Science Discovers God

Seven Convincing Lines of Evidence for His Existence

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Dedication

To my very patient wife, Lenore.

She, more than most, realizes that when one writes a book, almost everyone within the sphere of influence of the author also suffers!

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Preface

Is there any meaning or purpose to human lives? Does God exist? If He does, why does He permit so much suffering? And do we have to believe in Him? After all, hasn't science been able to explain most things without having to invoke God? Our deepest thoughts struggle with such questions as we search for answers about our origin, our purpose for being, and our ultimate destiny. Few are able to ignore these perplexing enigmas as we contemplate the mysteries of our being and the universe we live in. The issue of whether God exists or not is one that simply will not go away.

Fortunately, when it comes to ultimate questions about origins, all is not conjecture. In recent years scientists have made a number of remarkable discoveries that reveal such precision and complexity in the universe around us that it is becoming very difficult to suggest that everything resulted just from chance. It looks as if a very perceptive God had to be involved in designing the marvelous intricacies that we find everywhere in the universe.

Some scientists will immediately insist that science cannot consider God, because it and God represent separate realms of thought. Unfortunately, such a view imposes a narrow outlook on science that limits its ability to find all truth. Science cannot discover God and His role as long as it excludes Him from its explanatory menu. If science hopes to provide meaningful and truthful answers to our deepest questions, it needs to get out of the prison of secularism in which it has now trapped itself. Science should be open to the possibility that God exists and not exclude Him as belonging only to another realm of inquiry. *This book approaches the question of God's existence from the perspective that science is—or at least should be—an open search for truth, and that we will allow the data of nature to direct us wherever it may lead.* Frequently science itself indulges in various speculations and hypotheses, such as the existence of other universes beyond ours or of life originating all by itself. To be consistent, science should also be willing to consider the possibility that there is a God. Such open-mindedness could be important in case God does exist.

It is interesting that the pioneers of modern science, such as Kepler, Galileo, Boyle, Pascal, Linné, and Newton, all included the concept of God in their scientific outlook. They often spoke of Him, and they considered their scientific investigations as the continuing discovery of the laws that He had created. Those

intellectual giants demonstrated how science and an awareness of God can work together as we study nature. Since that time science and God have gone separate ways, and at present science essentially ignores the concept of a deity. Furthermore, some scientists are deeply concerned that a religious takeover of society would seriously hamper science. On the other hand, we find suggestions of a renewed interest in God on the part of some scientists and other academicians. This has resulted in part because of recent significant discoveries such as the very exact values necessary for the basic forces of physics, and the extremely complex biochemical pathways of living organisms. Such findings raise grave doubts about any suggestion that they just happened to have come about by chance, and it is becoming more reasonable to believe in the existence of a God behind the origin of the universe than in the extreme improbabilities we have to postulate for a universe that came into being on its own.

This book follows the broad approach that I believe is essential to provide the comprehensive view that the question of God's existence deserves. Because the most significant challenges to His existence have come from science, the discussion focuses essentially on scientifically related topics. In order to help the general reader evaluate the findings and conclusions of science, I have included a number of accounts of how scientists make their discoveries, especially those details that seem to touch on the question of God's existence.

This book starts with a brief historical review that leads us to the surprising fact that four out of 10 scientists in the United States believe in a personal God who answers their prayers. The paradox is that very few, if any, of those same scientists will discuss God in scientific journals and textbooks. What many scientists believe in and what they publish about when they take a scientific stance, can be quite different things. The book then discusses a number of key issues related to God's existence. These include the intricate organization of the matter of the universe and the precision of the forces of physics. Then a number of biological topics will follow, including the origin of life, the genetic code, and such complexities as the eye and the brain. Next we will consider the problem that time poses for evolution when we analyze the fossil record. It turns out that the suggested geologic eons are totally inadequate for the various explanations postulated.

The last third of the book addresses the intriguing question of why, in the context of so much data that seems to require a God in order to explain what we see, scientists still remain silent about Him. We will broach that question from the perspective of both the sociological strength of dominant ideas, such as evolution, and the exclusiveness and elitism of a highly successful scientific enterprise. The conclusion of the book is that science is providing abundant

evidence that there is a God. The hope is that scientists are going to allow Him back into the scientific perspective, as once was the case for the pioneers of modern science.

