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# The Biblical Basis of Science

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## Abstract

Science and Religion are often viewed as conflicting, even irreconcilable. In this article, the inconsistencies and incompleteness of both atheistic science and irrational religion are considered, including:

- an exploration of the "science vs. religion" dichotomy and why eliminating either results in an incomplete worldview;
- consideration of the generally unstated underlying assumptions of the materialistic worldview;
- the limits of reason, logic and science and the inconsistency of attempts to use science to disprove the existence of the supernatural;
- the failure of atheistic materialism to adequately explain the universe; and
- the importance and strengths of correct science within its limits of usefulness—why science must not be avoided by Christians.

Far from being incompatible with science, the Christian worldview gives meaning and consistency to science that is otherwise lacking.


*Keywords:* Science, religion, atheistic science, irrational religion, dichotomy, materialistic worldview, logic, reason, supernatural, atheistic materialism, universe, correct science, Christian worldview, biblical worldview

## The Biblical Basis of Science

It is an almost unquestioned assumption among those who seek knowledge of either the physical universe or human nature that science alone provides the tools necessary for the acquisition of such knowledge and the philosophical foundation on which to build a consistent worldview. It is no exaggeration to say that science has been immensely successful and useful. We are surrounded by the ubiquitous technological reminders of the success of science in every area of life. Our society is a "proof by example" that science works. But that is a far cry from the wholesale acceptance of scientism and atheistic materialism, the idea that science provides all the answers and the automatic discounting of religion, the supernatural, and any divine intervention in the natural realm. If the successful methods of science were applied to the evaluation of science itself and its philosophic underpinnings, the situation would be far different. The idea that science has no limitations is unscientific and unsupported other than by a faith that in its extreme form becomes scientism. Science as generally practiced today does not provide evidence supporting the materialistic worldview; rather, materialism is an *a priori* assumption that guides and artificially limits the practice of science. It is certainly allowed to make such assumptions and then consider their implications. The danger lies in making the assumptions without recognizing them for what they are and without a willingness to reconsider the assumptions if they logically lead to contradiction or conclusions that are false.

In this paper the assumptions of scientism and atheistic materialism are considered, as well as the logical contradictions that result from these assumptions. The untenable materialistic worldview is contrasted with that of the Christian who investigates the universe as the handiwork of the Divine Artist, conscious of both the usefulness and the limits of the scientific method and of human reason in general. Finally, the rejection of science by the self-styled religious is considered: its origin in the confusion between science and the philosophy of atheistic materialism and its own inner inconsistency. It is hoped that a clearer understanding of the place of science and revelation in our epistemology, and the realization that they are actually not in conflict, will result in a more complete and consistent approach to both.

## The Limits of Science

### The Scientific Method

There is considerable disagreement among scientists and philosophers of science about what exactly constitutes the scientific method or even whether there is only one scientific method. Two representative statements may serve as examples: "There is no one scientific method" (Hewitt, 2006, p. 2) and "Contrary to popular belief, the scientific method is not a standard recipe that scientists apply" (Lutgens, et al, 2005, pp. 10-11).

However, most agree that the process of doing science includes asking questions, collecting data, formulating hypotheses and models (called theories after they survive a certain amount of testing), testing hypotheses/models/theories by comparison with experiment, and, if necessary, refining or replacing theories based on experimental results (Griffith & Brosing, 2009, pp. 2-4).

An important requirement is an intense interest and curiosity about the workings of the universe. In the words of Nobel Laureate Richard Feynman, "Curiosity demands that we ask questions, that we try to put things together and try to understand this multitude of aspects as perhaps resulting from the action of a relatively small number of elemental things and forces acting in an infinite variety of combinations" (1994, p. 23). But each scientist need not be engaged in each part of the process: an experimentalist may spend most of her time (often as part of a large group of scientists) in the construction and implementation of experiments designed to test the theories of others or in the collection of new data, answering questions that have arisen; a theoretician may dream up new theories or modifications or extensions of existing theories, compare theoretical predictions to experimental results, etc. Questions may come up at any point in the process, leading to new hypotheses, new experiments, or new ideas of where to look next. Other sometimes overlooked parts of the process (Goldbort, 2006) are fundraising activities, writing papers for scientific journals, writing for the general public, political activism on behalf of science, and mentoring the next generation of scientists (Snieder & Larner, 2009). These are the inevitable result of the need for the scientific enterprise to be self-sustaining and provide a livelihood for its practitioners. Science is not accomplished in a vacuum. Scientists are human, too, with common human needs, concerns, and weaknesses (Goldstein, 2010).

