NOTABLE SCIENTISTS OF THE PAST

The following biographical sketches are in approximate chronological order. They are chosen to illustrate (1) the build-up of science and technology since the Reformation; and (2) the cultural shift since the early 1800s from biblically-based science to evolutionary-based science. Emphasis is given to points not emphasized in conventional sources.

I. Isaac Newton, British, 1642-1727

Isaac Newton is best known for developing the three laws of motion and the law of gravitation. For the six millennia from the creation to Newton's life, there is no record of anyone's having solved the problems that Newton tackled. Indeed, in Newton's time the philosophy of the ancient Greek philosopher Aristotle held sway. Aristotle had flourished around 300 BC and "thought of the heavenly bodies as obeying laws quite different from those that held on earth."[1]

In contrast, Newton explained "the motion of the heavenly bodies on the basis ... that the same laws governed the movement of [both] earthly and heavenly bodies ..."[2] In formulating these laws, Newton was therefore breaking with 2000 years of tradition. Amazingly, the entire conception and plan for confirming these laws arose in his mind soon after he graduated from college -- in 1666 when he was 24.[3]

Newton rightly believed that the mathematical proofs of his laws would have to be flawless. More than twenty years passed before Newton was convinced that his mathematics could withstand all possible scrutiny. By then he had invented the branch of mathematics known as Newtonian calculus as a tool for developing his mathematical proofs, and in 1687 he published these proofs in a book.

Newton wrote in Latin, at that time considered the language of scholars, entitling the book *Philosophiae Naturalis Principia Mathematica* (*Mathematical Principles of Natural Philosophy*). The title is often shortened to *Principia* (with a "k" sound for the "c" as in all Latin words). It is considered the greatest scientific work of the last millennium.

The *Principia* remains in print in English translation.[4] It is not easy reading. Newton later wrote *Opticks* to describe his experiments with prisms and light. *Opticks* was written in English and is fairly easy to read.[5]

How could one young man working alone in the privacy of his apartment begin to conceive of new laws overthrowing what authorities had taught for at least two millennia? Clearly Newton had nearly unique mental powers, possibly below only those of Solomon, noted in the Bible as having had wisdom above all others (1 Kings 3:11-12, 4:29). Newton's biographers have struggled to understand the workings of Newton's mind:

"It is little use discussing Newton in terms of ordinary experience, because he was a quite extraordinary man. Other great men of science ... have devoted all their best labours to their scientific researches. Newton had long periods when he seemed to have been indifferent to science ..."[6]

"Of how he arrived at his great discoveries we understand very little ... William Whiston, who knew him well ... was convinced that he had the power of perceiving scientific truths before he had proved them. ... Newton, perhaps, possessed this power of scientific foresight, correct scientific surmise, to a greater extent than any other man."[7]

Newton himself, "when he was asked how he made his discoveries ... said, `By always thinking unto them.' ..."[8] Newton biographer Edward Andrade concludes: "Even for great men of science it is hard to keep the mind concentrated on a problem ... for more than an hour or two: I believe that Newton, however, could sit for hours with the whole power of his mind fixed on whatever difficulty he was concerned with."[9]

One might think that the young Newton was motivated by rebellion against authority to overthrow long-established scientific tradition.[10] This conclusion would be wrong. In fact, "Newton's scrutiny of nature was directed almost exclusively to the knowledge of God and not to the increase of sensate pleasure or comfort. Science was pursued for what it could teach men about God, not for easement or commodiousness."[11]

Some writers have concluded from this kind of statement that Newton must have been a God-fearing Christian.[12] This conclusion is also wrong. Strongly theistic and God-fearing, Newton was nevertheless apparently not a Christian, because he did not truly understand who Christ was and is. One of the most extensive studies of Newton's religious beliefs summarized the situation this way:

"Newton's copy-books ... are pervaded by a sense of guilt and by doubt and by self-denigration. ... From the beginning to the end of his life, Newton's was a religion of obedience to commandment, in which the mercies of Christ the Redeemer played a recessive role ..."[13]