This book deals mainly with two strongly contrasting worldviews. On the one hand, we find those who limit reality only to what they can simply observe in nature. For them, that is essentially all there is. This fits closely with the current scientific mindset or ethos that excludes God. Others believe there exists a transcendent reality above the currently observable. Such a view would mean that our existence does have ultimate meaning. The Being who designed us has endowed us with such attributes as consciousness, understanding, concern for others, and a sense of justice. In other words, there is more to reality than simple observable matter, and our existence has purpose to it. Whichever of these two approaches we adopt has a profound effect on our worldview and personal philosophy. This treatise proposes that the current separation between these two contrasting worldviews is not valid. The data of science itself is essentially forcing us to conclude that something unusual is going on, and that it looks as if a knowledgeable and transcendent God was involved in creating the complexities that scientific observation keeps uncovering.

Is this book objective? Is it free of bias? Unfortunately the answer in both cases is no. Who can claim complete objectivity? On the other hand, I have made every effort to be fair to the data and have paid special attention to the best data. I then invite readers to draw their conclusions on the basis of the data and not just generally accepted inferences. This book is not simply a survey of prevailing interpretations. Some conclusions are not mainline. If we are going to improve on accepted views, we have to be willing to escape from them.

Several terms in the text, such as "truth," "science," "religion," "God," "evolution," and "creation," are vital to the dialogue, but have varied use and meaning. I invite the reader to use the glossary at the end of this book to clarify their meaning as used in this discussion. In some cases I have identified special use in the text.

Having spent more than 50 years dealing with the controversy between science and religion, I very much realize how emotionally laden the worldview issues that delineate one's personal philosophy can become. I am also fully aware that some will find my approach unpleasant. For this I am sorry. We all have much to learn from each other, and I would urge those with different views to keep communicating and contributing to humanity's total fund of knowledge.

Ariel A. Roth
Loma Linda, California

A Note About Large Numbers

I realize that some readers have an aversion to numbers. While I am fascinated with them, I have tried to keep them to a minimum. Occasionally I have had to use extremely large numbers. For quick general comparison, instead of writing out such long numbers, I simply use the common convention of using a superscript number after the ordinary number 10 to indicate the number of zeros present (powers of 10). The following examples illustrate the system.

$10^1 = 10$
$10^2 = 100$
$10^3 = 1{,}000$ = a thousand
$10^4 = 10{,}000$
$10^5 = 100{,}000$
$10^6 = 1{,}000{,}000$ = a million
$10^7 = 10{,}000{,}000$
$10^8 = 100{,}000{,}000$
$10^9 = 1{,}000{,}000{,}000$ = a billion
$10^{10} = 10{,}000{,}000{,}000$
Etc.

The little superscript number simply gives the number of times the number 10 is multiplied by itself, and is the same as the number of zeros if I had written the number out the ordinary way. This saves the reader from having to count all the zeros in large numbers, and makes for easier comparisons. For instance, you can easily see that 10^{19} has two more zeros than 10^{17} without having to count all the zeros had they been written out.

In this system the reader needs *especially* to keep in mind that each zero multiplies the number by 10—hence 10^3 (1,000) is 10 times larger than 10^2 (100); and similarly, 10^7 (10,000,000) is 1,000 times smaller than 10^{10} (10,000,000,000).

Chapter One

Can a Scientist Dare to Believe in God?

Science without religion is lame, religion without science is blind.[1]

—Albert Einstein

NEVER AT REST

Deeply committed to religion, he wrote extensively about the biblical prophecies of Daniel and the Apocalypse. A member of a commission to build 50 new churches around London, he helped in the distribution of the Bible to the poor.[2] Was he a pastor, a theologian, or an evangelist? No, he was none of them. Instead, he was the individual that many consider to be the greatest scientist of all time. Sir Isaac Newton stood head and shoulders above the other minds of his time as he helped lay down the firm foundations of modern science. Both a profound reverence for God along with a relentless devotion to thorough scientific investigation distinguished his life.