But "proving theories" and "finding truth" do not figure on any list of what "doing science" means. This is because, despite the impression given by some of its practitioners, science does not deal with proof or truth; science only provides possible explanations and a methodology for discarding models which fail to predict the results of experiment. No theory is ever authenticated, although there may be a perception that greater and greater reliance may be placed on theories which have "stood the test of time." Some authors present the progression in order of increasing reliability as "hypothesis, theory, natural law" (Zumdahl & Zumdahl, 2007, p. 6), but this is highly misleading. Even such a well-tested and universally accepted "law" as Isaac Newton's "Law of Universal Gravitation" is not a law at all but only a theory, and in point of fact, a theory that has since been surpassed by a more general, more accurate theory—Albert Einstein's General Relativity, the modern theory of gravitation. This, too, will almost certainly be shown to be only an approximation or limited case of a more general theory that unites both gravitation and quantum physics, perhaps a variant of string theory. Fundamentally, all scientific theories must be considered approximations, and even those which have not yet been surpassed do not come furnished with any credentials.

## Origins of Modern Science

Studies by philosophers and historians during the past half-century have swept away the formerly held view that the rise of science was a progressive triumph of knowledge and rationality over ignorance and superstition. For many, this interpretation had never previously been questioned and it gave their scientific explanations a highly anti-religious bent. One glaring example from an essay of noted author Isaac Asimov: "Tens of millions of Americans, who neither know nor understand the actual arguments for or even against evolution, march in the army of the night with their Bibles held high. And they are a strong and frightening force, impervious to, and immunized against, the feeble lance of mere reason" (Montagu, 1984). A similar and related situation is the demonization by later authors of the Middle Ages, referred to pejoratively as "The Dark Ages," without regard to the high levels of art and philosophical thought found in that time period. Likewise, the unbalanced view of a science vs. religion conflict (and their implicit equivalence to rationality and ignorance, respectively) has been superseded by more historically accurate expositions, showing how modern science grew naturally from the fertile soil of the existing (and conflicting) worldviews and philosophical trends. Far from replacing or being a reaction against the belief systems of the day, the development of science was directed by them.

Ironically, the roots of modern science are firmly entrenched in the Judeo-Christian tradition. It was the belief in an eternal, changeless, loving, and reasonable God that led the fathers of modern science to expect His creation to be understandable to humans in any degree. Although significant levels of engineering skill and practical knowhow occurred in various cultures throughout history, science did not arise from a foundation of animism (where no unifying principle is to be sought in nature, only incomprehensible local deities), nor in any of the many polytheistic societies with their squabbling, limited and capricious gods (such as those of Norse and Greek/Roman myth), nor in the Eastern cultures whose effort was not to understand reality but to transcend it and to achieve oneness with impersonal deity, nor even in the idealism (generally untainted by actual experimentation) of the

Classical Greek philosophers, but only in the Christian ethos of medieval Europe, whose omnipotent God created the world and called it “very good” (Genesis 1:31). Although Aristotle and Hipparchus were notable experimentalists, the testing of theoretical ideas by comparison to the real world is a modern invention, at odds with the thinking of classical Greek philosophers, who assumed that since we have at our disposal only imperfect examples of the Platonic ideals, no experimentation can be expected to perfectly reflect the “real” truth. Nancy Pearcey writes:

> In the biblical worldview, scientific investigation of nature became both a calling and an obligation.... The rise of modern science cannot be explained apart from the Christian view of nature as good and worthy of study, which led the early scientists to regard their work as obedience to the cultural mandate to "till the garden." (2005)

In the same article, Pearcey has collected statements from many historians of science as well as specialists in the history of various cultures, explaining the barriers to the development of science in other cultures and traditions.

Eric V. Snow (1999) argues “that the world view of Christianity was absolutely necessary for the rise of modern science,” while elucidating the thesis of Pierre Duhem and Stanley Jaki, who saw a direct connection between Christian metaphysics and the birth of a self-sustaining science, and that of Robert K. Merton, who linked English Puritanism's ethics to the rise of English science.

Although still surprising to many, the importance of Christianity for the rise of science has long been recognized. In his classic book, *Escape from Reason*, Francis Schaeffer, one of the 20th century’s foremost Christian apologists, wrote:

> Modern science was started by those who lived in the consensus and setting of Christianity.... Christianity was needed for the beginning of modern science for the simple reason that Christianity created a climate of thought which put men in a position to investigate the form of the universe.... The early scientists also shared the outlook of Christianity in believing that there is a reasonable God, who had created a reasonable universe, and thus man, by use of his reason, could find out the universe’s form (1968, pp. 41-42).

