CHRISTIAN INFLUENCES IN THE SCIENCES

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SUMMARY

Many of the sciences derive directly from the work of a Christian or were greatly influenced at their inception by a Christian. An alphabetical listing of modern sciences and scientific laws establishes this claim.

INTRODUCTION

It may seem an outrageous claim that Christians were seminal to much of what dominates modern scientific thinking, but it is true. There is hardly a science or scientific idea which cannot trace its inception as a viable theory to some Christian. The alphabetical table below verifies this claim. A few minutes with a good encyclopedia and a few biographies will corroborate this information. The names of the Christians who influenced each science or idea are starred. Often the Christian made CLAIMS, and PREDICTIONS or developed an idea which had IMPLICATIONS for the young science. To draw attention to these claims, predictions and implications, I have capitalized the terms in the text which follows.

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ANESTHESIOLOGY. *Crawford Long,* one of the three Americans who discovered anesthesia became a Christian. *James Young Simpson,* who championed its use in Britain was also a professing Christian, an ardent New Presbyterian.

Asked by a reporter what was his greatest discovery, he replied, "When I learned Jesus Christ had died for my sins."

ANTISEPTIC SURGERY. First championed by the Quaker doctor *Joseph Lister* against tremendous opposition, antiseptic surgery was based directly on the theories of
Louis Pasteur. Antiseptic surgery sought to kill germs, primarily by the use of carbolic acid.

Even in his own lifetime, Lister's innovative idea was giving way to aseptic surgery, surgery which tries to keep germs away from the wound in the first place. Joseph Lister was reared a devout Quaker and migrated to the Church of England. He reminded his pupils that they had to be prepared to give an account to God for their treatment of "the earthly tabernacle" of the soul (ie: the human body). And what of Pasteur? Although not a churchgoer, he was a Franciscan Tertiary and detested atheists and atheism. He proved the impossibility of the spontaneous generation of life.

ASSOCIATIONS FOR THE ADVANCEMENT OF SCIENCE. David Brewster*, who gave optics several of its laws, was a devout Christian, and a leader in the formation of the British Association for the Advancement of the Sciences. It was Brewster who wrote "It cannot be presumption to be SURE [of our forgiveness] because it is Christ's work, not ours; on the contrary, it is presumption to doubt his word and work."

James Dwight Dana* was converted in a revival and lived an impeccable life thereafter. He was a leader in the American Association for the Advancement of Science as was Josiah Willard Gibbs,* a man of quiet Christianity who showed it in conscientious work and steady churchgoing.

ASTRONOMY, MODERN. Because of the Galileo affair, it is popularly supposed that astronomy made its advances over the protests of a closed-minded, dug-in church. A closer look at the facts shows a mixed picture. This is only to be expected. Within any organization there are always some people who oppose new ideas as well as some who welcome them. Although many churchmen did oppose Galileo's ideas, many others supported them. In fact, many of those who supported and created the new learning were men of faith.

Truth to tell, the picture we now have of the universe is largely the product of Christendom. It is a fact that the names of astronomers who professed Christ read like a Who's Who of the field. Here is an alphabetical listing of some of the Christian makers of modern astronomy who have come to my attention.

John Couch Adams* (1819-1892) shares the honor of being the first to calculate where Neptune could be found. A Wesleyan, he won college prizes for Bible studies.

George Biddle Airy* (1801-1892), a Christ-professing churchgoer, became one of the first Astronomers Royal of Britain.

Jean Baptiste Biot* (1774-1862) established beyond dispute the stony nature of meteorites. Late in life he returned to his childhood Roman Catholic faith.
*James Bradley* (1693-1762) trained as a Protestant chaplain but won recognition not in the field of religion but for discovering the aberration of starlight and nutation of the earth.

Whatever his actual relationship to Christ—he was an odd man—*Nicolas Copernicus* (1473-1543), author of modern heliocentric theory, was a canon in the Catholic church.

It was another Catholic, a Jesuit, *Johann Baptist Cysat* (1586-1657) who became the first man to earn the distinction of discovering a comet through a telescope.

*Eugenio Danti* (1536-1586), a priest, made minor contributions to astronomy by inventing astronomical apparatus and assisting with reform of the Gregorian calendar.

