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Elements of the Scientific Method in Scripture



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General Aim

We seek to find in Scripture any of the elements of the scientific method as used in natural science. This topic is a small part of the larger subject of theology and science.



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Preliminary Abstract

printed in Annual Meeting brochure

- Many Christian analysts have emphasized that science developed most strongly in cultures influenced by Scripture. Reasons offered have included Scripture's emphasis on an orderly observable universe governed by a trustworthy creator. Fewer analysts have noted instances in Scripture where a specific element of the scientific method has been illustrated or endorsed. Many non-Christians in contrast have decided, based on disputes concerning what Scripture says about Earth history and biology, that the Bible is anti-science.
- In response to this cultural background, the present study involved a combing of Scripture for instances illustrating or endorsing specific elements of the scientific method and the general principles permeating its use. A large number and variety of instances was found, leading to the conclusion that the Bible endorses the scientific method.
- It was recognized at the outset that the scientific method has a variety of formulations and attendant principles. The analytical method used in the study was a systematic search of Scripture for (1) declarative prescriptions (mandates and commands), (2) statements of principles, (3) lessons from anecdotal narratives, and (4) reasonable inferences from various Bible passages. Prescriptive and descriptive materials were distinguished. To a lesser extent, the study also involved inferences based on generalized Biblical material, and identification of relevant models, paradigms, and Biblically-based ethics. The study was guided in part by expressions by authoritative scientist-Christians; Church elders; recognized reliable Bible teachers and authors; doctrinal statements, creeds, and catechisms; and collective understanding by the whole Church (in the generally orthodox tradition).
- Thus in general a Biblical epistemic milieu was identified that relates positively to the scientific method. Some of the concepts treated in the study are: objective truth, epistemic foundations, observation, measurement, experiment, empiricism, instrumentalism vs. realism, methodological naturalism, fact, hypothesis, law, theory, logic, probability, deduction, induction, falsifiability, causation, cumulative convergence, coherence, and preconditions necessary for science.

Challenges

- "How can you be a scientist and a Christian at the same time?" Classroom student, TCC
- "My question [...] is which account you should believe in, the Bible's or the scientific account?" Albert Ip, http://atheistbibleforum.blogspot.com/
- "Do I think Biblical literalists are a threat? Not really. But I think the antiscientism they represent is a huge problem" David Plotz, Slate.com editor, http://bs4a.blogspot.com/2009/03/interview-with-good-book-author-and.html
- "If we insist on the Bible's being literally true, then we must abandon the scientific method totally and completely."

Isaac Asimov, quoted in Paul Kurtz interview, "Isaac Asimov on Science and the Bible," *Free Inquiry*, Spring 1982. http://www.positiveatheism.org/hist/asimov.htm

• "The *Scientific method* vs. the Creationist method" – cartoon (see next slide)



A Few Authors on the Conflict Between Science and Religion

- John William Draper *History of the Conflict Between Religion and Science*, 1875
- Andrew Dickson White A History of the Warfare of Science with Theology, 1920
- Richard Dawkins *The God Delusion*, 2006
- Russell Martin When Science is Right and the Bible is Wrong, 2008

Broad Outline of This Presentation The Scientific Method and Scripture

- Brief on Conceptual Foundation:
 - Three Components of Science
 - Scientific Explanations
 - Scientific Confirmation
 - Philosophical Perspective / Worldview
 - Types of scientific investigations
 - Constraints
- The "Scientific Method"
- Elements of the Method in Scripture

Three Components of Science as the word "science" is commonly used

- The knowledge base and scientific explanations
 - Facts
 - <u>Hypo</u>theses
 - Laws
 - Theories
 - What is a theory? Distinguish hypothesis from theory.
- The "scientific method"
- The scientific establishment

Scientific Explanations

• Forms

- Inferential or covering-law model or theory
 - The item is explained in terms of its generalized properties HEMPEL, NAGEL
- Realist causal models
 - Involving statistical relationships or use of unseen entities JAKI
- Contextualist or pragmatist accounts
 - Explanations that answer "why" questions KUHN

Kinds

- Compositional *or* structural
 - Properties of elements explained by their component parts
- Evolutionary or historical
- Functional
 - An item explained by its role in a system
- Intentional
 - Behavior explained by the organism's goal or intention

See J. P. Moreland, Christianity and the Nature of Science, Grand Rapids: Baker, 1989, 73-81.