He also quotes J. Robert Oppenheimer, renowned American physicist, who despite being himself an atheist recognized the debt modern science owes to Christianity. Again, Schaeffer writes:

> Certainly, Renaissance elements and those of the Greek intellectual traditions were involved in the scientific awakening. But to say theoretically that the Greek tradition would have been in itself a sufficient stimulus for the Scientific Revolution comes up against the fact that it was not. It was the Christian factor that made the difference. Whitehead and Oppenheimer are right. Christianity is the mother of modern science because it insists that the God who created the universe has revealed himself in the Bible to be the kind of God he is. Consequently, there is a sufficient basis for science to study the universe. Later, when the Christian base was lost, a tradition and momentum had been set in motion (1983, p. 134).

It is an undeniable fact that modern science grew out of the Judeo-Christian worldview, and although the causal connection cannot be proven, it is reasonable. The belief in a single God, creator of both man and nature, who designed nature to operate according to logical, comprehensible laws and made man in His image, creative and having the ability to understand the logical works of God, provided the philosophical soil in which science could grow and prosper: the expectation that the universe was ordered, logical, reasonable, and that human understanding could grasp its inherent patterns. The giants in the early history of scientific discovery were believers and some even regarded scientific discovery as an act of adoration or worship. A few quotations from the pioneers themselves may be appropriate:

Nicholas Copernicus (1473–1543), mathematician and astronomer, who developed the heliocentric model of the solar system, rightly deciding that the Earth orbits the Sun, rather than vice versa:

> “It is his [the philosopher’s] endeavor to seek the truth in all things, to the extent permitted to human reason by God” (Copernicus, 1972, Preface).
>
> “To know the mighty works of God, to comprehend His wisdom and majesty and power; to appreciate, in degree, the wonderful workings of His laws, surely all this must be a pleasing and acceptable mode of worship to the Most High, to whom ignorance cannot be more grateful than knowledge” (Collins 2006, p. 230-31).

Galileo Galilei (1564–1642), astronomer, physicist, philosopher, mathematician, leading scientist of the Renaissance and “the father of modern science” (Whitehouse, 2009, p. 219):

> "The prohibition of science would be contrary to the Bible, which in hundreds of places teaches us how the greatness and the glory of God shine forth marvelously in all His works, and is to be read above all in the open book of the heavens. And let no one believe that the reading of the most exalted thoughts which are inscribed upon these pages is to be accomplished through merely staring up at the radiance of the stars. There are such profound secrets and such lofty conceptions that the night labors and the researches of hundreds and yet hundreds of the keenest minds, in investigations extending over thousands of years would not penetrate them, and the delight of the searching and finding endures forever" (Hobbs, 1917, p. 443).
>
> "But I do not feel obliged to believe that that same God who has endowed us with senses, reason, and intellect has intended to forgo their use and by some other means to give us knowledge which we can attain by them" (Galileo & Drake, 1957, p. 183).

Johannes Kepler (1571–1630), mathematician and astronomer, whose three laws of planetary motion provided the first mathematical treatment of astronomical data:

> "I feel carried away and possessed by an unutterable rapture over the divine spectacle of heavenly harmony.... We see how God, like a human architect approached the founding of the world according to order and rule" (Krantz & Blank, 2006, p. 126; Tiner, 1977, p. 193).
>
> "I was merely thinking God's thoughts after him. Since we astronomers are priests of the highest God in regard to the book of nature, it benefits us to be thoughtful, not of the glory of our minds, but rather, above all else, of the glory of God" ("Johannes Kepler", 2014).

Isaac Newton (1642–1726), physicist and mathematician, one of the most influential scientists of all time:

> The wonderful arrangement and harmony of the cosmos would only originate in the plan of an almighty omniscient being. This is and remains my greatest comprehension ("Science").
>
> It is the perfection of God's works that they are all done with the greatest simplicity. He is the God of order and not of confusion (Westfall, 1980, p. 326).

Building on the work of his predecessors in the great first scientific revolution, such as Copernicus, Kepler and Galileo, Newton constructed much of the framework of classical mechanics, explaining motion and forces – including universal gravitation—inventing the calculus along the way as he had need of more appropriate and powerful mathematical tools to describe the functioning of the universe. So closely has Newton's name become associated with the successful scientific explanation of the universe, that as an epitaph Alexander Pope wrote the now famous couplet (Dodd, 1875, p. 329),

> "Nature and Nature's laws lay hid in night:
> God said, Let Newton be! — and all was light."

Ironically, although Newton himself was a devout believer and saw in the order of the universe the handiwork of God, today his legacy is seen as primarily the mechanistic, materialistic, and atheistic worldview of modern science. Rosenblum and Kuttner write:

> The most immediate impact of the Newtonian world view was the breakup of the late medieval synthesis of the physical and the spiritual.... Our Newtonian heritage … still molds our commonsense view of the physical world and shapes our thinking in every intellectual sphere (2006, pp. 32-36).