Isaac Newton (Figure 1.1) came into the world as a Christmas Day present in 1642, but unfortunately his father had died three months earlier. He was apparently premature at birth and so small that he could fit in a quart pot. Paradoxically, his meager beginnings from an uneducated and undistinguished family background produced the dean of philosophers of his time. His father, though no pauper, reportedly could not sign his own name. Isaac's childhood was a mosaic of experiences characterized by his insatiable desire to calculate the best design for all kinds of devices such as kites and sundials. Because he loved books and had few friends, preferring study to socializing, people did not always understand or appreciate him. When he left home to become a student at Cambridge University, the servants rejoiced at his departure, commenting wryly that he was fit for nothing but the university.[3] Described as being "never at rest," [4] he tended to work alone and in-

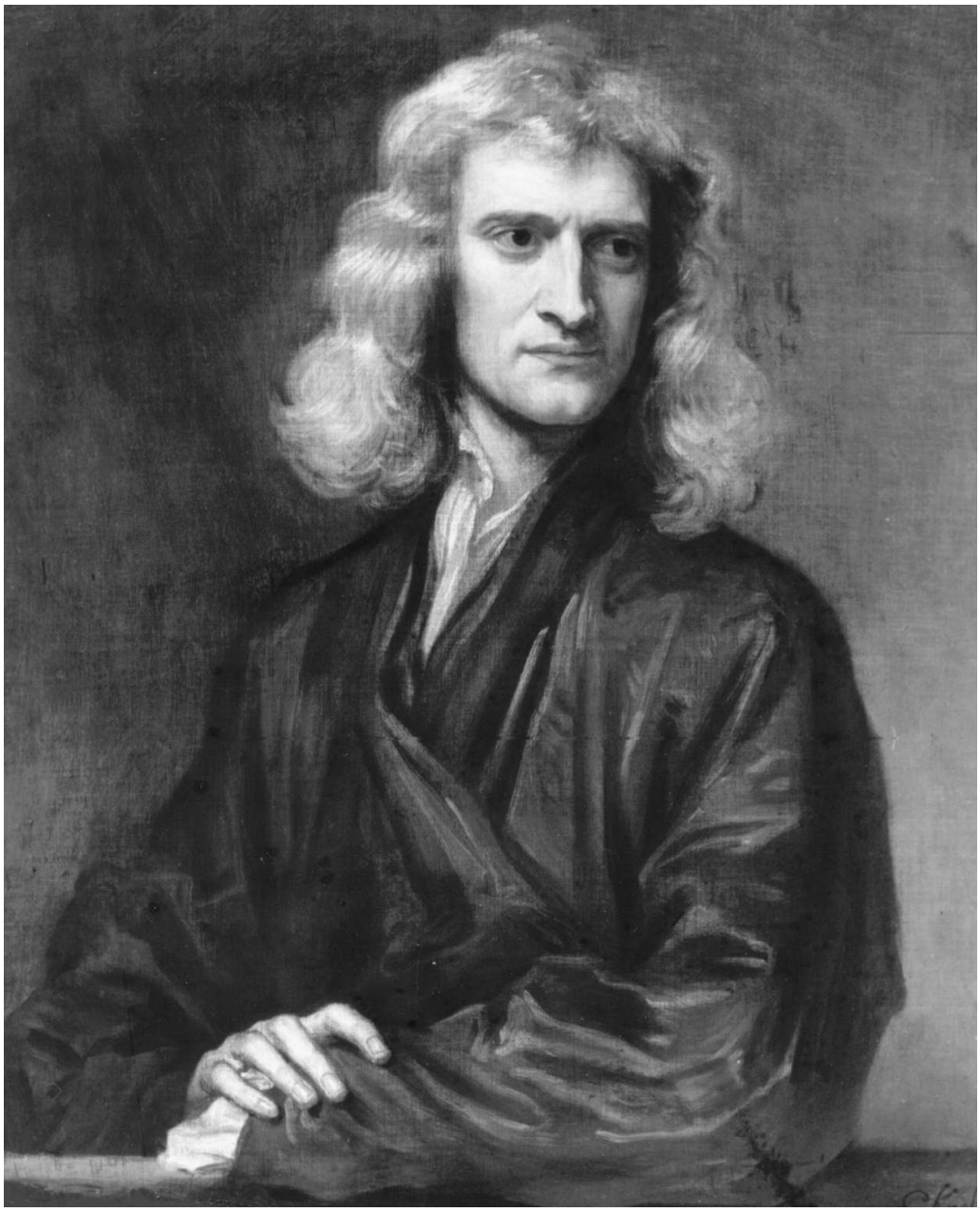

Figure 1.1 *Sir Isaac Newton. From a painting by Sir Godfrey Kneller around 1689.*
By kind permission of the trustees of the Portsmouth Estates.

tensely on his various projects, sometimes forgetting to eat or sleep.