Newton further maintained that there was only one God, God the Father, and "diminished the other two persons of the Trinity."[14] Accordingly he was called an "anti-trinitarian," a belief system now known as unitarianism, which descended from Arian and gnostic beliefs endemic to central Europe beginning with the heretic Arius about 400 AD. In other words, Newton never could bring himself to accept Christ as God:

"Newton yielded to a full embrace of the Arian [essentially unitarian] credo. ... Newton could not have been more explicit. He declared the Father to be supreme. The Son is a separate being, different from the Father both in substance and in nature. Christ is not truly God. . . ."[15] Newton maintained that Christ was the "Lamb of God," but only in the sense of being a good man who was sacrificed as an example of God's stern view of the effects of sin.[16]

Newton never saw God as loving. Indeed, Newton's struggle to pierce through the veil of God's judgment was so consuming

that he spent more time writing about theology than about science. His theological output was double his scientific output. One of his theological works, *Observations Upon the Prophecies of Daniel,* is still in print and traces the fate of the ethnic groups leaving Babel down to Newton's day.[17]

Historians have sought the reason for Newton's obsessive but failed effort to find acceptance with his "God of vengeful wrath." On one level, it seems that Newton did not understand that the God of the Old Testament is the same as the God of the New, and took the Old Testament emphasis on Divine judgment as the only characterization of God.

Even more significantly, the gnosticism which had spawned anti-trinitarianism also taught that the two Testaments involved different Gods, one of law and judgment, the other of love and mercy. This, by the way, continues to be the liberal/ modernistic misunderstanding of the two Testaments today -- not surprising since modern liberalism is in fact an outgrowth of the same gnosticism which affected Newton's theological views.

Newton historian Frank Manuel claims that Newton's spiritual insecurity originated in the death of his father prior to Newton's birth on Christmas Day, 1642.[18] According to this view, Newton, who never knew his father, and who was born prematurely (the tiny newborn Newton was wrapped in a napkin, nestled in a mug, and expected to die before the night was out), was a perfect set-up for numerous insecurities. This view seems shallow, however, considering that other great scientists like Michael Faraday (discussed below) came from extremely humble beginnings and yet found complete security in Christ.

Sadly, Newton grew into a bitter, back-stabbing person who was respected because of his scientific brilliance but who was also feared because of his vindictiveness:

"Isaac Newton was not a pleasant man. His relations with other academics were notorious, with most of his later life spent embroiled in heated disputes. ...[19]

Biographer Daniel Boorstin elaborates further: "The real Newton was anything but affable. The student who served as Newton's assistant for five years, from 1685 to 1690, declared that in all that time he had heard Newton laugh only once. ... Newton's later years, when he had become the idol of `Philosophic' London, could be chronicled in his acrimonious quarrels with subordinates and his vindictive plots against any who threatened to become his equal."[20]

The best known example of Newton's attempting to ruin another's reputation involved the German mathematician Leibniz. Leibniz had developed a calculus which in some ways was better than Newton's. Newton's response was to write anonymous letters smearing Leibniz, as well as denouncing him openly. This abuse hastened Leibniz to an early death. "Following the death of Leibniz, Newton is reported to have declared that he had taken great satisfaction in `breaking Leibniz's heart'."[21]

Newton became the director of the British mint, one of the highest political positions in the world at that time, since Britain was becoming the global power in trade and commerce. Newton used his eminence to further silence those who would disagree with him.