They go on to describe five "commonsense" ideas that characterize the Newtonian worldview: determinism, physical reality, separability, reduction, and "a sufficient explanation." Ironically, all of these commonsense notions are at least to some degree challenged by quantum physics, yet the mechanistic, materialistic worldview implied is still treated as foundational by most scientists. Although Newton himself did not believe in strict determinism, his successors applied it progressively more extensively until the whole universe, including humans, was seen as "clockwork," determined, and mechanistic. The next step was to reject the idea of a creator God, since "a sufficient explanation" for phenomena had been without "need of that hypothesis," a famous phrase attributed to Pierre- Simon Laplace, mathematician and astronomer, who when asked by Napoleon why his book contained no mention of God, is said to have replied « Je n'avais pas besoin de cette hypothèse-là. » ("I had no need of that hypothesis.") ("Pierre-Simon Laplace") It is clear, however, that at no stage were determinism and atheism proven scientifically – nor indeed could this have been done; rather, science came to be practiced using a different set of assumptions, to which we turn now.

## Presuppositions of Modern Science

### Materialism / Physicalism / Naturalism

Materialism, according to The Oxford Dictionary of Philosophy, is the "view that the world is entirely composed of matter. Philosophers now tend to prefer the term physicalism, since physics has shown that matter itself resolves into forces and energy, and is just one amongst other physically respectable denizens of the universe" (Blackburn, 1996). Physicalism, in turn, is defined as the "view that the real world is nothing more than the physical world.

The doctrine may, but need not, include the view that everything that can truly be said can be said in the language of physics." Naturalism is explained as "sympathy with the view that ultimately nothing resists explanation by the methods characteristic of the natural sciences.... It leaves the mental side of things outside the explanatory grasp of biology or physics."

Since scientists study the material, visible world, it is expected and inevitable that scientific explanations of one phenomenon involve other material, visible objects and phenomena; but the more radical claim that only the material exists cannot be substantiated by physics. It is like a colorblind person claiming that color does not exist because he cannot see it. Worse, proponents of strict materialism have conveniently ignored the introduction of first invisible and later nonmaterial entities in scientific theory (such as atoms and subatomic particles, forces in classical physics, the space-time metric in general relativity) or have quietly expanded their definition to accommodate the unseeable and nonmaterial, all without changing or even examining the more basic assumption. Materialism is ultimately an axiom of its proponents, not a result of science. Appeals to science to "prove" one of its assumptions can be considered little more than circular reasoning. The *a priori* exclusion of the supernatural in doing science leads to preselecting and discarding data to fit the naturalistic model.

On the other hand, it must be acknowledged that science has done an amazingly good job of explaining the universe in its own terms. The explanatory power of scientific models and the success of science in general can lead us (by induction) to rely increasingly on this technique, providing confirmation (although never proof) of its validity or at least its usefulness. It is only logical to continue using the methods of science to accomplish as much as we can by means of them, unless or until a logical contradiction is reached. The risk lies in claiming proof where no proof exists and the confounding of assumption with proof or evidence. Rather, the axiom should be recognized for what it is: one possible explanation, a working hypothesis that those so inclined may tentatively adopt for the purposes of testing its explanatory power. Such activity in no way threatens those who adopt an alternative position, i.e., that the universe may contain more than matter (and energy, and forces, and space-time curvature, etc.) and that although science lends itself to the study of the physical universe, other means may lead to knowledge of the non-material.

## Atheism

Atheism is the disbelief in God or, more generally, in the supernatural. The tacit assumption is that if we can explain the universe sufficiently well, there is no need to invoke the existence of a Creator God to account for its existence. When stated baldly the weakness of the idea is clear: my ability to explain something does not guarantee that I have any actual power over the process, nor does it rule out the existence of other agencies that *do* have that power. Atheism is part and parcel of the naturalistic presuppositions discussed above. After learning or developing "natural" explanations for various phenomena, the atheist consciously or unconsciously generalizes that no supernatural agent will ever be needed in our explanations, and may even believe that the existence of the supernatural has been disproved. Of course, nothing could be further from the truth: the great leaders in modern science quoted above quite reasonably saw the logic and pattern visible in nature as evidence that God planned it, that He formulated the rules by which the universe operates and is Himself the source of all that is. Nothing we have learned since rules out this worldview. In any case, we again have alternative possible assumptions, assumptions that are not proven by science but are used as foundational in the process of "doing science."