Scientific Confirmation

More complex than first appears

Conventionalism and Pragmatism

- Nonempirical, epistemic factors influence acceptance

• Simplicity, predictive ability, explanatory scope, accuracy, consistency, clarity, fruitfulness, absence of rivals, aesthetics, intuition, methodological values

Falsification

- Testing, corroboration, and falsification POPPER
 - Theories may be too complex for outright falsification

Justificationism

Positive instances tend to confirm laws or theories

See J. P. Moreland, Christianity and the Nature of Science, Grand Rapids: Baker, 1989, 82-89, 128-130.

Philosophical Perspective / Worldview

• Which of these competing worldviews is true? –

- Rationalism and scientific realism
 - Essentialism
 - Naturalism
- Idealism
- Instrumentalism (in several forms)
 - Constructive Empiricism models that describe and predict observations
 - Pragmatism effectiveness in problem-solving
 - Operationalism empiricism linked to lab operations
 - Phenomenalism/positivism radical empiricism based on sense-data
- Nonrational nonrealism
 - An alternative to difficulties in realism and in defining rationalism
- Which of the above perspectives is evident in Scripture?
 - The Biblical worldview is theistic and involves a realism involving both physical and nonphysical entities

Types of Scientific Investigations

- Some people make a distinction between
 - Experimental / observational / empirical
 - Deductive / theoretical
 - Historical / forensic

(all the above types have their differences)

- Sometimes it is claimed that one category is more reliable than another
- In actual practice, science is a mix of all three types
- Methods for the types vary

Constraints on Simple Understandings

- No universal agreement on the philosophical perspective concerning the external world, and therefore no universal agreement on what is the task of science
- No single scientific method

The "Scientific Method" in its typical formulation

- **Observations** in field or lab, with or without experiments
- <u>*Hypo*</u>theses to explain observations in terms of what is known and using reasonable conjectures
 - Testing hypotheses via additional observations
 - Confirmation or revision of hypotheses
- Articulation of laws as regularities of nature
- Development of theories as constructs of laws and facts

The "Scientific Method" *contd.* – Induction and Deduction

- The scientific method employs the logic of both induction and deduction
 - Induction "many leading into one" inferring conclusions from a large number of individual facts
 - Deduction "drawing out one from another" by logic, inferring consequences from a proposition
- Induction is used to generalize conclusions from sets of observations
- **Deduction** is used to identify consequences of hypotheses, laws and theories

Analytical Methods for This Study

The analytical method used in this study was as follows:

I. A search of Scripture for

- 1) declarative prescriptions (mandates and commands),
- 2) statements of principles,
- 3) lessons from anecdotal narratives, and
- 4) reasonable inferences from various Bible passages.

Prescriptive and descriptive materials should be distinguished.

II. To a lesser extent, the study also involved

- 1) inferences based on generalized Biblical material, and
- 2) identification of (a) relevant models, (b) paradigms, and (c) Biblically-based ethics.

III. Use of expressions by

- 1) authoritative Christian theologians, philosophers, and scientists
- 2) Church elders
- 3) recognized reliable Bible teachers and authors
- 4) doctrinal statements, creeds, and catechisms
- 5) collective understanding by the whole Church (in the generally orthodox tradition).

Restating the General Problem

Conflict and Challenge

- Natural science is frequently pitted against Scripture, especially when it is literally interpreted
 - Quotations from those who pit science against Scripture
- "Faith" response options
 - Reject science (this option is rejected outright)
 - Use natural science to prove whether the Bible is true (*a problematical option*)
 - Explore whether harmony exists between science and Scripture

The last option is the one pursued here. In particular, Scripture is searched for elements of the scientific method.

- Epistemic foundations
 - Scripture declares its foundations "The fear of the Lord is the beginning of knowledge" (Proverbs 1:7).
 - Concerning worldviews (empiricism, instrumentalism, realism, naturalism, etc.), Scripture is based on theism and realism.
- Sources of information
 - The Bible recognizes three means by which we may obtain information about ourselves, nature, or God. These are observation, rationality and revelation. Science recognizes the first two explicitly, and allows a form of the third via intuition.

- Observation
 - Jesus said "Go and report to John what you have seen and heard..." (Luke 7:22).
 - Jesus asked, "Do you know how to discern the appearance of the sky, but cannot discern the signs of the times?" (Matthew 16:2-3).
 - Reports of the Resurrection; see also Joshua 9:14 (observations by spies) and Romans 1:20.
- Objective truth
 - A limited appeal to objectivity in Scripture is found in Paul's reference to numerous witnesses to Christ's resurrection (1 Corinthians 15:6), and the insistence that guilt requires two or three witnesses (Deuteronomy 17:6). Consider also the Scriptural requirement for impartiality in courts of law equal application of justice to both rich and poor.