In a profound way, Newton touched virtually every major discipline in the physical sciences. We can sense the measure of his influence by considering some of the major scientific laws, inventions, and concepts named after him, as presented in the following chart:

Newton's Scientific Influence

Law or Invention	Discipline	Application
Newton's laws of motion	Physics	Basis of physics
Newton's law of gravitation	Physics	Basis of astrophysics
Newtonian calculus	Mathematics	Computer models
Newtonian mechanics	Physics	Engineering
Newtonian reflector	Astronomy	Telescope design
Newton's rings	Optics	Lens manufacture
Newtonian fluid	Fluid mechanics	Hydraulics
Newton's law of cooling	Heat transfer	Cooling systems

Newton is an example of the fact that God is sovereign and can use anyone to accomplish His will. It was God's will that Newton uncover the secrets of nature embodied in his laws. But Newton also stands as contrast to scientists like Faraday and Maxwell (see below) who showed the fruit of the Spirit in their lives.

II. Robert Boyle, British, 1627-1691

Robert Boyle is recognized as the "Father of Chemistry" because he framed the modern definition of an element as a substance that can't be chemically decomposed. He also discovered the gas law named after him. Boyle was deeply involved in the occult and alchemy when young, but made a complete break later in life, leaving alchemy and its occultic practices behind, and even denouncing it in his *The Skeptical Chymist*, the first modern chemistry book.[22]

By his definition of an "element," Boyle launched modern chemistry, with most of the elements being discovered on the basis of his definition within two centuries after his death.[23] Though the French often consider their countryman Lavoisier to be the Father of Chemistry, Lavoisier built on Boyle's innovations.[24] Boyle's reaction to alchemy later in his life is an indication of the fact that, although modern chemistry uses some of the same laboratory equipment used by alchemists, it has little if any philosophical connection with alchemy.

Boyle later in life was a devout Christian, and out of his personal wealth funded missionary outreaches and Bible translation efforts in foreign countries, including the Islamic world.[25] In his will he endowed the "Boyle lectures" to be delivered annually "for proving the Christian religion against

notorious infidels" including atheists, pagans, and "Mahometans" (Muslims).[26]

Boyle can be taken as an excellent example of a great scientist who was also a devout Christian. In *The Christian Virtuoso*, Boyle showed that a right understanding of science promoted an active Christian faith rather than destroying it,[27] in complete contrast to the claims of Enlightenment scientists who a century later would attempt to use science as a tool to dismantle the Bible.

III. Michael Faraday, British, 1791-1867

Michael Faraday invented the motor, generator, and transformer. To make these inventions Faraday experimented with electricity and magnetism.

In an indirect way Newton inspired Faraday. Faraday was motivated in his researches partly by the idea that if gravity extends through empty space as Newton had shown, maybe man could also utilize the electrical and magnetic fields which must also permeate space.

Robert Boyle started life with an inheritance which made him independently wealthy, but Faraday was born into poverty. By his early teens he was experimenting with chemistry in the back of the drug store -- the "chemist's shop" as English pharmacies were known -- where he worked. He read voraciously and was self-taught.

A devout Christian from an early age, he was a member of the Sandemanian Church, a fellowship of local churches desiring to be independent of the state Presbyterian Church of Scotland.[28] His Bible contained 3000 handwritten marginal notes including study aids, comments and cross-references.[29]

Faraday was thus a well-prepared lay preacher, spoke frequently in his church, and was known world wide in scientific circles for his Christian humility. Unbelievers associated his humility with his Sandemanian faith, one of them, fellow British scientist Tyndall, commenting:

"I think that a good deal of Faraday's week-day strength and persistence might be referred to his Sunday exercises. He drinks from a fount on Sunday which refreshes his soul for the week."[30]

Faraday's biographer L. Pierce Williams has concluded that, "No man in the history of science has been referred to as humble more often than Faraday, but it was a very definite kind of humility that shone from his eyes. ... His true humility lay in a profound consciousness of his debt to his creator. That Michael Faraday, poor, uneducated son of a journeyman blacksmith and a country maid was permitted to glimpse the beauty of the eternal laws of nature was a never-ending source of wonder to him."[31]

When invited by Queen Victoria to an audience at Buckingham Palace, he went, though the appointment was on a Sunday. His church stripped him of his preaching duties for violating the Lord's Day, but without rancor or bitterness, Faraday continued faithfully attending his church thereafter and was eventually re-instated as a lay preacher.[32]