The Quaker *Sir Arthur Eddington* (1882-1944), was an early champion of relativity theory and stayed on the cutting edge of stellar theory throughout his entire life.

Irrascible *John Flamsteed* (1646-1719) trained for the church, but made fame as first Astronomer Royal, establishing Greenwich observatory and providing Newton with essential data for his calculations. Poorly paid, he nonetheless poured his own money into new tools for the observatory. It was he who brought Greenwich to world-wide fame.

*Augustin Jean Fresnel* (1788-1827) contributed to astronomy through his studies of polarized light. He was a gentle Protestant.

Not so *Galileo Galilei* (1564-1642). His abrasive personality antagonized everyone. For all his difficulties with the church, he claimed to be a son of the faith and wrote a book showing that science and faith were not incompatible.

Francesco *Maria Grimaldi* (1618-1663), priest and scientist, in addition to systematically testing Galileo's theories, described the flattening of Saturn and discovered the diffraction of light.

*John Herschel* (1792-1871) surveyed the Southern skies as his father *William Herschel* (1738-1822) had surveyed the Northern before him. Both were at least nominally Christian although John's faith eventually ran deeper.

*William Huggins* (1824-1912) was a Christian of no specific denomination who did spectroscopic studies of stars and differentiated between gaseous nebulae and galaxies.

The faith of *Johannes Kepler* (1571-1630), first to discover the laws of planetary motion, has often been remarked. Unfortunately, he felt compelled to make a living casting horoscopes.

Not nearly so well known is the faith of *Johann Von Lamont* (1805-1879) who cataloged 12,000 previously unrecorded stars of the 7th through 10th magnitudes.
The first mathematical Big Bang theory of creation was put forth by a Belgian priest, Georges Lemaitre (1894-1960) who wrote "it had to have begun with light."

*Urbain LeVerrier* (1811-1871) who co-discovered Neptune was likewise a practicing Catholic.

*Nevil Maskelyne* (1732-1811) published an influential nautical almanac and measured the density of the earth to within 20%. He was a Protestant curate.

Work on double stars was pioneered by a Jesuit, *Christian Mayer* (1719-1783).

*Sir Isaac Newton* (1642-1727) wrote a million words of theology. Arian in outlook, his science was nonetheless motivated by his Christian thought.

One of the giants on whose shoulders Newton stood was the theologian *John Philoponus* (fl. 6th cent AD). Philoponus suggested (on creationist grounds) that the stars are made of the same essential matter as the earth and emit light because they burn. The different colors of stars are owing to differences of composition, he said, drawing his analogy from the differences in colors we see when we burn various substances on earth. He attributed to impetus the movement of celestial bodies (Aristotle said angels moved the planets) and argued for void (vacuum) between the stars. He was the first to suggest dropping balls of unequal weight from a tower. Galileo read and praised Philoponus.

It was a priest, *Giuseppe Piazzi* (1746-1826) who discovered the asteroid Ceres.

*Alexandre Gui Pingré* (1711-1796) made arduous voyages to observe the passages of Mercury and Venus on the sun. He became canon of Paris.

Cardinal *Johannes Regiomontanus* (1436-1476) revived the study of astronomy and mathematics in the Renaissance, preparing the way for the revolution in astronomical knowledge which began in the sixteenth century.

Other cardinals, priests, canons and monks of the Catholic church shine among astronomy's greats.

The binocular telescope was invented by a Capuchin monk, *Schyrle de Rhetia* (1597-1660).

The priest *Giambattista Riccioli* (1598-1671) made significant contributions to astronomy, geography and physics despite his opposition to Galileo.

Yet another Jesuit, *Angelo Secchi* (1818-1878) was a trailblazer in spectroscopic studies and helped define the nature of Saturn's ring.

*Johan W. J. A. Stein* (1871-1951), a Jesuit, published papers on binary stars.
The Canon of Condé, *Gottfried Wendelen* (1580-1667) produced approximations for the parallax of the sun which are close to modern figures.