At Cambridge Newton immediately distinguished himself, and soon became a renowned member of the faculty. He sent to the Royal Society in London a novel kind of reflecting telescope that he had made (Figure 1.2). It caused

a great sensation, generating considerable enthusiasm, and soon caught the attention of the leading astronomers of Europe. Shortly thereafter Newton gave the Royal Society thoroughly prepared documents about the properties of light and color that received much appreciation. Because he was reticent about presenting new ideas, years would often pass between the start of a project and when he would let others know about it. He released only a little of his work, "but each portion was an imperishable monument to his genius."[5]

It was probably inevitable that a highly successful but young scientist should draw some criticism from the old guard, and in Newton's case that did not take long. Several controversies developed, and historians have made much of them. Newton could be a formidable foe. After he had spent years on his discoveries, he sometimes found it difficult to be patient with those who had hardly thought at all about his new ideas or did not understand them but instead chose to oppose them.

A famous and prolonged conflict developed between Newton and Robert Hooke, the curator of experiments at the Royal Society. Hooke was no ordinary scientist, bordering on the genius level himself. Furthermore, he had written the treatise *Micrographia,* which also dealt with light and optical topics. Hooke considered himself the final authority on many things and had the obnoxious habit of claiming that he had made most discoveries himself. When the Royal Society in London discussed Newton's ideas and discoveries, Hooke quickly asserted that most of Newton's ideas had already appeared in his *Micrographia.* Newton, who was not there but in Cambridge, eventually pointed out that most of Hooke's concepts about light came from the famous French scientist and philosopher René Descartes! With all the tact of an uncoordinated walrus, Hooke patronizingly suggested to Newton that, as a novice, he should continue to work on telescopes, and leave the field of experimental light to those who had already developed satisfactory concepts.[6]

A severe controversy began brewing. In London secret meetings of the nation's leading intellectuals convened at a popular coffeehouse. They met to discuss Newton's ideas, with Hooke concluding, as expected, that the younger man had adopted some of Hooke's own ideas.[7] The participants also disputed the nature of light, an issue that remains somewhat unsolved to this day. Also they considered the question of what causes different colors of light. Newton, who had performed a multitude of experiments on the topic, briefly

Figure 1.2 *The reflecting telescope that Sir Isaac Newton built and gave to the Royal Society in 1671.* *By kind permission of the Royal Society. © The Royal Society.*

dismissed Hooke's arguments as invalid. The controversy continued for years until Hooke's death. "To Hooke," one historian summarizes, "Newton was a fearsome rival; to Newton, Hooke was nothing more than an intolerable nuisance, a skulking jackal unfit to feed among the lions."[8]

Others, besides Hooke, also challenged Newton's light concepts. On the main European continent an elderly Jesuit teacher at Liège in Belgium, who called himself Linus, took issue with Newton's ideas about colored light. He had experimented with prisms, as Newton had, and held that clouds in the sky caused the various colors of light. When Linus communicated his views to the Royal Society, Newton replied with instructions on how to conduct a crucial experiment that would settle the dispute, and he urged that the Royal Society try it. Further correspondence from Liège indicated that Linus had died, but that his very loyal pupil, John Gascoines, was ready to take up the battle against Newton. Suggestions that Newton had performed his experiment only once reflect on both a pathetic ignorance of the scientist's thoroughness and the superficiality of the comments from Liège. The Royal Society, with Robert Hooke present, finally performed the crucial experiment that Newton had suggested, and we can surmise that Hooke was not enthusiastic about the outcome.[9] The results were exactly as Newton had predicted. One would think that this would have quieted the objections from Liège, but it didn't. Another professor, Anthony Lucas, took up the battle against Newton, but it soon became obvious that Lucas and Newton operated at two widely different levels of objectivity. Finally Newton requested that letters from Lucas no longer be passed on to him.

