

Science

While science and religion use different methods, both science and religion strive to offer insights which enable us to understand ourselves and the world in which we live

Science is based primarily on reason and secondarily, but importantly, on non-rational processes (intuition, luck, vision, imagination and “strokes of genius”). It restricts its scope of inquiry to verifiable facts about physical phenomena. Within its method it generally excludes consideration of ethics, values and ultimate meaning

Theory - For example, for over two thousand years scientists assumed that the earth was the center of the universe and this “theory” was the unchallenged basis of much scientific thought. This assumption endured because it provided a basis for theories that did in fact “make sense” of a good deal of observable phenomena..

There is, in fact, no direct route by logical reasoning from data to theory.

Therefore, the scientific method often starts, not with the collection of data, but with a current theory or new concept perhaps related to a current theory linked to an act of creative imagination. Then it proceeds through the steps of collecting data, developing a hypothesis, etc. as outlined above. For example, Newton started with the creative insight that the moon was actually falling and then began to collect data to verify this insight logically and mathematically.

In the jargon of science, *all data are theory-laden*. There is no such thing as theory-free, neutrally-objective observation.

One of the commonly expressed characteristics of scientific knowledge is that it is “always open to modify its theories based on new data”. In general this is a fair statement. However, as noted above, there is often great resistance to a challenge to an accepted theory.

Religion

Religion concerns our relationship with God. Religion looks out on the same world as science, but asks different kinds of questions and uses different methods to address these questions. Furthermore, religion extends its inquiry beyond the observable world to seek the ultimate ground of all creation. It claims to see the world and human experience “in depth” in light an experience of the “Other” in some kind of revelatory event.

Unlike science, most religions are based on one or both of two sources: classic revelation (e.g. Moses, Jesus,) and natural theology (human reason). The first source elicits faith and does not lend itself to rational proof and scientific verification. However, while held in faith, the revelatory experience of God provides a matrix that “makes some sense” out of the mystery of human life and the universe. The second, human reason, also leads

ultimately to faith, but uses human reason to detect “signals of transcendence”, (to use Peter Berger’s term) within the world of nature and human experience. Religion also uses reason to explain that religious beliefs, which are derived from attempts to interpret and speak about revelatory experiences, are credible, that is not contrary to reason. Faith cannot contradict reason.

Theologians now understand better the three components of revelation: 1) the reality (God), 2) the experience (of Moses and in Jesus), and 3) the interpretation (the scriptures and theological traditions). Therefore, our faith based on this understanding of revelation recognizes that revelatory experiences are merely glimpses of the One Who reveals Himself. And that the interpretation of this experience expressed in theological statements is always in need of reformulation. Certainly the mystery of God calls us to an unending journey of discovery.

Science and Religion

Warfare -- Separation -- Dialogue -- Integration

Scientific Materialism - This view is based on two assumptions or “beliefs” (1) the scientific method is the *only* guide to true knowledge and (2) matter and energy are the *only* fundamental realities in the universe.

Biblical Literalism - While agreeing with scientific materialists that religion and science conflict, biblical literalists take a radically different view of how to understand the universe and the fundamental nature of all reality. Biblical literalists are loosely defined as those who understand the words of the Bible to be literally true without regard to subject matter or literary form. When the Bible is viewed to touch on any scientific subject (creation of the world, creation of mankind) then the Bible is “true science” and secular science, if it does not correspond to the letter of Scripture, is wrong.

SCIENCE AND RELIGION: As Pope John Paul II said in his 1998 *Message to the Director of the Vatican Observatory*: “ Science can purify religion from error and superstition...religion can purify science from idolatry and false absolutes. Each can draw the other into a wider world, a world in which both can flourish.”

Religion answers the WHY question: Why is there something rather than nothing? The answer is God. He Who creates and sustains the universe and all its mechanisms.

Science answers the HOW question: How does God create the universe? What mechanisms does He employ? The answer is to be found by way of scientific analysis using the scientific method.

Of course, whether or not Darwin’s scientific analysis as set out in the *Origins* sufficiently answers the HOW question is a matter of some dispute and one that religion

cannot settle. It is a scientific question. Indeed, while an overwhelming number of scientists support Darwin's theory *as science* and accept it as *the* integrating principle in natural science, there are some who challenge evolutionary theory on purely scientific grounds. This is to

Furthermore, if science tells us that "chance" plays a central role in the evolution of our world, then it may well confirm for us our religious conviction that God loves us, because love never coerces, it lets the other be free to develop and to love in return. Contrary to pantheists, the Catholic Tradition maintains that God creates us and the universe as distinct from Himself. If we are truly distinct then, by definition, we and the material world must have some degree of freedom and freedom involves risks and unpredictable "chance" events.