- Measurement
 - See the measurements of Solomon's constructions in 1 Kings 7, especially the sea of cast metal giving a value of π in v. 23.
- Experiment
 - A puzzling episode in Scripture that suggests experimentation is the story of Jacob and sheep-breeding (Genesis 30:31ff).
 - Daniel in King Nebuchadnezzar's service devised an experiment to secure his freedom to eat his preferred diet of vegetables (Daniel 1:5ff).
- Classification
 - Some elementary form of a list science as seen in ancient Middle East cultures appears to have been operative in Proverbs, such as in Proverbs 26:1ff and 30:24ff. Genesis 1 contains a preliminary census of heavenly and earthly objects.

• Rationality –

mental operations involving perceptions, reason, and logical thought

- "Come now, and let us reason together, saith the Lord." Isaiah 1:18
- Forms of argumentation employed by Jesus Christ.
- An extended example of rationality in Scripture is the book of Romans.
- The OT prophets employed as one of their forms of speech a form of reasoned argument known as the (Hebrew) rîb pattern, also called the prophetic lawsuit. Its elements included the announcement of court witnesses, the case against the people with presentation of evidence, a declaration of what the Lord has done, a conclusion presenting the indictment, and the sentence of judgment.
- Instances of natural theology in Scripture (see below), where reason is employed to point out truths to pagan society.
- Following the Ascension, eloquent reasoning was employed to win people to Christ. The speeches of Peter and Stephen and others are brilliant, logical defenses of the Gospel. Paul after his conversion went to the synagogues daily to reason with the Jews. His speech on Mars Hill in Athens begins with a logical appeal.

- Logic
 - Probability as Likelihood of Success
 - Counting the cost of building before beginning construction.
 - Deduction
 - Scripture says mankind since the Fall is sinful and in need of grace. The Apostle John consequently says in 1 John 1:8, "If we say that we have no sin, we are deceiving ourselves, and the truth is not in us."
 - Christ in Matthew 12:22-28 reasons with His audience about their belief that His power to drive out evil spirits came from Satan. If from Satan, this should lead them to the same conclusion about their own prophets, a logical contradiction of their belief-system. His conclusion was, "But if I drive out demons by the Spirit of God, then the kingdom of God has come upon you."
 - Induction
 - The risen Christ reviewed Old Testament prophecies regarding Himself in Luke 24:25-27.
 - Paul appealed to induction in mentioning multiple witnesses in 1 Corinthians 15:5-8 to support the claim of Christ's resurrection.

Proving and testing

• "Prove what is the acceptable will of God" (Romans 12:2). "Prove all things, hold fast what is good" (1 Thessalonians 5:21). "Beloved, do not believe every spirit, but test the spirits to see whether they are from God" (1 John 4:1). We ourselves are to "test yourselves to see if you are in the faith. Examine yourselves" (2 Corinthians 13:5). In 1 Thessalonians 5:19-22, Paul says to "Quench not the Spirit, despise not prophesyings, prove all things, hold fast that which is good, abstain from every form of evil." Other New Testament references to proving and testing are found in Acts 1:3, 2 Corinthians 2:9, 8:24, 13:3, Philippians 2:22, and 2 Timothy 4:5. To prove that He rose bodily, Jesus invited His disciples to see and touch Him, and He ate food (Luke 24:36-43; John 20:24-31; 1 John 1:1-4).

• Falsifiability and Confirmation (verification)

- The methods of discerning or disclosing false prophets are presented in Deuteronomy 18:20-22, 1 Kings 13:11-25, Isaiah 9:15, Jeremiah 6:13-15, 14:13-16, 23:9-40, 27:14-18, 28:15-17, 29:8-9, Ezekiel 22:25-26, 2 Peter 2:1, and 1 John 4:1-3. Confirmation procedures are presented in Deuteronomy 13.
- In Scripture the principle is presented in terms of the necessity of having multiple witnesses for a variety of activities. Multiple witnesses are required for convicting criminals of crimes, for establishment of political boundaries, and for determining God's gifts to individuals, and His directions to individuals or groups (see Deuteronomy 17:6, 19:15, Ruth 4:9-11, Proverbs 15:32, Matthew 18:16, 2 Corinthians 13:1, 1 Timothy 5:19, Hebrews 10:28). The principle is also reflected in Scripture's call for a multitude of counselors, such as for governmental activity, particularly war (see Proverbs 11:14, 20:18, and 24:6). False witnesses are rebuked, and if committing perjury in court, are subject to the punishment their lies would have inflicted on others (Deuteronomy 19:15-21). (See also Luke 24:28, Acts 2:32, 10:39, 20:23, 2 Corinthians 13:1, 1 Timothy 5:19, Hebrews 10:15, and 10:28 and 1 John 5:6-10 where the Apostle John referred to three witnesses for God's testimony in Christ: the Holy Spirit, the water, and the blood. The writer of Hebrews affirmed it in Hebrews 2:3.