Apologist Antonio Romaña attributes Christian belief also to the following influential astronomers: *Friedrich Wilhelm Bessel* (1784-1846); *Fedor Aleksandrovich Bredikhin* (1831-1904); *Harve Faye* (1814-1902); *Armand-Hippolyte-Louis Fizeau* (1819-1896); *Jean Bernard Léon Foucault* (1819-1868); *Joseph Fraunhofer* (1787-1826); *James Gregory* (1638-1675); *Alesky Pavlovich Hansky* (1870-1908); *Pierre Jules César Janssen* (1824-1907); *Johann Heinrich Madler* (1794-1874); *Heinrich Wilhelm Matthias Olbers* (1758-1840); and *Giovanni Virginio Schiaparelli* (1835-1910).

We see at work in astronomy a characteristic Christian impulse: to learn God's ways by studying creation. That so many famous astronomers were Christians does not validate Christianity. Other astronomers were indifferent or hostile to the faith. What it does show is that Christianity is not incompatible with science and even motivates it.

Remove Christians from the history of astronomy and it would be a far different story than we read. To divorce Christianity from astronomy, one must divorce it from the men who made the science.

ASTROPHYSICS. The name which dominates the first scientific study of the interior working of stars was the Quaker *Sir Arthur Eddington*. He PREDICTED the enormous interior temperatures of stars which have since been confirmed.

ATOMIC THEORY. The Quaker *John Dalton* was the first to put atomic theory on a scientific basis. He CLAIMED that the atomic weights of elements were proportionate to one another. This has since been completely established, a breakthrough absolutely fundamental to modern atomism. However, we should also note that Dalton interest in atomic theory derived at second and third hand from the renewed interest of the French Roman Catholic priest *Pierre Gassendi*. Gassendi had recently attempted to revive the atomic theories of the ancient Greeks, although he was unable to set these on a scientific footing. Gassendi's work came to England and through intermediaries reached John Dalton.

BACTERIOLOGY. Bacteria were first observed by the Reformed Dutchman *Anton von Leeuwenhoek* and were received with considerable skepticism.

BIG BANG THEORY. *Georges Lemaitre*, a Belgian priest, PREDICTED from his reworking of Einstein's theories, that space would be found to be expanding. Einstein himself at first resisted the implications but later applauded them. The expansion of space was soon confirmed. An IMPLICATION of Lemaitre's theories was background radiation. He was notified of the discovery of this radiation as he lay dying. A note found in Lemaitre's manuscripts said "It all had to have begun with light." His was the first scientific-mathematical creation theory, soon supplanted by better models. It is interesting to note that *Bishop Robert Grosseteste*, studying light, advocated (on
philosophical-theological grounds) a primitive Big Bang expansionist theory in the thirteenth century.

**BINARY MATHEMATICS.** Binary arithmetic, so important to modern computer science, was the brainchild of *Gottfried Wilhelm von Leibniz.* Leibniz, also invented a binary calculator which was a forerunner of modern computational machines. He was a devout Lutheran who refused opportunistic advancement which would have required him to convert to Roman Catholicism.

**BINOMIAL NOMENCLATURE.** Binomial nomenclature in the biological sciences was not invented by *Carl Linnaeus*, but he was its major champion and the first man to systematically apply it to a vast range of life. Linnaeus was strongly creationist and wrote many exclamations of praise to the Creator.

**CALCULUS.** Calculus was co-invented by two philosophers who claimed to be Christians. *Sir Isaac Newton* wrote a million words of theology. Although he clearly believed the Bible and its prophecies, he was essentially a Unitarian. *Gottfried Wilhelm von Leibniz* was an ardent Lutheran who refused preferment which would have required him to convert to Roman Catholicism.

**CELESTIAL MECHANICS.** *Johannes Kepler* made no bones about his faith. He was the first person to calculate that planets travel in ellipses around the sun.

**CHEMISTRY.** *Robert Boyle* is called by some the Father of Chemistry. His science sprang directly from his faith. All of his writings show the imprint of Christianity. As a young man, newly converted to Christ, he struggled with faith because the science of the day contained so much which was contrary to his belief. He therefore determined that every fact must be clearly established and tested, in which case he felt certain that it would prove compatible with scripture since both had the same author. *John Dalton,* a Quaker, gave us the atomic theory behind chemistry. *Josiah Willard Gibbs* was a creator of statistical mechanics (a specialized branch of chemistry) and in France, the ardent Roman Catholic *Pierre Duhem* also contributed to the emerging science of statistical mechanics. *Sir Humphrey Davy* claimed faith and is noted for his chemical researches as was his protege *Michael Faraday* who first liquified chlorine. The isolater of inert gases, *Sir William Ramsay,* also was a man of Christian faith.

