GREAT SCIENTISTS

Pathetic side of their lives

An *INSPIRING* book especially for—

Unprivileged Science Students

–An Incomplete Version

ROSS NAZIR ULLAH

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PREFACE

This book has been compiled in response of two situations; firstly those that I encountered during my teaching experience with science students and secondly talking to friends about the lives and works of scientists.

In this book you will find only those scientists who got some pathetic part in their lives. I have tried my best to collect as many scientists as possible that fall in this category.

Entries are not listed in alphabetical order. Each entry contains a short account of major achievements and early life followed by pathetic moments in their lives.

An important aim is to provide unprivileged students with a challenge. I am particularly concerned about science students obtaining low scores in the exams. It has been designed for personal possession as a guide and for consultation in colleges and universities.

All first efforts to develop a genre in a particular direction suffer from the constraints of space and time, and this may have led us to fall short of our self-imposed standards. I became aware in this selection that how fascinating history of scientists' biography excitingly unveils their values and attitudes.

This book has two chief features; firstly, short biographical sketch and secondly, the tragic moments in one person's life. However, these two features also prove to be the major limitations of mentioning some important, informative, interesting and scientific achievements in the lives of the scientists.

I very much welcome feedback from readers, which will enable to improve its coverage or treatment in future editions.

Ross Nazir Ullah

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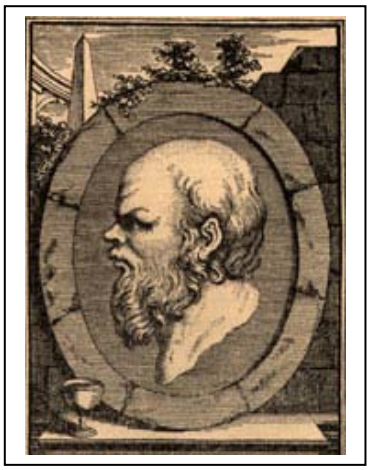
Socrates (469 - 399 B.C.)



Socrates was an ancient Greek philosopher, who profoundly affected Western philosophy through his influence on Plato. Born in Athens. He initiated a question-and-answer method of teaching as a means of achieving self-knowledge. The sacred Oracle in the city of Delphi declared that he was the 'wisest man in the world', but Socrates never wrote a book.

Socrates studied the Sophists, Ionian philosophers, and the culture of Athens in the time of Pericles. Socrates believed in the superiority of argument over writing.

Socrates believed he could serve his country best by devoting himself to teaching and persuading Athenians to engage in self-examination. His logic emphasized rational argument and the quest for general definitions. He believed in a purely objective understanding of justice, love, and virtue.

His life and ideas were recorded by his pupil, the great philosopher Plato, and by the historian Xenophon. He was a soldier in the Peloponnesian War, and afterwards returned to Athens. His theories of virtue and justice have survived through the writings of Plato. Socrates liked to spend his time in the streets and market places of the city, talking with whoever would listen to him. He claimed to receive a kind of divine guidance in his wisdom.

Although a patriot and a man of deep religious conviction, Socrates was disliked by many of his contemporaries, who disagreed with his attitude toward the Athenian state and the established religion. Eventually he got trouble with the Athenians government, who thought his claim was blasphemous. In 399 BC he was brought to try, charged with blaspheming, as well as corrupting the minds of Athenians youth, leading them away from the principles of democracy. He defended himself skillfully, and was only found guilty by a tiny majority of those who tried his case. He was sentenced to death. His friends planned his escape from prison, but he insisted on complying with the law and dying for his cause. He calmly fulfilled his sentence by drinking a cup of hemlock (poison), a customary procedure of execution.

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Archimedes (c. 287 B.C. - 212 B.C.)

He is the greatest of ancient Greek mathematicians. Creator of Statics and Hydrostatics.

Born in Syracuse, a city of Sicily in about 287 B.C. His father Phidias was an astronomer, he was on intimate terms with King Hiero himself.
He was brilliant at maths, especially in geometry. His work in geometry, hydrostatics and mechanics was of a pioneer nature.
His many discoveries and inventions include the Archimedes Screw, Archemedes Principle, and the value of 'pi' (π).

Foreheads were tapped of mad man, obviously suffering from the effects of the day's Sun. The naked runner passed, busy tongues speculated on the happening. This feat of absent-mindedness was done by Archimedes. Hiero, King of Syracuse, suspected the golden crown, given the task to this great mathematician. In the normal course of that routine, he went to the public bath. Suddenly he splashed out of his tub, shouting: "Eureka! Eureka!".