• Correction

• For teaching on correction, see Psalm 27:12, Proverbs 10:17, 12:1, 29:1, 6:19, Matthew 26:60, and 2 Timothy 3:16.

• Fact

• The essence of the idea of a fact is found throughout Scripture. However, Hebrew and Greek lack a word equivalent to the word "fact." The Hebrew culture had not developed the concept of a fact which is autonomous, objectified, and self-evident, a connotation which is common in the present everyday culture. Instead, the concept was expressed in terms which kept in view the role of an observer, participant or agent. Exodus 1:18 and 2:14 speak of Moses' murder of the Egyptian as a "thing" done which has become "known." In Exodus 3:16, God instructs Moses to tell his fellow Hebrews that He has seen "that which has been done to you in Egypt." Leviticus 4:14-14 speaks of "things which should not be done." Deuteronomy 4:9 warns the Hebrews to not forget "the things which thine eyes have seen." Deuteronomy 17:4 sets forth the procedure for establishing evidence concerning adulterers.

• Law

- The celebrated examples in Scripture are the Mosaic Code (the Torah), and portions of the Psalms and Prophets. Psalm 119 is a special example extolling the law in every verse.
- The popular view is that Scriptural law came by direct revelation – that Hebraic law was received as a corpus by Moses. Modern scholarship has painted a different view, because of similarities of structure of Hebraic law with law in other contemporaneous societies, in particular that of Mesopotamia. James Barr believes that Hebraic law in part developed as a God-inspired reworking of Middle Eastern traditions, and thus the process has similarity with natural theology. He mentions Jethro who, while not a priest, altered Hebrew legal polity (Exodus 18), and the daughters of Zelophehad who provoked changes in inheritance laws (Numbers 27:1ff; 36).There was a rational character to these developments. The significance for our theme is that Biblical law was to some degree the result of a rational process, which is similar to how law develops in natural science.

• Theory-1

The New Testament uses the Greek word theoria (θεωρια) more than fifty times. Jesus said that when a man "looks at (beholds) Me, he sees (beholds) the One Who sent Me" (John 12:45). The women of Matthew 27:55 "beheld" Jesus on the cross. Mary Magdalene and the "other" Mary went on the first Easter to "look at" or survey the tomb (Matthew 28:1). "Beholding" the crucified Jesus, all of his followers beat their breasts (Luke 23:48). A slightly different meaning is found in Hebrews 7:4, where the reader is invited to "consider" or view mentally the greatness of Melchizedek. But scientific theorizing is more than just being a spectator, and involves reasoning.

• Theory-2

- The Old Testament uses at least four Hebrew words to convey possible variations of reasoning. 1 Samuel 12:7 mentions pleading. Job 13:3 and 15:1-6 present the desire of Job to "argue" his case before God. Ecclesiastes 7:25 mentions the "reason" or "scheme" of things. Eliphaz asks rhetorically in Job 15:3 whether Job should "reason" with unprofitable talk. God at least invites man to bring his case, as in Isaiah 1:18: "Come now, let us reason together"; God of course knows the outcome, that faith, not reason, is the only route to salvation. Finally, in Daniel 4:36, the King Nebuchadnezzar declares that his "reason [or sanity] returned."
- In the New Testament, reasoning is referred to by a Greek word διαλογιζομαι which yields "dialog" in English. Jesus repeatedly asked about the reasonings of his audience (Matthew 16:8, 21:25, Mark 2:8, 8:17). The Pharisees and disciples reasoned, but incorrectly (Mark 11:31, 12:28, Luke 5:21, 9:46, 20:5, see also Luke 20:14).

• Theory-3

- The Bible as a whole may be regarded as a presentation of a theory. Creation sets the stage. Then the gamut of human behavior is narrated in historical and situational context. The problem of sin is highlighted. And then the solution to this problem is presented.
- In this characterization, the Bible is the forerunner of elaborate, comprehensive theories in natural science. It differs, of course, in heavy reliance on revelation in addition to observation and rationality, as opposed to how natural science generally proceeds, which depends on empirical observation and experimentation almost exclusively as sources of data, and mental reflection for conceptualization of law.

Causation

• Causal explanations are prevalent in science. Causation as a theme in Scripture points to the Fall, and sin's role in the catastrophes of human life. God is presented as First Cause.