**CHEMURGY.** Chemurgy is the branch of chemistry which focuses on the industrial use of organic materials. *George Washington Carver,* with his work on peanuts and sweet potatoes was a great pioneer in this field. His faith has been well-documented.

**CLINICAL PSYCHIATRY.** *Johannes Weyer* did studies on hysteria and witchcraft which mark him as the Father of Clinical Psychiatry. At a time when his fellows were for burning so-called witches, this compassionate Christian doctor was for understanding and treating the dementia which led to the odd behavior of the poor wretches accused of demonism.
COLOR THEORY. A priest, and science facilitator, *Nicholas de Malebranche,* founded modern color theory.

COMPARATIVE ANATOMY. The invention of *Georges Cuvier*, comparative anatomy considers the anatomical structures of animals in relation to one another. Cuvier claimed to be a Christian.

COMPOUND MICROSCOPE. *Joseph Lister, Sr.* and *Thomas Hodgkins* were both sincere Quakers who united their efforts in developing a microscope which used laminated lenses to correct for the aberrations which are always caused by a single substance. This compound lens significantly increased the power of the microscope.

COMPUTER SCIENCE. Several Christians had important roles in the development of the computer. *Blaise Pascal* built the first workable computing machine. It was too cumbersome to be cost effective.

Pascal's Pensees and other Christian writings are well known. *Gottfried Wilhelm von Leibniz* advanced the state of computation with a calculator much superior to Pascal's and also invented binary mathematics and attempted an early form of symbolic logic. His Lutheran faith was integral to his life. Charles Babbage, the true theorist of thinking machines, held Christian beliefs but also accepted such nonsense as reincarnation which is clearly unbiblical.

CRYOLOGY. *Lord Kelvin,* a professor who opened each class with prayer and an apologist for creationist ideas, did fundamental work which led to ice-making machines.

CURVATURE OF SPACE. *Nicholas Cusa,* Catholic cardinal, PREDICTED that space must be curved if God were to be equally present at every point. Twentieth Century findings confirmed his fifteenth century prediction. One of the mathematicians who "invented" curved space was *Bernhard Riemann* a devout Christian. He died young of tuberculosis, having his wife read his favorite psalms to him.

DIFFRACTION OF LIGHT. Jesuit *Francesco Maria Grimaldi* discovered the diffraction of light.

ELASTICITY THEORY. *Saint Venant* was a key contributor to elasticity theory, which was first investigated scientifically by *Sir Christopher Wren* and other men of his circle.

ELECTRONICS. *John Ambrose Fleming,* who leaned to the evangelical wing of the Church of England, was not only a Christian, but a first-rate pioneer in electronics, inventor of various items, including a "bridge" and electron tubes which were essential to the development of the field.

ELECTRO-MAGNETISM. *Ewald von Kleist* a Pomeranian bishop, discovered the Leyden jar which first made electricity available in amounts which could be studied.
*Joseph Henry* discovered inductance. He actually beat Faraday to many discoveries, sometimes by mere months, but did not publish, wanting to refine his researches, thereby losing the immortality which might have been his. He is said to have been a Christian.

*Michael Faraday,* a man of humility and Christian faith, discovered the generator and transformer and proposed field theory. He made electricity useful. Because Faraday knew little math, it was left to *James Clerk Maxwell* to state Faraday's findings mathematically. Maxwell united electricity and magnetism with light in his famous theories in which he PREDICTED the discovery of radio waves. At his death science magazines mentioned his deep Christian faith which was well-known to the entire scientific community. *Ampere's* biographers note that he undertook some of his electrical researches to answer questions which he thought had a bearing on the truth of the Christian faith. He gave us the amp. Alessandro Volta for whom the volt and voltage are named, did not live a Christian life, but wrote an apologetic for Christianity, perhaps along the lines of "Do as I say, not as I do."