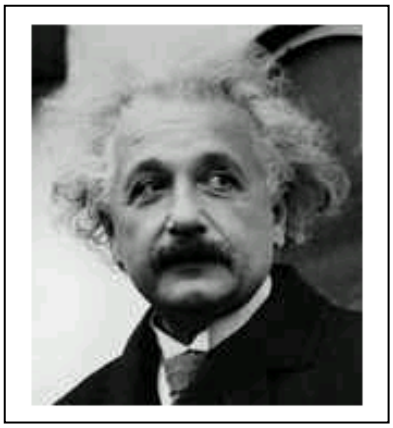
Roman general Marcellus laid siege to Syracuse. Archimedes is sometimes credited with having set the Roman fleet on fire by means of an arrangement of mirrors and lenses. Archimedes refused to attach any value to his mechanical inventions, as he regarded them as beneath the dignity of pure science. He wrote many books. Some of them are now lost.

Archimedes was sometimes strange in his manner. He was often so absorbed in his scientific problems that he neglected his person and had even to be taken to the baths by force. It is recorded that during his ablutions he drew geometrical designs in the soapsuds on his body.

He was killed when the Roman soldier ordered him to come on, the general wanted to see him. "Eh? What? Oh, go away. I'm busy in my problem". Archimedes answered. An angry flush mounts to the Roman's cheek. A thrust of the short, broad sword, and Archimedes falls on top of his infinished problem.

In 75 B.C. Cicero found the tomb of Archimedes near Agrigentine Gate, over-grown with briars and thorns. His tomb was marked by the figure of a sphere inscribed in a cylinder.

Albert Einstein (1879-1955)



German-born American physicist and Nobel Laureate. The father of 'Theory of Relativity',which altered mankind's fundamental concepts of space and time, and for his bold hypothesis concerning the particle nature of light.

Einstein was born in Ulm. His family owned a small shop. His father's business demanded moving frequently which resulted in irregular education for his son. When his father's business failed, they moved to Milan, Italy, Einstein quit school, without earning a diploma. To bolster the family's meager finances, he took the examination for entrance to the Federal Institute of Technology in Zurich, which did not require a high school diploma. Because he was unprepared, he failed.

He did not speak until he was four year old and didn't read until he was seven. His teacher described him as 'mentally slow, unsociable and adrift forever in his foolish dreams'. At the age of 12 he taught himself Euclidean geometry. In Munich, he read philosophy, mathematics, and popular science on his own. He was expelled and was refused admission to Zurich Polytechnic School.

Einstein was a quiet, withdrawn child who was attracted to mathematics but otherwise disliked school because of its rote teaching and army like discipline. He often cut classes and used the time to study physics on his own or to play his beloved violin. He passed his examinations and graduated in 1900 by studying the notes of a classmate. His professors did not think highly of him and would not recommend him for a university position.

He was unable to get the post of a school teacher. He found employment in the Patents Office in Berne as a junior clerk and he devoted most of his spare time to research. For two years Einstein worked as a tutor and substitute teacher.

His General Theory of Relativity created a raging controversy among scientists since it challenged Newtonian Physics. Also he proposed Quantum theory. Virtually no one accepted Einstein's proposal. Einstein's efforts in behalf of social causes have sometimes been viewed as unrealistic. Most of Einstein's colleagues felt that these efforts were misguided.

Being a shy man, the glare of publicity embarrassed him. In 1933, while Einstein was on a lecture tour abroad, the Germans confiscated his property and took away his citizenship. Einstein died in Princeton on April 18, 1955.

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Roger Bacon (c. 1214 – 1292)

English philosopher and often regarded as first carried out research into optics and invented the magnifying glass.

Born at Ilchester, Somerset, England.
Little is known of Bacon's early life.
He appears to have come from a wealthy family.

Bacon's scientific works contain lengthy philosophical digressions. He is the disciple of Aristotle.

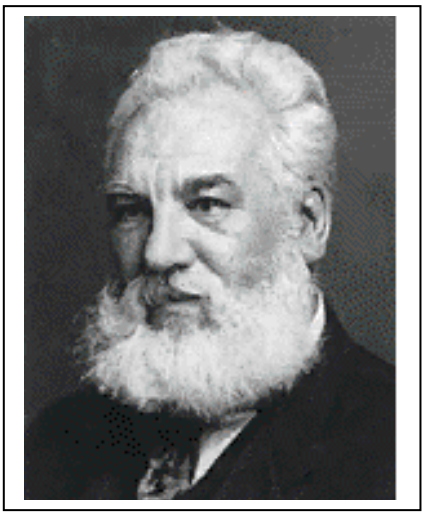
About 1247 he joined the Franciscon Order, and three years later he returned to Oxford, but it appears that his quarrelsome nature and independence of thought led him into conflict with his colleagues. From 1257 onward he pursued his studies in isolation—traditionally at a house on Folly Bridge that stood until 1799—taking no part in University affairs.