• Cumulative convergence

- The sign miracles in John pointed to the divinity of Jesus Christ.
- Isaiah 28:9-13 includes the phrases "Order on order, order on order, line on line, line on line," indicating that God imparts knowledge to His people in a progressively unfolding way. The Proverbs of Solomon declare that "The beginning of wisdom is: Acquire wisdom; and with all your acquiring, get understanding...." (Proverbs 4:7,20).

• Connectivity

 Connectivity as a principle in science refers to the linkage of new theories to previously accepted findings. The unfolding of Christ as the answer for sin links Old and New Testaments, illustrating connectivity in Scripture.

• Coherence

• Scripture overall presents a coherent view of God's love overcoming man's sin.

Pragmatism

• "...if I do them [works of the Father], though you do not believe me, believe the works ...(John 10:38).

• Preconditions necessary for science

Realist-causal model

- This model is found in both Scripture and science, in which theoretical entities are employed in explaining data in terms of a cause or causes. Scripture presumes God as Primary Cause; science postulates unobservable entities as causes.
- Exemplified in John 8:12ff. In verse 44, Jesus declares concerning the Pharisees: "You are of your father the devil, and you want to do the desires of your father."

Presuppositions

• Scripture presupposes God's existence and His role as lawgiver and Primary Cause. Jacque Monod, atheist, Nobel-prize winner, and author of *Chance and Necessity*, recognized that science is also presuppositional, depending on an arbitrary ethical postulate for its epistemological foundation (objective data lead to truth), one not derivable from within science itself.

• Theology and Natural Science

- The encounter between science and theology has been explored by various writers who have noted the similarity of methods of theology and science.
- The following elements are found in both theology and science, namely, accumulation of observations and phenomena of revelation resulting in tradition (παράδωις) and deposit (παραήκη), representation of reality, theory development, and communication (the transmission element).
- These elements common to science are found <u>not only in</u> <u>theology</u>, <u>but also in Scripture itself</u> whence they derived. For example, the concept of the mystery of the church, as a theory, was progressively revealed from the Old Testament to the New, and came to be a central element of Paul's teaching (1 Corinthians 2:7, 4:1, Ephesians 3:9, 1 Timothy 3:9).

• Theology and Natural Science – *contd*.

- Natural theology is found in Scripture (*e.g.*, in Acts 17:16ff, and Romans 1-2). Psalms 8, 19 and 104 contain weaker examples. The passage in Acts is an instance of an appeal to natural observation, presented within a paradigmatic context of a general belief in God, which leads to a conclusion about God's nature and His intentions regarding the human race.
- The presence of natural theology in Scripture means that Scripture contains appeals to observations of the natural world and to the factual reality giving those observations their content. Moreover, the instances of natural theology involve cognitive reflections that ultimately yield claims about reality. In this, the instances are like the scientific appeal to observational facts and their use in constructing conceptual models of physical reality.

Revelational Theology and Natural Science

- Christ employed ordinary observation and common-sense reflection in drawing parallels between natural activity and spiritual realities. One can see a similarity in how natural scientists build theories, particularly in the sense that the conceptual building blocks of a <u>novel</u> theory are not predictable outcomes of the mental processing of facts and already-known laws, and in celebrated cases they have extended well beyond previously known paradigms (*e.g.*, quantum theory, relativity, Big Bang cosmology, and plate tectonics).
- Christ Himself as Incarnational Mystery introduced both extreme novelty and profound explication of prior human thought and experience. Similarly, natural science on occasion yields new paradigms that swallow old ideas, even generating revolutions, as in heliocentrism.

Summary of the Common Elements of the Scientific Method in Scripture Other examples from Scripture may be identified

- **Principle of evidence** Acts 26:26, 1 Cor 15:6
- **Observation** Luke 7:22
- Testing and proving 2 Cor 13:5, 1 Thess 5:21
- **Falsifiability and correction** Psalm 27:12, Prov 10:17, 12:1, 29:1, 6:19, Matt 26:60, and 2 Tim 3:16
- **Facts** concept inherent in narratives
- **Logic** 1 Cor 15:12-29
- Laws, ordinances, commandments central to Scripture
- Theory theoria "to behold" John 12:45; Genesis 1 creation model
- General nature of things and situations akin to theories
- **Presuppositions** John 8:31-32

Conclusion

This exploration shows a multitude of correspondences between the methods of natural science and features of Scripture. From the results, we conclude that –

- it is not only wrong to claim that natural science and Scripture conflict, with respect to methods or routes to knowing,
- it is also right to declare, in the positive sense, that Scripture endorses methods of natural science.

The End

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