He was kind to all. Having no wealth, he and his wife were housed in apartments in facilities of the Royal Institution of Science in London at government expense. He and his wife were deeply in love:

"Mrs. Faraday proved to be exactly the true helpmeet for his need; and he loved her to the end of his life with a chivalrous devotion which has become almost a proverb. ... Tyndall, in after years, made the intensity of Faraday's attachment to his wife the subject of a striking simile: `Never, I believe, existed a manlier, purer, steadier love. Like a burning diamond, it continued to shed, for six and forty years, its white and smokeless glow'."[33]

The Faradays never had children, but even in the midst of work at the Royal Institution, he would patiently and kindly receive his cousins, nieces and nephews whom he regarded as his own. He "took great delight" in lecturing to children,[34] and "was to be seen at his best as a lecturer in the famous Christmas Lectures for children.[35] Unlike many great scientific figures, he spoke evil against no one and was greatly mourned at his death as one of the greatest and kindest of scientists.[36]

Without Faraday, modern electrical technology would not exist. All labor saving devices depend on motorized power, and all electrical generation is ultimately based on Faraday's innovations. Without the transformer, electricity could be sent only a few miles at most, and the modern power distribution system could not exist. Faraday is an excellent example of a great scientist who also exhibited the Christian graces of humility and charity, as well as faithfulness to his local church.

IV. James Maxwell, British, 1831-1879

A devout but quiet Christian, James Maxwell developed modern electromagnetic theory which is the basis for all telecommunications. Maxwell's theorizing was in turn based on Faraday's experimental work.

Maxwell was a mathematical genius, demonstrating in 1858 when he was only 26 that Saturn's rings could not have evolved.[37] The so-called Kant-Laplace hypothesis had been devised in the 1700s to explain the evolution of the solar system. It was not subjected to a mathematical analysis until "the great British theoretical physicist James Clerk Maxwell" applied his skill.[38]

"By this time it was well known that Saturn's ring [sic] is ... a swarm of innumerable bodies ranging in size from a mountain to a sand grain and circling the planet under the forces of Newtonian gravity. Why, Maxwell asked himself, don't these particles condense into several individual satellites as a result of the Newtonian gravity forces acting upon them? If, according to the Kant-Laplace hypothesis, the original disk

surrounding the Sun condensed into a comparatively small number of individual satellites, why doesn't Saturn's ring do the same?"

Besides gravitational force which would tend to make the ring particles draw together, Maxwell found that "there are other kinds of forces which attempt to break up the rudimentary condensations resulting from the gravity forces."[39]

Since the rings exist, this was hardly a surprising result, but problems arose for solar system evolution when Maxwell applied the same analysis to the origin of the solar system: "The next step was to apply the same considerations to a much larger ring, which, according to the Kant-Laplace hypothesis, [once] surrounded the Sun. Maxwell ... came out with the astounding result that it could not have possibly condensed into individual planets. ... This result delivered a mortal blow to the Kant-Laplace hypothesis, which had been riding high, wide, and handsome for more than a century"[40]

This disproof of naturalistic solar system origins was so serious a blow to evolutionary theory that nearly a century passed before astronomers developed a "response" to Maxwell's challenge. In fact, Maxwell's challenge still stands, but with some mathematical sleight-of-hand, most of the evolutionary community allowed themselves in the 1940s to be convinced that Maxwell's challenge was no longer a threat; there is still no satisfactory theory of how the solar system might have evolved.