## Does Science Prove Atheistic Materialism?

As already clear from the above discussion, science does not prove the atheistic materialistic worldview. Three main points have been made and a fourth may be added:

- Science does not prove atheistic materialism: science does not actually prove anything, but only finds possible models;
- The "modern scientific" worldview is an assumption used in doing science today, not a result proven by it. Assumptions cannot in any case be proven by (circular) reasoning based on them (more on this below, in the section "The Limits of Reason");
- A theistic foundation of science is quite viable: Newton himself did not espouse the deterministic view of nature later called "Newtonian," nor did most of those influential in the birth of science, i.e., 50 of the 52 most significant contributors to the scientific revolution (Stark, 2003, pp. 160-163, 198-199); and

- Newtonian physics has actually been disproved and replaced by quantum physics in the course of the second scientific revolution, and although there is still wide disagreement about all of the philosophical implications, it is now clear that no deterministic, reductionist, materialistic worldview can be brought into agreement with it, making it difficult to understand some scientists' almost obsessive clinging to the atheistic assumption, which was introduced together with and was considered to mutually support the other (now disproved) assumptions.

One might consider the naturalistic mindset to be "the price of doing business" for the scientist: In the process of seeking explanations for natural phenomena, it is only natural to look for natural causes – that is our job. This can be motivated by the belief that only natural (non-supernatural) causes exist or it may be based on faith in the reasonableness of an ordered universe designed by a being higher than ourselves, but since the order in the universe has been used to bolster both the theist and the atheist view, it is not in itself a definitive argument. We must allow both alternative systems, based on mutually exclusive axioms, to develop independently to the point where (possibly) one reaches a contradiction and must be abandoned. Meanwhile, in no way can it be considered that science has excluded God. It can just as well be said that science has shown us God's signature on the universe.

## The Limits of Reason

Reason or rationality has justly been seen as the foundation of science and a powerful tool for the discovery of truth in its own right. René Descartes wrote,

> For since God has endowed each of us with some light of reason by which to distinguish truth from error, I could not have believed that I ought for a single moment to rest satisfied with the opinions of another, unless I had resolved to exercise my own judgment in examining these whenever I should be duly qualified for the task (Descartes, 1637).
>
> [A]nd thus I comprehend, by the faculty of judgment alone which is in the mind, what I believed I saw with my eyes (Descartes, 1641).

Descartes attempted to use rational thinking and reasoned argument to prove the things he believed; or rather, he attempted not to believe anything until he could prove it, beginning with his famous dictum, "I think, therefore I am," and going on to argue for the existence of God. This extreme attempt was doomed to failure, as can easily be seen in retrospect. It was only necessary to apply rationality to its own study to find that it has limits. These differ depending on the type of reasoning.

### Induction

Inductive reasoning is the process of generalizing from specific cases, identifying patterns in the data and creating general rules that explain them. The general rules can then be applied to other cases to see whether they apply to them also. The rules are not proven by this testing: only in the case of a finite data set can a generalization be proven by example, and then only if all cases have been tested. Obviously this is not practical for most situations and impossible for rules that purport to be applicable for an infinite number of cases, although for a finite or countably infinite data set we may still be able to use mathematical induction. The discovery of a counterexample may invalidate a proposed general rule, but repeatedly finding examples for which the rule works only "confirms" it in the sense that the rule remains a viable explanation, while some other, competing explanations may have been eliminated by counterexample. This is the first weakness or problem with inductive logic, if problem it be: It does not provide proof. Clearly the scientific method is inductive in nature, considering as evidence individual experimental results, trying to formulate rules that may be widely applied.

Consider the generalization, "All crows are black." How could this be proven? I can collect data, noting the color of each crow I see, looking for patterns to explain the data. I may hypothesize that all crows are black and continue to collect data that appears to confirm the hypothesis, which I may eventually refer to as a theory or even as a natural law. After many years I may move to India and discover that there no crows are black: all are either black and white, or gray and white, disproving my generalization long after I had come to rely on it. Indeed, this is exactly what happened to the author at the age of 11, when his family moved from the USA to India.

Other possible problems with an inductive argument are:

- hasty generalization—generalization based on too few facts;
- non-representative data: data taken from only a limited subset, so a counterexample could appear at any time; and
- *post hoc* fallacy ("*post hoc ergo propter hoc*")—assuming that temporal succession is evidence of causal relation.

The probability of these occurring can be reduced by experiments with appropriate controls and statistical sampling of the data. But still, any correlations found have an associated probability, the relationship is never proven, and it cannot in any case be assumed to be causal.

Inductive logic, like science, gives possible explanations, not proof. Although incredibly useful – and indeed, we must use it constantly in order to function, using generalizations rather than affronting each situation, every datum, as new – the main problem with induction is that we are tempted to believe implicitly in theories that are not and cannot be proven – and may even be false.