Even more famous is the battle between Isaac Newton and Gottfried Wilhelm Leibniz. It involved the issue of which of them had first discovered the complex mathematical procedures of calculus. Soon the disagreement reached international proportions. Leibniz in Germany had a retinue of supporters, mostly on the main European continent, while in England the Royal Society served as a loyal base, endorsing Newton as the inventor. Both scientists had been accused of stealing calculus from the other. The enigma, which historians have investigated ever since, still lacks a few factual details that would permit final resolution. In general, scholars agree that most likely both invented calculus independently,[10] Newton before Leibniz, but Leibniz being the first to publish his findings (the calculus symbols that he developed are still the ones taught today). As the conflict intensified, Newton's camp claimed that Leibniz refused to acknowledge an early letter he had received from Newton that suggested calculus. On the other hand, some have claimed that Newton influenced in his favor the reports from the Royal So-

ciety that indicated that he had invented calculus long before Leibniz. Newton was president of that prestigious organization during the last 24 years of his life as the feud continued. As for Leibniz's calculus, Newton was of the opinion that second inventors count for nothing.

One can rightly accuse Newton of being a recluse, especially during his earlier years, and although he shied away from confrontations, he did not hesitate to use the force of his intellect and position to minimize the work of those who opposed him. Yet he also had a kindly side to him. When his half brother became ill with a malignant fever, his mother nursed him to health, but she eventually came down with the fever herself. When he learned what had happened, Isaac left Cambridge and hurried to her home to take personal charge of her care. One of his relatives reports that Newton stayed up whole nights with her, giving her physical treatments, dressing her blisters with his own hands, thus using that manual dexterity for which he was so famous, to lessen the pain.[11] But all his efforts could not stop the devastating disease, and she eventually died. While his mother's second marriage and the fact that she did not bring him up had strained family relationships, he still proved to be a loyal and dutiful son. As executor of her will, he saw to it that she was buried next to his own father whom he had never seen.

Newton, who was reticent to publish anything, eventually published the results of many years of study in his *Principia*[12] which has been hailed as "perhaps the greatest event in the history of science—certainly the greatest till recent years."[13] Furthermore, "no living persons could challenge its originality or power. Newton had become the admitted dictator of scientific thought, and there was no one able to cross swords with him."[14] The importance of the three-volume *Principia* is that it introduced an unprecedented and very high level of observational and mathematical rigor to science, thus dramatically improving respect for such studies. Newton placed the discipline on a much firmer foundation than it had had in the past. *Principia* is full of mathematical deductions, covering topics such as gravity, celestial mechanics, comets, the moon, tides, the motion of fluids, and the laws governing them. His studies dealt a deathblow to the popular grand cosmological system developed by the great French mathematician and philosopher René Descartes, who is renowned for the famous saying, "I think, therefore I am." Descartes proposed that the planets move by the ac-

tion of rotating vortices in an ether, or medium, that extends throughout the whole universe. Newton's elegant calculations, showing how gravity explained many details of the precise rotation patterns of planets, eliminated any need for Descartes' ideas. At the end of the second edition of *Principia* Newton added some concluding remarks under the title *General Scholium*. Here some of his religious fervor also comes to light as he gives credit to God as Creator, commenting that "this most beautiful system of the sun, planets, and comets could only proceed from the counsel and dominion of an intelligent and powerful Being."[15]

Newton also eventually published the result of his many investigations on light and optics. It appears that he had much of it prepared when one day upon returning from chapel at Cambridge he found that a candle had started a fire that had burned his manuscript and other very valuable documents. The loss so disturbed him that it is reported that he was not himself for a month. Some have described it as a mental breakdown, while others totally disagree.[16] All the details of this genius' life have been the subject of extreme scrutiny and speculation.[17] More than a decade after the fire he finally published his studies on light under the title of *Opticks*. The historian of science Sir William Dampier comments that "Newton's work on optics, even if it stood alone, would have placed him in the front rank of men of science."[18] *Opticks* merited three English editions as well as two French and two Latin ones.

Newton received many honors. At Cambridge his mathematical prowess won him the position of Lucasian professor of mathematics. After he moved to London, the government appointed him master of the mint and he became involved in many civic concerns. The Académie des sciences in France elected him as a foreign associate. Queen Anne bestowed the coveted knighthood on him, and he became Sir Isaac Newton. Voltaire, one of the great French leaders in the burgeoning free thought and reasoning movement of that time, was personally acquainted with Newton. He lauded the scientist, commenting that "if all the geniuses of the universe were assembled, he should lead the band."[19] More than a century later famed French mathematician and cosmologist Joseph Lagrange suggested that Newton's seminal *Principia* was assured for all time "a preeminence above all other productions of the human intellect."[20] Recently, in discussing the most important individuals of the past millennium, *Time* selected Newton as the most influential person of the sev-

enteenth century.[21] Without doubt he possessed one of the greatest minds of all time.