Like Faraday, Maxwell was a gifted teacher, and like Faraday, presented popular versions of technological developments to the public. Maxwell was keenly aware of t he right reasons for doing science. According to a prayer found in his papers after his death, the scientist should develop technology to lighten the lives of peoples otherwise struggling to survive, so that with their physical needs alleviated, they may come to reflect on the truth of the gospel and receive Christ as Savior. The actual wording of the prayer is as follows:

"Almighty God, Who hast created man in thine own image, and made him a living soul that he might seek after Thee ... teach us to study the works of Thy hands, that we may subdue the earth to our use, and strengthen the reason for Thy service; so as to receive Thy blessed Word, that we may believe on Him Whom Thou hast sent, to give us the knowledge of salvation and the remission of our sins. All of which we ask in the name of the same Jesus Christ, our Lord."[41]

For Maxwell, science was ultimately an evangelistic tool. "It was [also] his custom to visit the sick and shut-in persons in the community and to read [the Bible] and pray with them if they desired."[42] Unfortunately, Maxwell succumbed to stomach cancer at age 48. Like Faraday, Maxwell is an excellent example of a great scientist who was also a devout Christian.

V. William Thompson, Lord Kelvin, 1824-1907

Like Robert Boyle, Kelvin was independently wealthy. A man of intense personal energy, he found it difficult to sit still for fifteen minutes, often writing while standing so he could more quickly move from one task to another. Kelvin developed the temperature scale named after him, as well as modern statements of the first and second laws of thermodynamics. He was knighted for services such as his leadership in laying the first trans-Atlantic telegraph cables between Europe and America.[43]

Kelvin's productive years centered around the mid- to late 1800s, a time of intense conflict between evolutionary and biblical chronologies. One of the most interesting of such conflicts for Kelvin involved the age of the sun.

By the mid 1800s, some 300 years had passed since the Reformation, and the physical sciences had developed sufficiently to devise a scientific model of the sun's energy generation. This was the gravitational contraction model, the idea that the potential energy of the sun's in-falling gases is converted into heat and light as the sun slowly shrinks. Also known as gravitational collapse or the "shrinking sun" theory, this process would occur at a rate too small to be detectable over intervals less than many decades. German physicist Hermann von Helmholtz first announced this theory during a public lecture in 1854.[44]

Helmholtz was not a creationist. Neither was he seeking to show that the sun is young. He assumed an evolutionary model for solar formation that is still in vogue today, that the sun began forming by the gravitational contraction of a nebula, i.e., the Kant-Laplace hypothesis. Helmholtz concluded that about 20 million years would be needed for the sun to form this way.

Almost from the beginning, there was tension between this figure and the time claimed for terrestrial evolution. In the mid to late 1800s, the earth and its life were thought to be hundreds of millions of years old. Attempting to bring both chronologies into agreement, investigators sought to make increasingly accurate computations of the sun's age assuming it evolved by gravitational contraction.

George Howard Darwin, son of Charles Darwin, published one such study on this topic in 1888.[45] It became increasingly clear that gravitational contraction alone could not provide the age for the sun demanded by geological and biological evolution. This dilemma was part of a larger process in which evolutionists were completing the paradigm shift away from creation toward evolution that had begun with Charles Lyell and Charles Darwin.

By the late 1800s, evolutionists were trying to bring chronologies from all scientific disciplines into agreement with the terrestrial chronology devised from Lyell's uniformitarian principles.

Defying the evolutionary chronology for the earth, Kelvin championed the concept of gravitational contraction, believing it provided a more accurate evolutionary age for the solar system than the geologists and biologists were willing to admit. Kelvin's first major paper about solar energy generation was

published in 1862.[46] Kelvin was a Christian, but not a biblical creationist. Today he would probably be described as a theistic evolutionist, one who believes that God has employed evolution to bring the world into existence. He had no particular difficulty with an old age for the creation. However, the physical sciences indicated that the earth and the sun could not be as old as was typically demanded, and these were the sciences he trusted.[47]

After Kelvin's death the sun was discovered to be powered by nuclear fusion reactions as well as by gravitational contraction. This new discovery meant that the sun's age cannot be limited by Kelvin's argument. However, the physical sciences continue to proclaim that the creation is young in ways unknown while Kelvin lived, and Kelvin is still remembered for refusing to yield to the fallacious time scale of evolutionary geology.