## Deduction

Deductive reasoning is the process of obtaining logically valid conclusions from a set of premises by applying rules of inference. (Blackburn, 1996) The premises and other statements of the system may be expressed in natural language or using an agreed upon set of mathematical/logical symbols. Both premises and rules of inference can be thought of as "givens," assumptions that are used to prove other statements but cannot themselves be proven by the system. Below is a standard example of a syllogism, a form of valid deductive reasoning:

All men are mortal.

Socrates is a man.

∴ (Therefore) Socrates is mortal.

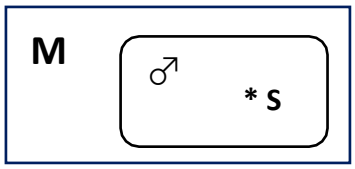


*Figure 1 Venn diagram of syllogism*

If the first two lines (the premises) are true, then the conclusion (third line) must also be true. This can be visualized in terms of the accompanying Venn diagram (Figure 1 Venn diagram of syllogism), showing Socrates (S) as one member of the set of men (♂), the set of men being a subset of the set of mortal things (M). Again, the logical conclusion follows immediately.

France is in Europe.

Paris is in France.

∴ Paris is in Europe.

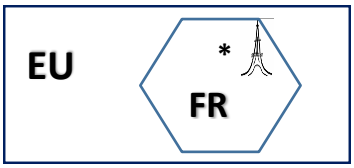


*Figure 2 Paris in France in Europe*

A second example follows the same pattern, and so again, if the premises are true (France is in Europe and Paris is in France), the conclusion (Paris is in Europe) must also be true. But in a logical argument one or both of the premises may be false, in which case we are not required to accept the conclusion, *even if the logic is valid*. Here are some examples (with true statements in bold for easy identification):

*Table 1 False premises with valid logic*

| | | | |
|---|---|---|---|
| USA is in Europe | France is in Europe | France is in Asia | USA is in Europe |
| Chicago is in USA | Chicago is in France | Chicago is in France | Paris is in USA |
| ∴ Chicago is in Europe | ∴ Chicago is in Europe | ∴ Chicago is in Asia | ∴ Paris is in Europe |

Although the logic is valid in all these cases, the conclusion does not have to be true since at least one premise is false. In the fourth case the logic is valid, both premises false, and the conclusion true anyway! But it is more common to encounter true premises and invalid logic, as in these examples:

*Table 2 True premises with invalid logic*

| | | | |
|---|---|---|---|
| All men are mortal | All dogs are mortal | France is in Europe | France is in Europe |
| Zoe is mortal | Socrates is mortal | Berlin is in Europe | Paris is in Europe |
| ∴ Zoe is a man | ∴ Socrates is a dog | ∴ Berlin is in France | ∴ Paris is in France |

Since the logic is faulty in all of these cases – shown here by the bar through the symbol "∴" and the zigzag "bottom line", the conclusion does not logically follow from the true premises and may be false (frequent occurrence) *or* true (as in the last case above).

We can reduce the possibility of incorrect reasoning by carefully examining the logical steps of each argument. This verification is a basically mechanical process and can be done unambiguously: A computer can even be programmed to generate theorems (proven statements) from initial axioms, using agreed-upon rules of inference. In fact, there is a significant and growing overlap between the fields of propositional logic and computer science, or more specifically, information theory and artificial intelligence. This has clarified the process of deduction but also highlights the arbitrary nature of the set of axioms and inference rules: Different rules or axioms would generate (prove) a different set of statements. This may make deduction appear to be little more than a game with arbitrary rules, unconnected with the search for truth. In the same way the axiomatization of geometry and, later, of other areas of mathematics eventually led to a changed understanding of the purpose and meaning of mathematics. No longer were mathematical results seen as inevitable, necessarily true, and proven; now they were only the well-formed formulas generated in a game whose goal was to generate as many formulas (theorems) as possible from a minimal set of axioms, a mathematical game with no obvious connection to truth or the observable universe.

This showcases twin problems of deduction: First, the inability of any deductive system to prove its own assumptions, including its axioms and inference rules. This even applies to our own "logical" thinking, as closely as we can model it. We can prove the results of our assumptions but must always start somewhere. Our results are only proven true if the unprovable initial assumptions were true, and this we cannot prove. Insofar as the exercise reflects anything real, the assumptions must be accepted by faith. So we find that reason is unable to replace faith but must instead rely on it at a very basic level.

