

Why do different scientists interpret reality differently?

By **Dr. Humberto M. Rasi**, Department of Education, General Conference of the Seventh-day Adventist Church (1990-2002). See photo.



It is generally assumed that well-educated people who dedicate their professional lives to the scientific study of nature are able to approach their subjects with a dispassionate attitude. Using sophisticated equipment, they make careful observations, conduct experiments, develop hypotheses, propose theories, and arrive at objective conclusions in their respective areas of expertise. Nevertheless, scientists applying the scientific method while using similar equipment to study the same aspect of nature **can and do arrive at different conclusions**. Why does this occur? The answer to this question can be found at three levels.

1. Differences in interpretation Some of the common reasons for which scientists reach different conclusions in their research include factors such as the size and reliability of the sample data gathered, the adequacy of design in the experiments conducted, the precision of the equipment used, or simply human error. These factors can usually be remedied as other scientists learn of the results, review the procedures, data, and findings, then attempt to replicate the observations or experiments, and finally determine which of the conclusions or discoveries is favored by the weight of the evidence. In March 1989, two established electrochemists - Martin Fleischmann and Stanley Pons - announced they had produced nuclear fusion at room temperature using heavy water and a palladium electrode. The reaction of the international scientific community was immediate, because the financial implications of producing energy at a very low cost are enormous. During the following years, similar experiments were conducted in many countries, conferences on the topic were convened, and well-funded research centers were established. However, most scientists have been unable to reproduce the original results and, as a result, have reached the conclusion that the evidence does not support the original claim.

2. Different paradigms A deeper reason for disagreement among scientists on a particular issue may be differing scientific paradigms, a concept proposed by **Thomas Samuel Kuhn (1)**. In his view, science is not an empirically autonomous and objective endeavor, but a collective activity influenced by social and historical factors. During periods of “normal science,” he argued, the scientific community operates on a generally accepted model or paradigm. However, results that do not fit within those understandings gradually build up until a “paradigm shift” occurs. At that point, a new consensus and paradigm provide a new set of assumptions that serve as the basis for doing science. Kuhn provides the example of the paradigm shift that occurred when the

Ptolemaic geocentric view of the universe was replaced by Copernicus' heliocentric model of the solar system.

Another significant paradigm shift occurred in the earth sciences in the 1960s, when the weight of evidence confirmed ideas that **Alfred Wegener (2)** had advanced regarding the movement of the continents. Up to his time, it was thought that the various continents were immovable and had been connected by land bridges that had later submerged. But during a conference in 1912, Wegener proposed that the continents had first been part of a supercontinent (which he named Pangaea) and later they drifted apart. In 1915, he published this theory in a book on the origin of continents and oceans. For a few decades, his proposed theory of continental drift was rejected by the preeminent geologists, due in part to intellectual inertia and, more importantly, to the lack of concrete evidence and an explanatory mechanism. But after substantial new data accumulated, Wegener's idea that the continents have moved was accepted as valid and is now the working paradigm in geology, geophysics, oceanography, and paleontology.

The current debate surrounding climate change provides a prime example of a paradigm-based disagreement. For a number of years, a group of scientists have been analyzing data that suggest a recent steady increase in our planet's temperatures. Computer model projections indicate that if global warming continues at the current rate, humanity will face a series of irreversible catastrophes. However, scientists disagree over the cause; hence the two contrasting paradigms at play. One group believes that the recent rise in temperatures is caused by natural climate cycles, which occur independent of human activity. Scientists using this paradigm emphasize the correlation between solar cycles and global temperatures. The other group believes that human activity is responsible for the increase in global temperatures. Scientists using this paradigm look for correlations between carbon and other emissions and indices of climate change. Of course, the ethical, economic, and political implications of this debate and its outcome complicate the issue. However, once this controversy is settled, a paradigm shift may have occurred, followed by more government policies or international mandates regarding effluents and pollution.

At a more profound level, however, disagreements among scientists in several fields may be based on what rules should be applied in interpreting the origin of the natural world and its operating laws. Is there or is there not a Supreme Being who designed, created, and sustains the universe and its creatures? This debate has been growing in intensity since the 1800s, particularly after **Charles Darwin (1809-1882)** published in 1859 his book *On the Origin of Species*. Why do scientists disagree on this fundamental question? And, more importantly, is this an issue that can be settled by applying the scientific method? These questions lead us to consider the concept of worldviews.

3. Worldviews and their implications All humans, including scientists, develop a worldview through which they understand, interpret, and explain reality at its most fundamental level. Since we all wish to make sense of our experiences, our personal worldview serves as a mental map that orients us in our decisions and actions.