He had remarkable powers of imagination and many of his prophecies have been fulfilled. They include mechanical transport on land and sea, aerial flight and submarine exploration.

Some time between 1277 and 1279 Bacon was condemned to prison by his fellow Franciscans because of certain suspected noveltics in his teaching. How long he was imprisoned, it is not possible to determine. His last work , incomplete as so many others, was written in 1292 and shows him as aggressive as ever. He was suspected by many of being involved in magic. He may have been imprisoned by the church authorities, who disapproved his writings.

He died on 11th June 1292 and was buried in Oxford.

Alexander Graham Bell (1847 – 1922)



He invented the telephone. Also invented photophone, aids for teaching the deaf.

Born in Edinburgh, Scotland on March 3, 1847. His father Alexander Melville Bell, was a famous teacher of elocution, an expert on phonetics, and author of a system of "visible speech'.

In 1870 Graham Bell's health began to decline; there were fears of consumption. So with his father, he left his native country and went to Canada.

He spent much of his life working with deaf-mute people and experimenting with sound.

The most extraordinary thing of inventor of the telephone, is that he hated the telephone. When he retired to his country house at Baddeck to wrestle with the manifold problems of invention, he stuffed his telephone bell with paper to prevent it from interrupting his work.

He gave numerous addresses and published many scientific monographs. Bell was the founder of the American Association to Promote the Teaching of Speech to the Deaf. Also he helped founding the National Geographic Society.

Throughout his work Bell Maintained his two main fields of study; his tuned system of multiple telegraphy and the study of air waves within the ear during reception of voice sounds.

He died on August 2, 1922, at his summer home near Baddeck, Nova Scotia.

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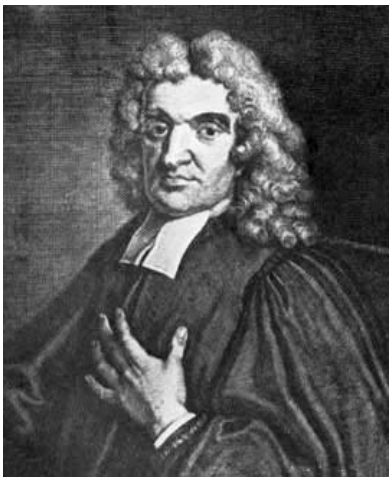
John Flamsteed (1646 – 1719)



He was the father of modern astronomy; the first Astronomer Royal, who corrected all the astronomical tables in use in 17th century.

John Flamsteed born on August 19, 1646 at Denby, Greenwich. His father Stephen Flamsteed, was a maltster. After three years, his mother had died.

The cold brought other ailments in its wake. Primarily a rheumatic affliction of the joints.

Young John became very ill, rheumatism crippled him; he grew unable to walk to school and left in May 1662. From his fourteenth year to his death, Flamsteed struggled against illness and physical agony, but the illness gave him opportunity. He could not go to school, so he began to teach himself. He read the books between the agonizing bouts of his illness.

It was not long before his talents attracted notice. Friends lent him books, and he repaid them writing papers. In order to buy astronomical instruments, he took private pupils, during his service in Royal Observatory at Greenwich. From 1676 to 1709 no fewer than 140 pupils sat under him. His first observation was made in September 1676; unable to afford assistance, he worked single-handed for thirteen years ; by 1689 he had made 20,000 observations.

For John Flamsteed, the chuckling, rheumatic, crippled, suffering, irritable old man, who first studied the heavens from a bed of pain, had made one of the richest contribution to practical astronomy that the world has seen.

He was still working and observing when he was taken ill on December 27, 1719; on the last day of the year he was dead.

William Harvey (1578 – 1657)

He opened a new era of medical science by introducing his theory of the circulation of blood in the body and made profound discoveries in the science of mbryology.

He was born at Folkestone, England. He was the son of Thomas Harvey, a yeoman-farmer. He was one of 'a weak of sons where of this William, bred to learning, was the eldest'; William was a voracious student, first studied in King's School, Canterbury, and afterward to Cambridge.

In 1597 after a serious illness Harvay travelled to Padua, at that time the most famous school of medicine in the world. There in the candle lit lecture hall of the University, he listened to Fabricius of Aquapendente, the great anatomist. That proved the starting point of his discovery.