WHY IS THERE SOMETHING RATHER THAN NOTHING? And if religion can grant science that the only gaps in the evolution of the universe are the gaps in human knowledge, then science may indeed grant religion that when the gaps are filled, there still remains the question: why is there something rather than nothing? A question reserved for a religious answer.

Darwin

Darwin's theory has two major components: 1) natural selection and 2) the common ancestry of all earthly life.

that there are two main mechanisms that Darwin postulated to operate in the process of natural selection and they call for an answer by any theist who would consider adopting Darwin's evolutionary theory:

1) Randomness/Chance -- Darwin observed that the small variations in individuals that led to differentiation of species seem purely random or undirected. Today (in neo-Darwinism) these differentiations are understood as genetic mutations and are attributed in theory to pure "chance". Dennett calls the process *algorithmic* -- meaning purely mathematical, automatic, impersonal. For Dennett and others like him, life evolves without design, meaning or purpose.

2) Struggle -- The fact that all offspring must struggle to survive, and that most do not, suggests a basic cruelty and indifference within the process, particularly toward the weak. Only the "fit" survive to reproduce, the rest die. This led the philosopher Herbert Spencer to coin the phrase "survival of the fittest". This process of struggle and death is offered as a challenge to the traditional Christian idea of a providential God who loves and cares for what He has created.

Darwin - : "To my mind, it accords better with what we know of the laws impressed on matter by the Creator that the production and extinction of the past and present inhabitants of the world should have been due to secondary causes like those determining

the birth and death of an individual”.

Further, in the last sentence of the *Origin* Darwin writes: “There is grandeur in this view of life, with its several powers, having been *originally breathed into a few forms or into one* (italics mine); and that, whilst this planet has gone on cycling according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.”

Intelligent Design

“Darwin’s Black Box” 1996. *Canadian Catholic Review* 1999 - “irreducibly complex molecular machines” -- cilia. Such systems were purposely designed by an intelligent designer. “It would have to arise as an integrated unit, in one fell swoop” (Black Box p. 5).

However, “the irreducibly complex biochemical systems...did not have to be produced recently. It is entirely possible ...that they were designed billions of years ago and passed down to the present by the normal process of cellular reproduction.” “It could have been present in the initial conditions of the Big Bang” (P. 71 Canadian Review)

Similar to Darwin (see above)

Behe in 1999- see p. 71 Canada Review.

Lamoureux -

To believe in Divine Providence does not require one to believe in Divine Intervention to fill the gaps in our knowledge. And to lay such stress on design threatens the reality of freedom and novelty that we experience in everyday life and which our concept of God demands.

? If our designer God can produce the “irreducibly complex” molecular basis for the evolutionary process (a la Behe), why the problem with the not-so-complex genetic flaw? The presence of evil in the world is certainly a profound mystery, and the positing of a designer God is no answer.

Haught sees the universe not so much in terms of order and design, but an unfinished saga of creation, of a world still coming into being. He speaks of a God who has a vision rather than a design for His world, a world that participates in its own creation.

In response, Haught argues that the notion of divine love as found in the Scriptures demands a genuine independence of creation from its Creator. Logically this requires that

God leaves room in nature for accidents and chance.

For **Johnson** the days of viewing the world as the mechanical operation of Newton's laws must give way to a more "opened-ended view of the world in which some events are in principle unpredictable, although in retrospect they may make sense". For example, at the subatomic level, quantum mechanics functions by laws that have uncertainty built into them. This is demonstrated in the case where it may be predicted that a mass of radioactive uranium will decompose at given rate, however, there is no way to predict which atom will decompose first, second, etc.. The overall event is highly predictable, but the quantum mechanics involved are not. This is an instance of what Johnson cited above: "random events operating within a law-like framework."

Going from the micro level to the macro level, Johnson gives the example of weather chaos theory where small changes in initial conditions bring about massive changes. She cites the famous example of a butterfly fluttering its wings in Beijing resulting in a massive storm in New York a week later. Weather is so unpredictable because of the massive number of random events that make up its initial conditions. Thus chaos theory also represents a form of "structured randomness" in the universe.

A third example is evolution. It is also an example of an *interaction of chance and law*. The novelty in life (chance) comes about precisely because of the inherent ability of matter to organize itself and bring about complex structures, including conscious human life, by a "long, complex sequence of self-ordering processes" (law).

Here Johnson makes a distinction between providence and intervention. The fact that God may not intervene in the universe does not eliminate Divine Providence.

Johnson calls on the vision of St. Thomas Aquinas who sees God as the creator and continuous sustainer of the universe. For Thomas, the universe exists through participation in the being of God. However, this participation does not mean that God is part of our essence (pantheism) but that God is the ongoing source of our ability to exist and to act. For Thomas, God, the first cause of all that is, only acts in the world through the secondary causes of His creation. All that exists is genuinely on it own.