VI. Matthew Maury, American, 1806-1873

Matthew Maury grew up in a Christian home in Tennessee with Bible reading each evening. While young, he was moved by mention in Psalm 8:8 of God's control over "the paths of the seas." This verse impelled him toward a lifelong study of the seas, particularly ocean currents.[48] A devout Christian, he made the first modern survey of ocean currents, made the first maps of ocean currents used in navigation, made the first modern weather reports, and founded the Naval Academy in Annapolis.

His textbook on oceanography was used as a standard text at the Naval Academy for nearly a century, a testimony not to any backwardness of the Academy's curriculum but to the high quality of Maury's writing. The book remains in print today.[49] Maury is well named the Father of Oceanography.[50] Maury was also a consultant in the laying of the first trans-Atlantic cable which Kelvin supervised.[51]

Active in the emerging battle between evolution and creation in the late 1800s, he adopted a view of theistic evolution. Nevertheless, he spoke out aggressively against those who would use evolution to explain God away altogether. He had no tolerance for those who believed education should be taught without reference to God or the Bible. A Episcopalian, he dedicated the University of the South (a school with Episcopalian roots) at Suwannee, Tennessee, just prior to the Civil War as an institution meant to keep the Bible in education. (Sadly, this school has not remained true to this mission.) On that occasion Maury said:

"When I discover the truths of Revelation and the truths of science reflecting light the one upon the other, how can I, as a truth-loving, knowledge-seeking man, fail to point out the beauty and rejoice in the discovery? Reticence on such an occasion would be sin ..."[52]

When the Civil War broke out, Maury, then a Virginian and a strong believer in States' rights, found himself on the side of the Confederacy. As the South's fortunes waned, he fled to London with his family and lived there the rest of his life. Even among those who disagreed with him politically, Maury was respected for his Christian testimony. Maury can be presented as a great scientist who was also a Christian, but not as one who was a strong creationist. His testimony for the Lord was outspoken, however, and in this he was a good example.

VII. Louis Pasteur, French, 1822-1895

Louis Pasteur represents the secular scientific spirit which overtook the academic world in the late 1800s and rules academia today. Like Newton, Pasteur is sometimes claimed to have been a Christian on the basis of superficially theistic statements such as, "Would that I had the faith of a Breton peasant woman."[53]

Like Newton's expressions of theism, however, Pasteur's statement should not be glibly accepted as a Christian profession. The Bretons in the north of France were of Celtic heritage and pagan, not Christian. Thus Pasteur was cleverly revealing his non-Christian beliefs. Indeed, Pasteur's faith was in science to solve human problems:

"It was not in an abstract manner that he worshipped science. He said himself that it had been `the dominating passion' of his life, and that he had `lived only for it' ..."[54]

Pasteur himself confessed near the end of his life that, "I love my country and I have served it with all my might [as a scientist]. That is my profession of faith."[55]

Pasteur is well known for having demonstrated that microbes can propagate only from pre-existing microbes ("life comes only from life"), and in this demonstration he showed that "spontaneous generation" is impossible. Spontaneous generation, the arising of life from non-life, thus has been disproved scientifically but is an absolute requirement for evolution to have happened. In a lecture at the University of Paris, Pasteur said, "Spontaneous generation is something I have looked for without finding it," but then, revealing his evolutionary faith, he added, "I do not believe it to be impossible."[56] Pasteur's statement remains the position of modern evolutionists.

It has been said that Pasteur's name has been used more than that of any other scientist because we all speak of "pasteurized milk." Pasteur was globally famous in his own time. However, he was overbearing, dictatorial, and, like Newton, used people rather than serving them.[57] Pasteur had his Liebniz, a now-forgotten French microbiologist who like Pasteur was a brilliant student of disease theory, but whose alternative theory differed somewhat from Pasteur's.