He was present at the Battle of Edgehill. His task was to take care of the Prince of Wales then twelve years of age. Harvey sought the shelter and started reading a book from his pocket, which was interrupted by a cannon ball dropped near by. But William Harvey was not satisfied with being the foremost anatomist of his day.

By studying animals given to him by his regal employer, Harvey eventually developed an accurate theory of how the heart and circulatory system operated. He published his theories in 1628, which made him notorious throughout Europe. Many people thought it was absurd, and others took it as a threat to their understandings of how the body worked. Controversy went for years. It was believed by the vulgar that he was crack-brained; and all the physicians were against his opinion. At last after about 30 years it was received in all the universities in the world.

Harvey remained a physician at St. Bartholomew's until 1643. He maintained his college lectureship until 1656, the year before his death, missing by a moment the dismantling under Cromwell of the monarchy that had supported his research throughout his life.

When he was 68 years of age and much troubled with gout, which he sought to ease by putting his feet in cold water. In 1654, his busy life was now declining. His health was poor, although almost to the last he maintained his clarity of mind. On June 3, 1657, he was struck down by paralysis. Unable to speak, he managed to distribute some of his personal belongings to his nephews and then died. He was buried at Hempstead in Essex. His wife died childless some years previously.

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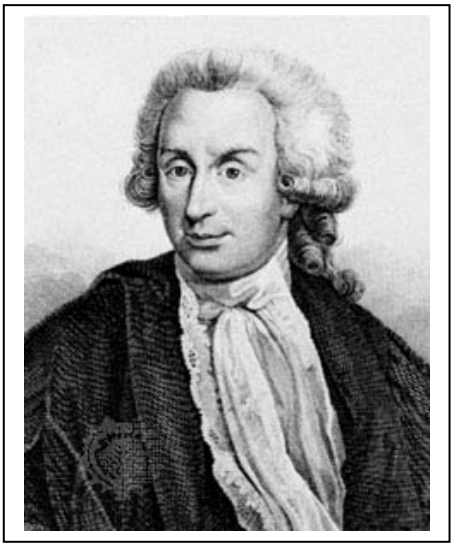
Luigi Galvani (1737 – 1798)



He was one of the pioneers of electricity. Introduced the theory of galvanism.

Luigi Galvani was born at Bologna on 9th September 1737. He was a deeply religious cast of mind, but his parents educated him as a physician. He made anatomy his special study, and in due time was appointed lecturer in that subject at the University of Bologna.

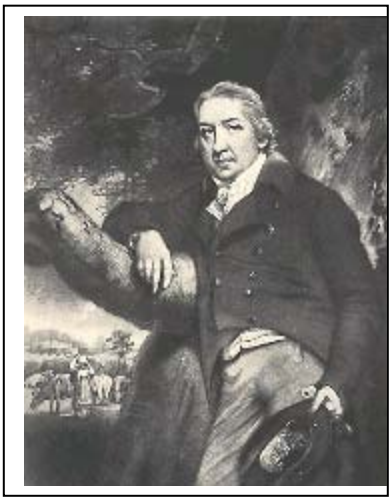
Galvani married the daughter of a physician named Galeazzi; and the story goes that it was mainly to this lady's observant eyes and sound sense that we owe the discovery of galvanism. She noticed that the legs of a dissected frog lying on her husband's table were violently convulsed when they touched a scalpel which had been in contact with an electrical machine.

Galvani seldom stirred out of his native city, never out of his native land.

Galvani published his discoveries which was reprinted several times. He taught as quiet, uneventful respected university professor. But politics invaded the realm of science; and the result was disaster to Luigi Galvani. He had never wavered in his devotion to the Papacy. He was quite prepared to suffer for his fidelity to the Papacy.

Deprived of his post at the University of Bologna, he retired into private life, taking refuge with his brothers. This disastrous end to his career affected his bodily health; and through grief and mortification he fell into a decline. He took no more interest in life, and, though the authorities recognizing his gifts, offered to reinstate him in his post, the offer came too late, for he died in Bologna on 4th December 1798.

Edward Jenner (1749 – 1823)



He worked for twenty years to establish at last his principle of vaccination, which was recognized as an effective preventive of smallpox.

Edward Jenner was born at Gloucester, England on May 17, 1749. He was the son of the Vicar of Berkeley, and at the age of thirteen was apprenticed to a surgeon. He spent all his life in his father's vicarage at Berkeley.