**ENCYCLOPEDIA, SCIENTIFIC.** The first scientific encyclopedia featuring the characteristics we accept--contributed articles, pictures, alphabetical entries--was prepared by a minister, *John Harris.* Earlier encyclopedias with scientific and medical content had been compiled by Christians, including *Cassiodorus,* *Hildegarde,* *Isidore of Seville,* *Rhabanus Maurus,* the Dominican *Vincent of Beauvois,* *Bartholomew de Glanville,* *Johann Heinrich Alsted,* whom Cotton Mather called "the doorway to the sciences," but who is more famous as the mentor of Jan Amos Comenius. A French priest, *Louis Moreri,* also compiled an encyclopedia.

**ENTOMOLOGY.** *Jean Henri Fabre* is a name almost synonymous with the study of insects. Always opposed to atheism, he converted to Christ late in life.

**EXPANDING UNIVERSE.** The Belgian priest *Georges Lemaître* first gave us a viable mathematics for an expanding universe. His PREDICTION that the universe could not be stable was soon proven by Hubble and others. *Sir Arthur Eddington* championed Lemaître's theories in a book called *The Expanding Universe.* Eddington was a Quaker who said that the believer found arguments for the non-existence of God to be quaint.

**FIELD THEORY.** *Michael Faraday* first envisioned field theory. Having little mathematics, he was forced to rely on imagination to describe what he saw. He belonged to a small Baptist group. Faith, humility and love governed his life.

**FLUID MECHANICS.** *George Gabriel Stokes* was a pioneer in this field. He was a member of an apologetics society. A profound mathematician, he was commonly sought out for advice. He rejected Darwin's theory of evolution, saying it was based on inadequate evidence.

**FLUORESCENCE.** *George Gabriel Stokes* was a pioneer in the study and explanation of fluorescent effects. He had learned to read by reading the Psalms. As a Christian he said that evidence for Christ's resurrection must lead to action commensurate with the fact. Head and heart must go together.
GAS DYNAMICS. *Van Helmont* gave us the word gas (Dutch chaos=gaas). Believing, on Biblical grounds, that God had breathed life into man, he thought the spirit was to be found in a study of invisible gases and this led him to some profound observations. He might have been disappointed to learn that gases are just matter, after all. *Robert Boyle* also studied gas and gave us Boyle's Law of Gases in refutation of an atheistic opponent. *James Clerk Maxwell* studied heated gases and discovered principles of gaseous behavior. His statistical approach quickly led to quantum theory.

GENETICS. *Gregor Mendel,* a Roman Catholic priest and abbott, first discovered the laws of genetics with his now famous studies of the garden pea. His work lay in obscurity for many years before being rediscovered. Mendel did not accept Darwin's theory, because his own discoveries in genetics showed that creatures tend to revert to kind.

GEOLOGY. *Nels Steno,* who became a Roman Catholic bishop (and preached to people in their own language rather than Latin so they could understand the gospel) drew up the first, simple laws of geological study. He is usually named the Father of Geology. Many other Christians made major contributions to the science of geology. The minister *Adam Sedgewick* discovered and named the Cambrian. Another minister, *William Buckland* refuted Wernerism which said all deposits were laid down by water, showing definitively that volcanism played a major role. He worked closely with the *Reverend Daniel Conybeare* in a study of Irish volcanism. Lyell became interested in geology as a result of Buckland's teaching. *Louis Agassiz* was a prominent voice in promulgating ice-age theory, which he convincingly proved. He was strongly creationist, even to the point of introducing absurd ideas. Still another minister, *John Playfair,* converted Lyell's theories into readable form. *William Smith* professed Christ and drew the world's first substantive geological maps. Smith's work was championed by two clergymen, the Reverends Benjamin Richardson and Joseph Townsend. Smith was in great demand because of his immense knowledge and ability to predict underlying strata. *James Dwight Dana* wrote the first systematic geology of North America. *Hugh Miller* was an ardent apologist and geologist.

GERM THEORY OF DISEASE. *Louis Pasteur,* a Franciscan Tertiary, developed the germ theory of disease and CLAIMED that microbes transmit many diseases. This claim has been thoroughly proven. The doctor who first applied Pasteur's theories to the operating room was the Quaker *Joseph Lister.*

GRAPHING. *Nicole Oresme* is the first person known to have prepared a scientific graphing. Galileo borrowed one of Oresme's graphs in his own work. Oresme was a popular preacher and a vehement opponent of superstitious practices such as astrology. Some claim Oresme's work as the predecessor of Cartesian geometry.