The second problem is related to the abstraction of the deductive process, which becomes little more than a mathematical game or the output of a computer program printing combinations of symbols ultimately devoid of meaning. The very arbitrariness of the choice of assumptions may tempt us to think that there is nothing special about our own logical thinking, leading us to embrace relativism and to abandon belief in any absolute truth. Yet this is a superficial reaction. After all, even the question of whether a given conclusion can be deduced from a particular set of axioms is an absolute. One answer is not "just as good" as the other.

We can continue to use logical thinking but only by faith. It is up to us to choose our axioms, the tenets of our faith. The quality of our choices might be judged by how well our "proofs" reflect truths we know from other sources. In effect, we must use induction to select good axioms for our deduction, and induction does not provide proof!

## Truth vs. Provability: Gödel's Theorem

One of the greatest shocks to the mathematical and philosophical world occurred in 1931 when the young Austrian mathematician Kurt Gödel published his famous Incompleteness Theorems in "Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme" ("On Formally Undecidable Propositions of Principia Mathematica and Related Systems") (Gödel, 1931), proving for any sufficiently powerful system of logic or propositional calculus, that (1) if the system is consistent, it cannot be complete, and that (2) the system cannot prove its own consistency. This dealt a death blow to the still ongoing effort of David Hilbert, Bertrand Russell, Alfred North Whitehead, and other eminent mathematicians of the day, to show that a consistent and complete theory of mathematics, set theory, and logic could be based on a reduced set of axioms. That they experienced difficulties is no surprise in retrospect, but at that time it was considered only a matter of time until the program would be successful, and Gödel's theorem struck like a philosophical bombshell. Not only would any consistent formulation of mathematics be forever incomplete but its consistency could not be proven using the available tools of the system.

The "sufficient power" condition mentioned above is roughly that simple arithmetic can be modeled in the system, so it applies to all but severely limited propositional systems and certainly includes any model we form to describe our process of proof and logical thought. But "incompleteness" is not in itself such a terrible fate. It simply means that there will be true statements expressible in the system that the system cannot prove. Gödel devised a method for encoding statements as numbers and then used this "Gödel-coding" to create self-referential statements (that refer to themselves by number), including such statements as "G is not provable in the system." If false, G would be provable and therefore true, so by contradiction it cannot be false. There is no such inconsistency if G is true, yet we now must distinguish between "provable truths" and "unprovable truths." Taking such a true but unprovable statement as an additional axiom does not help in the slightest; the new axiomatic system has its own "Gödel statements." Logic has proven that logic has limits: some true things cannot be proven – and we can prove that! Logic can still be used to prove many things, and subject to the truth of the axioms chosen those proofs are still valid; but proof can never again be thought to be the only means of finding truth.

This breakthrough should have sent philosophers back to the drawing board to consider the implications of accepting a different worldview, one including the possibility of the supernatural, the self-revelation of the God-Man who said, "I am the way and the truth and the life. No one comes to the Father except through me" (John 14:6 New International Version). Not that the limitations of logic prove the validity of any particular religion, but the existence of truth beyond what can be proven by logic – or found by science – should force every intellectually honest person to consider scientism and its assumptions to be effectively disproven.

## Inconsistent and Consistent World-Views

### The Unreasonableness of Pure Reason (Alone)

The inconsistency of continuing insistence on logical proof or "scientific demonstration" for all truths is now clear and should lead to a re-evaluation of the assumptions of scientism, including the assumptions of atheistic materialism. Reason has shown that reason is incomplete, yet since reason works well in a limited sphere, an obvious and consistent alternative worldview is that of the giants of scientific discovery: that reason, like the creative impulse and life itself, is given to Man by the infinite Creator God, "with whom is no variableness, neither shadow of turning" (James 1:17 King James Version). Eternal constancy is an attribute claimed by the Deity, who says, speaking through the prophet Malachi, "I the Lord do not change" (Malachi 3:6 NIV). The author of the book of Hebrews ascribes the same constancy and consistency to the second Person of the Godhead: "Jesus Christ is the same yesterday and today and forever" (Hebrews 13:8). Perfection and complete consistency is God's alone, our limited human application of His gifts allow us to "think God's thoughts after Him" to a limited but still very real way. Science again is seen as a useful but limited exploration of God's universe and what from the viewpoint of naturalism is seen as the "unreasonable effectiveness of mathematics" (Wigner, 1960) in explaining the workings of the universe again makes sense. Our ability to understand is real and intelligible because it derives from the Creator God but limited because we are finite, fallible creatures. Science and reason do not conflict with a belief in God, but their incompleteness rules out sole reliance on reason and science, leaving theism as a viable worldview for the scientist. We next turn to further implications of atheism to consider whether it remains a possible internally consistent option at all.