Therefore, for Johnson the scientific observations concerning the interplay of chance and law expresses God's purposes. God leaves us and the world free to become. Without chance and freedom we would only be extensions of God, totally determined by Him. With chance and freedom we are able to truly be His creatures.

So the providence of God is not intervention, but is expressed and comes to fruition by means of purposes inherent in creatures themselves. God providential guidance is accomplished in and through the free working of secondary causes. These secondary causes include rather than exclude chance, contingency and freedom of choice.

Official Church Statements

354-430 - **St. Augustine**

“One does not read in the gospel that the Lord said: ‘I will send you the Paraclete who will teach you about the course of the sun and moon.’, for he willed to make them Christians, not mathematicians.”

“If it happens that the authority of Sacred Scripture is set in opposition to clear and certain reasoning, this must mean that the person who interprets Scripture does not understand it correctly. It is not the meaning of Scripture which is opposed to the truth but the meaning which he (the interpreter) has wanted to give to it. That which is opposed to Scripture is not what is in Scripture but what he has placed there himself, believing that this is what Scripture meant.” (Epistula 143, n. 7)

1981 - **Scripture and Science: The Path of Scientific Discovery. An Address to the Pontifical Academy of Science, by Pope John Paul II**

“On the occasion of a previous solemn session (Address to the Pontifical Academy of Sciences, 11/10/79) I have already had the opportunity to tell you how highly the Church esteems pure science: It is ‘a good worthy of being loved, for it is knowledge and therefore perfection of man in his intelligence...It must be honored for its own sake, as an integral part of culture’”.

“The Bible itself speaks to us of the origin of the universe and its makeup, not in order to provide us with a scientific treatise but in order to state the correct relationships of man with God and with the universe. Sacred Scripture wishes simply to declare that the world was created by God, and in order to reach this truth it expresses itself in the terms of the cosmology in use at the time of the writer. The Sacred Book likewise wishes to tell men that the world was not created as the seat of the gods, as was taught by other cosmogonies and cosmologies, but was rather created for the service of man and the glory of God. Any other teaching about the origin and make-up of the universe is alien to the intentions of the Bible, which does not wish to teach how the heavens were made but how one goes to heaven.”

1988 - **John Paul II: Message to the Director of the Vatican Observatory** (source: *Physics, Philosophy and Theology: A quest for Common Understanding* ed. Robert J. Russell, William R. Stoeger, S.J., and George V. Coyne S.J. - Vatican City State: Libreria Editrice Vaticana, 1988, M13.)

“Science can purify religion from error and superstition...religion can purify science from idolatry and false absolutes. Each can draw the other into a wider world, a world in which both can flourish”

“If the cosmologies of the ancient Near Eastern world could be purified and assimilated into the first chapters of Genesis, might contemporary cosmology have something to offer to our reflections upon creation? Does an evolutionary perspective bring any light to bear upon theological anthropology, the meaning of the human person as the *imago Dei*, the problem of Christology-- and even upon the development of doctrine itself? What, if any, are the eschatological implications of contemporary cosmology, especially in light of the vast future of our universe? Can theological method fruitfully appropriate insights from scientific methodology and the philosophy of science?”

1996 - Magisterium and Evolution: Truth Cannot Contradict Truth, Message to the Pontifical Academy of Sciences, by Pope John Paul II

“I had the opportunity with regard to Galileo to draw attention to the need of a rigorous hermeneutic for the correct interpretation of the inspired word. It is necessary to determine the proper sense of Scripture, while avoiding any unwarranted interpretations that make it say what it does not intend to say. In order to delineate the field of their own study, the exegete and the theologian must keep informed about the results achieved by the natural sciences.

New knowledge leads to recognition of the theory of evolution as more than a hypothesis. It is indeed remarkable that this theory has been progressively accepted by researchers, following a series of discoveries in various fields of knowledge. The convergence, neither sought nor provoked, of the results of work that was conducted independently is in itself a significant argument in favor of this theory.”

“And, to tell the truth, rather than the theory of evolution, we should speak of several theories of evolution. On the one hand, this plurality has to do with the different explanations advanced for the mechanism of evolution, and on the other, with the various philosophies on which it is based. Hence the existence of materialistic, reductionist and spiritualist interpretations. What is to be decided here is the true role of philosophy and, beyond it, of theology”.

“Theories of evolution which, in accordance with the philosophies inspiring them, consider the spirit as emerging from the forces of living matter or as a mere *epiphenomenon* of this matter are incompatible with the truth about man. Nor are they able to ground the dignity of the person”.