No philosophy degree is needed to possess a worldview. Even scientists are unable to approach the study of a particular object, organism, or phenomenon with a completely objective attitude - all bring to their investigation a particular set of understandings and assumptions regarding the universe and life - a worldview. Our individual worldview begins to take shape during adolescence and matures in young adulthood. It is initially the result of various influences - family, studies, media, and the surrounding culture. We continue to adjust its contours throughout our life due to new information and experiences. At its most basic, a worldview answers four questions:

Who am I? The origin, nature, and purpose of human beings.

Where am I? The nature and extent of reality.

What is wrong? The cause of injustice, suffering, evil, and death.

What is the solution? Ways of overcoming these obstacles to human fulfillment.

Of course, this set of basic questions could easily be expanded. Ultimately, our worldview provides the foundation for our values and is reflected in our decisions and behavior. It influences, for example, our choice of vocation or profession, our relationship with other humans, the way we spend our financial resources, our use of technology, our attitude toward the environment, and even our socio-political decisions regarding issues of justice and peace. The answers we give to the questions listed can be linked by an overarching story (a meta-narrative) that integrates concepts of origin, purpose, meaning, and destiny. Imagine, for example, how two well-trained scientists with different worldviews - for example, a Bible-believing Christian and a neo-Darwinian evolutionist - would structure and articulate their overarching narrative from their individual perspectives. It is worthwhile to note that the impact of the scientist's worldview on research questions, methods, and results has been much more significant in the historical and cosmic sciences than in the experimental and mathematical sciences.

Major worldviews Through recorded history, humans have adopted three major worldviews, which can be summarized as follows:

Theism posits the existence of a personal God who is Creator and Sovereign of the universe. This Supreme Being is separate from His creation but acts in its operation.

Pantheism identifies an impersonal deity with the forces and workings of nature. Reality consists of the universe plus god. They are mutually interpenetrating and interacting.

Naturalism assumes that reality consists of the material universe operating according to natural laws plus nothing else.

Modern science emerged during the 1500s and 1600s within the context of a theistic culture that was predominantly Christian. Pioneer thinkers and scientists in various disciplines such as Copernicus, Galileo, Kepler, Pascal, Boyle, Newton, Halley, and others believed in a Creator God who had established operating laws in the universe

and nature that could be discovered and applied for the benefit of humanity. In contrast, cultures in which pantheism predominated did not offer a favorable milieu for scientific endeavors because nature was seen as divine and therefore sacred.

Some more recent approaches seek to establish connections among these basic worldviews. Theistic evolution, for example, attempts to bridge Christianity and naturalism, proposing that God operates in the world through the process of evolution. Neo-pantheism, on its part, suggests close links between scientific materialism and religious mysticism.

Contrasting worldviews During the last 150 years, the scientific community has gradually moved away from its Christian roots and has assumed a naturalistic worldview that discounts any supernatural intervention or transcendent meaning. It is within this worldview that the sciences are generally taught, research is conducted, and articles are rejected or accepted for publication. **The most popular current expression of this worldview is secular humanism.** The contrast between the basic tenets of biblical Christianity and secular humanism - as representatives of theism and naturalism - can be summarized as shown in the table on page 6.

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The biblical worldview narrative The existence of God and whether He created the universe and life are, by definition, questions beyond the scope and the capability of naturalistic science. The answers to such questions rely on worldview assumptions, which are based on evidence that may or may not be satisfactory to equally competent scientists. Yet, these answers influence the development of hypotheses and theses and the interpretation of data in many scientific endeavors.

From the beginning of modern science, Christian scientists have worked based on the premise that the Creator of the universe and life is the same God that communicated with humans through the Scriptures. Christians who anchor their convictions in the Bible develop a worldview and narrative that, **as interpreted by Seventh-day Adventists**, include seven key moments in cosmic history:

- **1. Creation in heaven.** At some time in the remote past, God creates a perfect universe and populates it with intelligent and free creatures.
- **2. Rebellion in heaven.** An exalted creature rebels against God's principles and, after a struggle, is banished to earth with his followers.

■ **3. Creation on earth.** During six days in the recent past, God makes this planet inhabitable and creates plant and animal life, including the first pair of humans, who are endowed with free will.

■ **4. Fall on earth.** Tempted by the rebel creature, the first couple disobeys God and the entire web of life on this planet suffers the consequences, including a devastating global flood.

■ **5. Redemption.** Jesus Christ, the Creator Himself, comes to earth to rescue fallen humans, offering them free salvation and power to live a transformed life.