The alternative theory claimed that microbes did not exist in an unchangeable form but could change and be manifested in different disease symptoms over a person's lifetime. Pasteur ridiculed and humiliated this idea, but it now appears that this alternative theory was right. Shingles, for example, is recognized as a disease occurring in adults due to the microbe

which in young children causes chicken pox. By his disproof of spontaneous generation, Pasteur placed an obstacle in the way of evolutionary theory. Pasteur, like Newton, exemplifies that God can use anyone He chooses to fulfill His purposes.

Notes

1 Andrade, E.N. da C., *Sir Isaac Newton: His Life and Work*, Anchor, 1964, p. 10.
2 ibid.
3 Anthony, H.D., *Sir Isaac Newton*, Collier, 1961, pp. 49-50, discusses Newton's genius: "In 1661 Newton, at the age of eighteen, came up to Trinity [College of Cambridge University] as a Sub-sizar or poor scholar. His tutor and teacher in mathematics and geometry ... perceived that his pupil was a genius unlike anyone else."
4 Newton, I., trans. A. Motte, *Mathematical Principles of Natural Philosophy*, University of California, 1934, reprint of 1687 edition.
5 Newton, I., *Optics*, Dover, 1979, reprint of 1730 edition.
6 Andrade, op. cit., pp. 128-129.
7 ibid., pp. 127-128. William Whiston produced a famous English translation of the Roman historian Josephus which remains in use today (Flavius Josephus, trans. W. Whiston, *Complete Works*, Kregel, 1976, reprint of 1867 edition).
8 Andrade, op. cit., p. 35.
9 ibid.
10 Einstein and other founders of so-called "modern physics" have claimed that rebellion against authority was in fact one of their motivations for developing the new physics.
11 Manuel, F.E., *The Religion of Isaac Newton*, Oxford, 1974, p. 48.
12 Three examples are: (1) Barnes, T.G., *Science and Biblical Faith*, Creation Research Society, 1993; (2) Morris, H.M., *Men of Science, Men of God*, Institute for Creation Research, 1982; and (3) Tiner, J., J*ohannes Kepler*, Mott Media, 1977. These sources also emphasize that Newton was a staunch creationist. However, Newton's expressions of theism and supernatural creation, though admirable, reflected no more than the "cultural Christianity" respectable in his time. One must be careful not to confuse professions of theism and creation with professions of genuine saving faith.
13 Manuel, op. cit., pp. 15-16.
14 ibid., p. 61.
15 Christianson, G.E., *In the Presence of the Creator*, Free Press, 1984, p. 253.
16 Manuel, op. cit., p. 61.
17 Newton, I., *Observations Upon the Prophecies of Daniel*, Oregon Institute of Science and Medicine, 1991, reprint of 1733 edition.
18 Manuel, op. cit., p. 18.
19 Hawking, S.W., *A Brief History of Time*, Bantam Books, 1988, p. 181.
20 Boorstin, D.J., ***The Discoverers***, Random House, 1983, pp. 410, 412.
21 Hawking, op. cit., p. 182.
22 Dampier, W.C., *A History of Science and Its Relations with Philosophy and Religion*, Cambridge, 1977, reprint of 1948 edition, pp. 140-141.
23 Slabaugh, W.H., and A.B. Butler, *College Physical Science*, Prentice-Hall, 1973, p. 270. Nine substances now recognized as elements were known in ancient times. Six more were discovered by the alchemists over some 400 years from c. 1250 to 1669. Boyle died in 1691; a total of 59 elements, nearly two-thirds of the 92 natural elements, was discovered from 1691 to 1886. The remaining 18 natural elements were discovered between 1894 and 1907.
24 Dampier, op. cit., p. 141.