### Mind Over Matter: The Downfall of Materialism

The deterministic worldview of Newtonian physics is taken to its logical extreme in Laplace's famous thought experiment:

> We may regard the present state of the universe as the effect of its past and the cause of its future. An intellect which at a certain moment would know all forces that set nature in motion, and all positions of all items of which nature is composed, if this intellect were also vast enough to submit these data to analysis, it would embrace in a single formula the movements of the greatest bodies of the universe and those of the tiniest atom; for such an intellect nothing would be uncertain and the future just like the past would be present before its eyes (1902).

The Heisenberg uncertainty principle in quantum physics shows the impossibility of simultaneous measurement – or even knowledge – of conjugate variables such as position and momentum. Therefore, the "present state of the universe," including all positions and velocities of all particles, cannot be known. Even after the advent of quantum physics, great efforts have been made to retain a deterministic view of the universe, and many social scientists continue to cling to behaviorism, a deterministic view applied to humans. There is an inherent paradox here, since in a truly deterministic universe all human actions, all thought, would be predetermined. Even the belief in determinism (or its denial) would be determined and would have no connection whatever to the truth or falsity of the idea itself. Thought itself becomes meaningless. Belief in determinism should be discarded for this reason alone, even without the evidence from modern physics.

It may also be mentioned that retaining the assumption of materialism while replacing determinism by non-causal quantum probabilities is also problematic. If my thoughts are either determined or chaotic, there is still no place for free will, choice, or self-determination, and no way to discuss the truth of my beliefs, which are either causally determined or random. Belief in a purely materialistic universe is self-contradictory or meaningless. Even logic loses its foundation entirely if one cannot be sure whether belief is due to the correctness of logical deduction or the results of deterministic or probabilistic physics. There are no self-consistent answers for the problems of metaphysical, moral, and epistemological necessity, other than that He is There and He is Not Silent, as Francis Schaeffer argues in his short but powerful book of that name (Schaeffer, 1972).

"Leap of Faith"

But it is equally incorrect to see reason and science as discredited, to see their limitations as inconsistency and to insist that only faith is important. Again, science and logic are not inconsistent if based on a foundation of theism, but following Kierkegaard in merely replacing incomplete reason by a completely irrational act of faith is a recipe for philosophical disaster. Such an irrational "leap" is likely to be in the wrong direction, leaving the seeker after truth worse off than relying on reason alone. The frequently seen distrust of science on the part of conservative Christians is an irrational, although perhaps understandable, overreaction to the unfounded claims of scientism.

## "Consider and Understand"

In Isaiah chapter 41, the prophet looks forward to a time when God will save His people, changing the desert into a fertile home for them, giving evidence of His power and love, "so that people may see and know, may *consider and understand*, that the hand of the Lord has done this, that the Holy One of Israel has created it." (Isaiah 41:20 NIV) [emphasis added] In the same way we should consider all the works of God, not only to see, but to attempt to understand, to use the mental faculties given us by the loving Creator. Our understanding is limited: God's own logic and reasoning powers are far superior to our own, and this is emphasized later in the same book, where God says, "As the heavens are higher than the earth, so are my ways higher than your ways and my thoughts than your thoughts" (Isaiah 55:9 NIV). But our reason is a gift of God, and throughout Scripture God interacted with humans in ways not only to encourage their faith but also to engage their God-given reasoning powers. We, like Galileo, should "not feel obliged to believe that that same God who has endowed us with senses, reason, and intellect has intended to forgo their use." God expects faith, yes, but a reasoned faith, a faith based on experience and a relationship with Him. Far from being incompatible with it, biblical Christianity gives a consistent intellectual basis, motivation, and meaning for science as an exploration of the wonders of God's created universe, an exploration that is itself an expression of praise to our Creator. Psalm 104 eloquently expresses this in a hymn honoring God as Creator:

> Bless the Lord, O my soul! O Lord my God, You are very great: You are clothed with honor and majesty, ... Who stretch out the heavens like a curtain..., who laid the foundations of the earth.... O Lord, how manifold are Your works! In wisdom You have made them all. The earth is full of Your possessions.... I will sing to the Lord as long as I live; I will sing praise to my God while I have my being.... Bless the Lord, O my soul! Praise the Lord! (Psalm 104:1,2,5,24,33,35 NIV)

This, then, is a solid foundation for true science. Rather than pursuing the peripatetic peregrinations of impersonal matter-energy governed by blind forces, we study the amazing creation of the infinite personal Artist. There is purpose to our study, joy in the process, and meaning in the results. Our understanding may be forever limited, but insofar as our finiteness permits, because of the creativity and reason implanted by the One in whose image we were created, we can, like Kepler, "think God's thoughts after Him."

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