■ **6. Second coming.** At the end of time, Christ returns in glory as promised, and grants immortality to those who have accepted His offer of forgiveness and salvation.

■ **7. Consummation.** After a millennium passes, Christ returns to execute final judgment, eliminates evil, and restores the entire creation to its original perfection, which will last forever.

The biblical worldview and its overarching narrative are attractive because they provide an internally coherent answer to key worldview questions. This worldview offers a satisfactory explanation for what we learn, discover, or experience in real life, and gives meaning and transcendent hope to humans' deepest desires. At the same time, **our Christian worldview as Adventists** is always in development, under the guidance of the Holy Spirit, because our understanding of God's revelation is limited and progressive.

Conclusion As we have seen, equally capable scientists arrive at different conclusions due to methodological factors, working within different paradigms, or the contrasting worldviews they have embraced. Nevertheless, Christian scientists who conduct research from the biblical worldview perspective can comfortably work alongside other scientists who may not share their assumptions and yet jointly achieve meaningful findings and respectable conclusions. **Those who accept the biblical narrative as true and reliable enjoy the advantage of having at their disposal additional options and insights provided by the Creator in the Scriptures.** This fact can generate research questions that may lead to fruitful hypotheses, explanations, and discoveries.

END

COMPARISON TABLE

KEY CONCEPT	BIBLICAL CRISTIANITY	SECULAR HUMANISM
Prime realty	A transcendent God who acts in the universe and can be known by human beings on the basis of His self-revelation.	Inanimate matter and energy.
Origin of the universe and life	Both were created by God by the power of His word to operate on the basis of cause and-effect laws in a system He sustains and in which He freely acts.	The universe is eternal or began with a sudden cosmic explosion and operates on the basis of cause-and-effect laws in a closed system. Life appeared from nonlife by chance and natural laws.
Means of knowing truth	God's self-disclosure perceived through His created works, in the Scriptures, and especially in the person of Jesus Christ. God also communicates with humans through their conscience and reason illumined and guided by the Holy Spirit.	Through human reason and intuition, working through and confirmed by the scientific method. For others, truth is beyond human reach, if it exists at all. Ultimately, all knowledge and truth are relative to culture, time, and place.
Origin and nature of human beings	Physical-spiritual beings created perfect in God's image, capable of free moral decisions, now in an imperfect condition.	Humans are merely another form of living organism that originated through unguided evolutionary processes.
Human history	Ultimately, a meaningful sequence of events, guided by free human decisions, but supervised by God, who acts in fulfillment of His overall plan for the good of His creatures.	Unpredictable and without overarching purpose; guided both by human decisions and by natural forces beyond human understanding and control.
Basis of morality	The unchanging character of God (merciful and just), revealed in the life of Jesus Christ and in the Scriptures.	The majority opinion, contemporary customs, cultural traditions, particular circumstances, or a combination thereof.
Cause of the human predicament	Conscious rebellion against God and His principles; an attempt to enthrone humans as autonomous creatures; as a result, the image of God in humans has been defaced and the entire world suffers.	Ignorance of true human potential, bad laws, incompetent government, lack of human cooperation, a natural human flaw, among others.
Solution to the human predicament	A spiritual rebirth: trust in divine forgiveness through Jesus Christ, which leads to a life of loving obedience to God, proper self-understanding, inner peace, and harmonious relationships.	Improved education, more support for science, technological progress, just laws, competent government, improved human tolerance and cooperation, eugenics (3), stronger care of the biosphere, among others.
Death	An unconscious parenthesis until the day of God's final judgment. (Other Christians teach: entrance into another conscious state.)	The final end of human existence in all its dimensions.
Ultimate human destiny	Transformed beings living eternally in a new earth or eternal annihilation. (Other Christians teach: eternal punishment.)	Nothingness and oblivion.

NOTES:

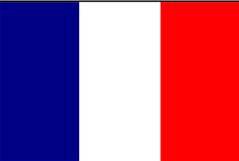
(1) **Thomas Samuel Kuhn** (1922-1996) was a US historian and philosopher. He wrote several essays in the history of science. His book is titled: *The structure of scientific revolutions*.

(2) **Alfred Wegener** (1880-1930) was the first to theorize the drift of the continents. Since the seventies, Wegener's theory has been resumed and finalized to become the theory of plate tectonics that children around the world study in classrooms.

(3) **Eugenics**: Complex study for the genetic improvement of a breed.

- The essay of H. Rasi appeared on *Ministry 09*, 2011, International Journal for Pastors.

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luisetti46@gmail.com/06-07-2017
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