25 Williams, E.L., and G. Mulfinger, *Physical Science for Christian Schools*, Bob Jones University, 1974, p. 127. This mission activity took place a century before the so-called beginning of modern missions under William Carey, illustrating that God is always at work.
26 Anthony, op. cit., p. 139.
27 Manuel, op. cit., p. 34.
28 MacDonald, D.K.C., *Faraday, Maxwell, and Kelvin*, Doubleday Anchor, 1964, p. 10. The Sandemanian group no longer exists.
29 Williams and Mulfinger, op. cit., p. 105.
30 Williams, L.P., *Michael Faraday*, Simon and Schuster, 1971, p. 6. **31** ibid., p. 103.
32 Kendall, J., *Young Chemists and Great Discoveries*, Books for Libraries Press, 1969, reprint of 1939 edition, p. 79.
33 ibid., p. 57.
34 ibid., p. 82.
35 Williams, op. cit., p. 344. The Christmas Lectures are still delivered annually in London to this day and are open to the public. Modern topics as likely as not are those promoting evolution, a complete difference from Faraday's time. Then the battle lines between creationists and evolutionists had not been drawn as sharply as they are now, and though Faraday certainly saw the hand of God in his study of science, he did not try to harmonize his science with the Bible (ibid., pp. 103-104). His Christmas Lectures were entertaining expositions and demonstrations of chemical principles. His most famous Christmas Lecture was "The Chemical History of a Candle," a topic appropriate to the Christmas season and originally delivered over several sessions in 1860-61 (*The Harvard Classics*, Vol. 30, Scientific Papers, pp. 86-170).
36 Evolutionist Charles Lyell, whose life more-or-less coincided with Faraday's, recalled the following incident: "Hearing that a subscription had been opened for the widows and orphans of the men who had perished by [an] explosion, I found, on inquiry, that Faraday had already contributed largely. On speaking to him on the subject, he apologized for having done so without mentioning it to me, saying he did not wish me to feel myself called upon to subscribe because he had done so" (Kendall, op. cit., p. 78).
37 Maxwell, J.C., *On the Stability of the Motion of Saturn's Rings*, Macmillan, 1859, p. 85; reprinted in Brush, S.G., C.W.F. Everett, and E. Garber (eds.), *Maxwell on Saturn's Rings*, MIT, 1983, pp. 68-158.
38 Gamow, G., *A Planet Called Earth*, Bantam Books, 1965, p. 20.
39 ibid., pp. 20-21.
40 ibid., p. 21; Gamow, G., *One, Two, Three ... Infinity*, Mentor, 1953, p. 283.
41 Campbell, L., and W. Garnett, *The Life of James Clerk Maxwell*, Macmillan, 1882, p. 323.
42 Williams and Mulfinger, op. cit., p. 486.
43 The ship used in this endeavor, the *Great Eastern*, is believed possibly to have been the largest floating vessel built since Noah's Ark.
44 Moulton, F.R., *An Introduction to Celestial Mechanics*, Macmillan, 1902, p. 62; Birchfield, J.D., *Lord Kelvin and the Age of the Earth*, University of Chicago, 1990, p. 54.
45 Moulton, op. cit., p. 62.
46 Birchfield, op. cit., pp. 54, 241.
47 ibid., pp. 29-32.
48 Williams, F.L., *Ocean Pathfinder*, Harcourt, Brace & World, 1966, pp.112-113.
49 Maury, M.F. (ed. J. Leighly), *The Physical Geography of the Sea and Its Meteorology*, Harvard, 1963, reprint of 1861 edition.
50 Gross, M.G., *Ocenaography:*, Prentice-Hall, 1972, p. 20.
51 Field, H.M., *The Story of the Atlantic Telegraph*, Scribner's, 1866, p. 32.
52 Corbin, D.F.M., *A Life of Matthew Fontaine Maury*, Sampson Low, 1888, pp. 178-179. Diana Corbin was Maury's daughter.
53 See the sources cited in Note 12.
54 Dubos, R., *Pasteur and Modern Science*, Doubleday Anchor, 1960, pp.145-146.
55 Cuny, H. (trans. P. Evans), *Louis Pasteur: The Man and His Theories*, Scientific Book Club, 1965, p. 175.
56 ibid., p. 13.
57 ibid., p. 42.