GYNECOLOGY. *James Young Simpson* is but one of several Christian doctors who made significant advances in gynecology.
HELIOCENTRISM. *Nicholas Copernicus* was a canon in the church of Rome. Whether he was a born-again Christian is doubtful, but his mind-set was clearly cast in the Christian philosophic mold, making his discovery possible.

HYDRAULICS. *Blaise Pascal,* author of the famed Pensees, "Thoughts," which have inspired Christians for centuries, was the first to show how water pressure could be applied evenly, the principle of the hydraulic jack.

ICHTHYOLOGY. *Louis Agassiz* by his comparison of fossil fish and studies of living fish was one of the great founders of ichthyology. He was strongly creationist in his views.

MASS-LUMINANCE LAW. Quaker scientist *Sir Arthur Eddington* did work on stellar masses which led directly to the mass-luminance law. He PREDICTED the existence of variable stars, of a certain threshold mass. These stars, called Cepheids, were soon discovered. Because their mass is known from the work of Eddington and others, they serve as markers for the measurement of distances in space.

MINERALOGY. *Gerogias Agricola* is considered the Father of Mineralogy. Deeply devout and humane, this keen observer attempted to make a science of a mass of seemingly unrelated data he gathered. In more recent times, James Dwight Dana* created a massive, scientific systematization of mineralogy which long remained the standard, definitive text on the subject. He was closely allied with *Dr. Benjamin Silliman,* one of America's premier science teachers and helped give Dana his start. Silliman was strongly Protestant. *David Brewster,* whose Christianity almost led him to become a minister, used optics to study minerals, especially polarization. *Augustin-Jean Fresnel was involved in studies of crystal polarization also, and he, too, chose Christ.

NON-EUCLIDEAN GEOMETRY. When *Bernhard Riemann* died, a biographer noted that he had served Christ outside the pulpit as his father had served Christ in the pulpit. Riemann's father had intended his son for the ministry, but Riemann chose mathematics instead. He created a major branch of non-euclidean geometry and did other mathematics of much value.

OCEANOGRAPHY. *Matthew Maury* created the science of oceanography because he believed the Bible when it said there were paths in the seas. Obtaining millions of observations world-wide he and his assistants compiled charts of currents and winds. The practical result was huge savings for world shipping. His Christian belief ran deep and touched all he did.

OPTICS. *George Berkeley,* idealist philosopher and Christian bishop, showed how images form upside down in the eye. The French protestant *Augustin-Jean Fresnel* invented the Fresnel lens used in lighthouses. *David Brewster,* who gave his name to several laws of light, was devoutly Christian. *Sir Isaac Newton* theorized on the nature of light. Some of his findings were useful, but others erroneous. */Deitrich of Frieberg,* *Witelo,* and others made contributions. See also COMPOUND MICROSCOPE.
PALEONTOLOGY. *Georges Cuvier* created the science of paleontology, using bones dug from beneath Paris. He was brilliantly able to deduce function from bones.

PHOTOGRAPHY. *Sir John Herschel,* a man won to sincere Christianity by the character of his wife, coined the terms POSITIVE and NEGATIVE. He discovered hypo as a fixative agent.

PHYSICS. It is almost impossible to list the Christians active in the history of physics. A short list would include *Philoponus,* *Bradwardine,* possibly *Buridan,* *Galileo,* and *Newton,* the Mertonians, *Grosseteste,* *Faraday,* *Maxwell,* *Thompson (Kelvin),* *Tait,* and more.

POLARIZATION OF LIGHT. We have already mentioned *David Brewster* and *Augustin-Jean Fresnel* in connection with polarization. See OPTICS.

RELATIVITY THEORY. Einstein built his theory of relativity on the work of three men, two of whom were Christians. The first of these Christians was *Bernhard Riemann* who had developed the mathematics of Riemannian Space, which Einstein found could explain the curvature of space. The other was *James Clerk Maxwell* whose equations and work with pre-quantum physics led directly to modern physics. Einstein's work was to some measure forced by the famous Michelson-Morely measurements of the speed of light which showed that the speed of light is an absolute. Einstein sought and found the explanation. *Edward William Morley* was the Christian half of that experimental duo.