Newton, along with all his superlative scientific understanding, had a profound devotion to God, and this has significant implications when we consider the relationship of religion to science. He did not approve of disbelief in God, stating that "atheism is so senseless and odious to mankind that it never had many professors,"[22] and he did not condone any levity about religious matters. Whenever it happened in his presence, he severely criticized it.[23] While most scientists of his time believed in God and commonly referred to Him in scholarly writings, Newton distinguished himself by his extensive studies of religious topics. Isaac left to posterity a prodigious number of writings. At least one third involve religious topics.

Especially interested in biblical prophecies, he studied everything he could on the topic, whether written in Greek, Aramaic, Latin, or Hebrew. He compiled long lists of the various interpretations. The relationship between biblical prophecies and history was of special concern to him, and before his death he had prepared a manuscript dealing with the interpretation of historical dates. Theologians and commentators needed them to establish correct reference points for biblical prophecies. His manuscript was published after his death under the title *Chronologies of Ancient Kingdoms Amended*. The two primarily prophetic books of the Bible, namely Daniel and the Apocalypse (Revelation), especially interested him. Studying them he used the same analytical approach that he employed when examining nature. Developing a series of 15 "rules for interpreting the words and language in Scripture,"[24] he regarded the prophecies in the two different books as a foretelling of world history. Many current interpretations of these biblical books still echo those of Newton's. Several years after his death his studies in this area were published as *Observations Upon the Prophecies of Daniel and the Apocalypse of St. John*.[25] Also he wrote on the life of Christ and other religious subjects, sometimes showing great independence in his theological thinking, such as rejecting the traditional Christian doctrine of the trinity for the Godhead. Newton believed, as the Bible indicates, that all nations came from Noah, and that God created all things, as He states He did in the Ten Commandments.[26] To him both the study of God's nature and that of God's sacred Scripture were all part of his overwhelming desire to know Him more fully.

In addition, Newton studied and wrote extensively about alchemy. Thoroughly familiar with the alchemical literature of his day, he approached the subject with the same analytical attitude that he applied to other topics. Some charlatans had given alchemy a bad name as they attempted to fake the transformation of base elements into gold, but in Newton's time, in part because of the careful work of Robert Boyle, alchemy was beginning to emancipate itself from a mystical cloak on its way to becoming respectable chemistry. Some have tried to imply a mystical personality to Newton because of his alchemical writings, but this seems to belie his thoroughly rational (i.e., based on reason) approach to physics, mathematics, and the Bible. While some of the implications of alchemy may have been of interest to his metaphysical questions, he still sought experimental verification just as he did in physics.[27]

The aura of religious fervor that developed around Newton brought him many admirers. A renowned Frenchman tried to establish a new Religion of Newton church. Another Frenchman severely criticized England for not giving due respect to Newton's divinity. Furthermore, he suggested, the calendar should be revised, starting with the date of Newton's birth, and a church should be built at Newton's birthplace.[28] The Swiss-born mathematician Fatio de Duillier was a good friend of Newton's, and a letter from him reflects Newton's spiritual depth and influence. Fatio became ill and did not expect to live. Writing to Newton what he thought might be his final letter, he said, "I thank God my soul is extremely quiet, in which you have had the chief hand."[29]

Newton found his final resting place among England's greatest in the revered Westminster Abbey. Paradoxically, about a century and a half later Charles Darwin, who had very different ideas about God, was also buried in Westminster Abbey, just a few feet away from Newton's tomb. When I visited the graves of these two gigantic scientific icons, I could not refrain from musing about the contrasting legacies about God that they had bequeathed to the world. That difference is the basis of much of the discussion in the chapters ahead.

To Newton, God was not an ordinary concept. He had a deep reverence for Him, commenting that "this Being governs all things, not as the soul of the world, but as Lord over all. . . . The supreme God is a Being eternal, infinite, absolutely perfect."[30] To him God was also an intensely personal