Afterlife?<br>God?<br>Intelligent designer?<br>Soul?                           | How should I behave?<br>Right?<br>Wrong?                       |
| Guides to Belief  | Myth and legend<br>Religious teachings<br>Science                         | Introspection<br>Myth and legend<br>Personal revelation<br>Religious teachings | Conscience<br>Desired nature of society<br>Religious teachings |
| Conflicts         | Religion and science  | Personal knowledge and religion  | Rational decisions and religion                                |

I decide whether to assign a belief to the physical or the spiritual realm by a simple criterion. Can I ever expect reliable physical evidence for the belief -- evidence that everyone, not just a prophet or a few of the chosen, can observe, agree upon, and then try to interpret? If so, the belief rests on physical evidence, and lies in the physical realm. If not, the belief lies in the spiritual realm, and I must seek reasons other than physical evidence to believe it -- reasons such as religious scriptures or personal revelation.

(Please note how I am defining the word "spiritual" for my use in this essay. Many elements of our society, from the deeply religious to the new-age, assign their own idiosyncratic meanings to the word. You cannot pick a definition of "spiritual" at random and apply it to the word as you find it in this essay. In this discussion, I give the word a simple meaning: it simply refers to things -- for example, gods or souls -- that give no physical, testable, communally verifiable evidence of themselves.)

The third realm of belief is the moral realm. I believe that certain actions are virtuous and others are sinful -- bad and good, right and wrong not in truth, but in the moral sense. I might believe in democracy, which means that I should not accept any privileges that are not available to all. I might believe that killing another person is wrong no matter what the circumstances. I might believe that the use of animals in research is justifiable if it benefits humans and other animals, and if the animals are treated humanely. All of these beliefs lie in the moral realm.

These three realms -- physical, spiritual, and moral -- encompass all my beliefs. The physical and spiritual realms are distinguished by whether their beliefs can be supported with physical evidence. The moral realm is distinguished from the other two by containing beliefs about what OUGHT to be, rather than what IS -- what is true in nature or the spiritual realm.

I said that conflicts are between beliefs. What kind of conflicts can arise between science and religion? Religious teachings include beliefs in all three realms. The followers of a religion are asked to believe certain things about nature, spirit, and behavior. Science discovers reliable knowledge in only one realm -- the physical. Therefore, conflicts between science and religion can occur only in the physical realm, and can be of only one kind: a religious teaching about nature conflicts with a belief about nature that is soundly based on scientific findings.

Conflicts between religion and science over beliefs in the spiritual realm cannot occur. Science gives no basis for belief in the spiritual realm, because things in the spiritual realm give no evidence for science to interpret.

Conflicts between religion and science over beliefs in the moral realm cannot occur. Science does not lead to conclusions about whether an action is virtuous or sinful. It leads only to conclusions about what is true in nature.

I conclude that science and religion can come into conflict only when a scientifically based belief about nature (science's ONLY realm) contradicts a religious teaching about nature. Religious teachings about spiritual matters and moral matters are immune to conflict with science.

Here is an example of a true science-religion conflict. According to religious teachings based on an interpretation of the Old Testament by James Ussher, the Anglican Archbishop of Armagh, God created the earth on Sunday October 23, 4004 BC in the Julian calendar. This age appears as an annotation on the first page of some printings of the King James bible. So some religious teachings assert that earth, in 2005, is 6009 years old. On the other hand, an impressive number of reliable and independent scientific findings indicate that the earth is at least 5 billion years old. Now, there's a real conflict. Science and religion, in this case, differ by almost a million-fold in their assessments of the earth's age.

This is the only kind of real science-religion conflict that I can imagine. And in this and many other such cases, I resolve the conflict by asking which source -- science or relig-

ion -- in my opinion, is more likely to give me reliable knowledge about nature. So it will not surprise you that I believe that the world is around 5 billion years old. Furthermore, in keeping with what I said earlier, my belief that a particular religious belief about nature is incorrect does not undermine anything that this religion might teach me in the spiritual or moral realm.

In my view, religion is simply not a very good place to go for reliable knowledge about nature.

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Anticipating possible questions.

- Isn't Intelligent Design a scientific theory?

How could physical evidence prove or disprove Intelligent Design?

- If scriptures are divinely inspired, who can they be wrong about nature?

--- Could a pre-scientific world understand an accurate account of nature?

--- If God taught Moses modern molecular biology on Mt. Sinai, what would Moses's notes look like?

--- Distortions due to translation or self-interest. Except supposedly for the Quran, no scriptures are available in their original form.

- If science produces reliable knowledge about nature, why don't all scientists believe the same things about nature?

--- Nature is complex, and our knowledge of it is partial.

--- Individual scientists differ, due to differing experience, in their assessment of the reliability of evidence, or aptness of interpretation.

- Are there other realms of belief?

--- Two realms, the physical and the non-physical would seem to cover all realms of what IS.

--- Beside realms of what IS and what OUGHT TO BE, can you think of others?

--- I think that my wife, my dog, my motorcycle, and John Singer Sargent's "The Daughters of Edward Darley Boit" are all beautiful. Is that a belief?

• What forms does "reliable knowledge" take?

--- Data or facts, which are the results of observations, measurement, and experiment.

--- Laws, which are descriptions of patterns or trends in the data, and can often be summarized in equations.

--- Theories, which are attempts to explain why laws hold, and are only useful if they are testable (can be disproved by data or laws that are not compatible with them).

• If the nature of science-religion conflicts are as simple as you say, why are these conflicts so intense and persistent?

--- What religion teaches about nature and ourselves is comforting. What science finds is rather sobering and humbling.

--- Concluding that a religious belief about nature is incorrect undermines religion's authority in the spiritual and moral realms (though it should not).

-- It is simple for me, because I know science, its methods, and its findings well enough to know where confidence is justified, and when to suspend judgment or simply reject a purported scientific finding.

--- If you are ignorant of science, its underlying philosophy, its methods, and its findings, you are vulnerable to all kinds of so-called scientific claims that are not science at all, and you are vulnerable to excessive loss of confidence in science due to a single instance of unethical business practices (Vioxx) or a single scientific blunder (thalidomide).