ROYAL SOCIETY. The premiere scientific organization of England was founded by Christians and had an initial membership almost entirely Christian. Among the charter members were the Protestants *Robert Boyle,* *Sir Christopher Wren,* the preacher *John Wilkins,* and the Christian *John Wallis."

SCIENTIFIC METHOD. *Bishop Robert Grosseteste,* a reform-minded cleric of the 13th century, is the first man known to have explicitly spelled out the scientific method. His methodology was made world-famous by his pupil, the friar *Roger Bacon.* Both PREDICTED that application of their methods would result in the systematic acquisition of knowledge--a result which followed. Bacon especially enumerated the results, which included submarines and flying machines.

SCIENTIFIC PAPER. *Robert Boyle* wrote the first scientific paper in modern format, showing what instruments he used, the conditions of experiment, his hypotheses and conclusions. The model he developed has been followed ever since. Among his many Christian activities was funding of Bible translations and provision of support to persecuted Welsh clergy who refused to adopt Church of England liturgy.

SPECTROSCOPY, STELLAR. Two of the most famous pioneers in stellar spectroscopy were Christians: *Pietro Angelo Secchi* and *William Huggins.*
SPONTANEOUS GENERATION. *Louis Pasteur* proved that spontaneous generation was impossible. Not so well known is that many of his methods of proof were improvements on work taken directly from the Roman Catholic priest *Lazzaro Spallanzani.*

STATISTICAL MECHANICS. The American Congregationalist *Josiah Willard Gibbs* and the French Catholic *Pierre Duhem* were two Christians whose work led to an understanding of the thermodynamics of and equilibrium in chemical systems.

 STELLAR MAPPING. Many Christians were engaged in stellar mapping. Some made contributions of the highest calibre. Among them were *William and John Herschel,* *John Flamsteed* (founder of Greenwich Observatory), and the curate *Nevil Maskelyne* who became director of Greenwich.

SYMBOLIC LOGIC. Even the great Lutheran *Gottfried Wilhelm von Leibniz,* co-inventor of calculus, was unable to invent a workable symbolic logic although he took key steps in that direction. Success awaited the efforts of Irish-born *George Boole,* a man who held and practiced the Christian faith.

THERMODYNAMICS. *James Joule,* and *Lord Kelvin* are two famous names associated with the development of thermodynamics. Both were Christians, Kelvin more openly so.

TOPOLOGY. *Leonhard Euler,* famed as a mathematician and the butt of Voltaire's ridicule for his apologetics, created the science of topology with his study of the seven bridges puzzle.

TRANSFINITE MATHEMATICS. The Roman Catholic Czech theologian *Bernhard Bolzano* was one of the first to attempt a significant infinity theory. However, other Christian mathematicians such as *Weierstrass* and *Cauchy* also made contributions. It was, however, the brilliant mathematician and Protestant convert *Georg Cantor* who finally set the subject on a scientific basis. His work was embraced by the Jesuits.

VACCINATION. The most famous champion of vaccination was a Christian doctor, *Edward Jenner,* who did his work against fierce opposition and in the teeth of threats against himself. In effect he wiped out smallpox from among the diseases that terrify mankind. He died from a cold caught carrying firewood to an impoverished woman.

VACUUM. In the face of furious contradiction, *John Philoponus,* a Christian philosopher of the 6th century, CLAIMED that vacuum existed between the stars. This notion was derived from his creationist beliefs, and was directly contrary to Aristotelian teaching. This has since been confirmed. *Blaise Pascal* of Jansenist leanings, finally proved the possibility of vacuum in the 1600s. *Robert Boyle* developed a vacuum pump in conjunction with Robert Hooke and systematically showed the effects of vacuum and the role of air. Boyle's Law of Gases, found in chemistry texts, was one result.
WAVE THEORY OF LIGHT. *Thomas Young,* a Quaker, was the first to perform a double slit experiment and to show that light acted as a wave. The French Protestant *Augustin-Jean Fresnel* confirmed and mathematized Young's findings.