Before Jenner published his discovery, after more than twenty years of research, Sir Walter Farquhar said to him that if he chose to preserve it a secret, he might make 100,000 lbs by it. But Dr. Jenner determined to give it to the world.

Edward Jenner was modest by nature and yet impervious to unscrupulous opposition. He had two kinds of opposition to face. The first was the direct attack of the conservative medical men of the time, who regarded vaccination as a dangerous practice; the second was much more difficult to deal with. No sooner he published his results, the village quacks offering "the genuine vaccine operation of Dr. Jenner", and the people that were thus infected with disease were innumerable.

Jenner wrote a letter and Empress Josephine went to plead for the release of some English prisoners. At first the Emperor was adamant, but when Josephine said it was Jenner who was pleading, Napoleon said, "Ah! We can refuse nothing to that name". So highly was the name of Jenner thought of that certificates signed by him acted as passports and secured the release of other prisoners in countries as far apart as Mexico and Austria.

In 1810 his eldest son died, and this loss and the strain of his labors caused Jenner to have a breakdown. He retired to Berkeley only going up to London on important business. Although to all appearance he seemed destined to live many years longer, his unflagging industry and care for others had taken its toll of his strength, and he was found on the morning of January 24, 1823, unconscious on the floor of his library. His right side was completely paralyzed. The next day this benefactor of mankind passed to his reward.

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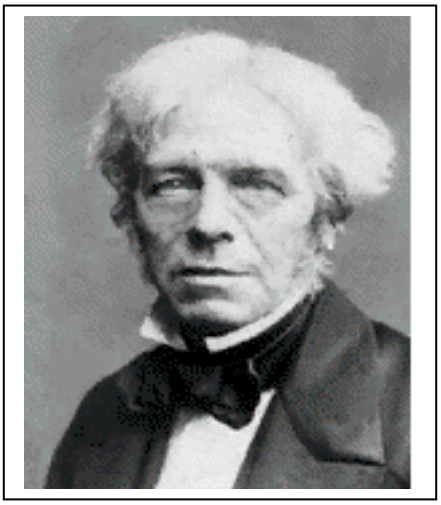
Michael Faraday (1791 – 1867)



He was a great chemist as well as physicist. He made electricity a domestic and industrial slave. His achievements are among the highest ever attained by humanity, for the fruits of them may never be exhausted.

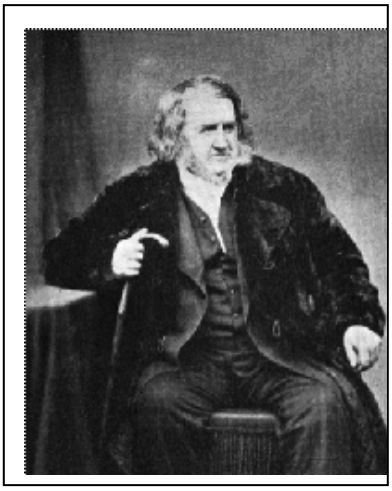
Michael Faraday was born at Newington Butts, London. His father, James Faraday, was a blacksmith. He was hard put to it to make ends meet, and the young Michael experienced the hardships of poverty throughout his childhood. His education was minimal. At the age of thirteen, he had to leave the school and go out to earn his living. He became an errand boy for neighboring book-seller. His job consisted mainly of carrying and delivering newspapers. It is hard now to imagine becoming a great scientist without secondary schooling; what Faraday lacked was a training in mathematics. He was a self-taught scientist; he had practically no proper education.

Faraday belonged to a very religious group. They did not believe in pride and vanity and Faraday turned down the presidency of the Royal Society and a knighthood.

At the Royal Institution, Davy engaged him as a laboratory assistant at 6 dollars a week. He went every working day into his laboratory with some new question to put experimentally to Nature and he never paused until he had a sufficient answer, 'yes' or 'no', to his query. During his work at this period both he and Davy were several times injured by explosions of chloride of nitrogen, a dangerous gas. Faraday had first been a bookbinder, and he had gained Davy's favour by presenting him with a bound copy of notes made at his lectures. Lady Davy used him as a menial and almost drove him to return home. At Geneva Davy was the guest of his friend, who was shocked when he found out that Farady was living with the servants. The courteous host accommodate by sending Faraday's meals to his own room.

In 1836 Faraday made world's first installation in the South Foreland Lighthouse, which was to be lighted by electricity. After the intense, original and lonely work concerning electricity, and perhaps from getting too much mercury into his system in the laboratory, Faraday had a breakdown in health in 1839. His nerves were shattered, and his mind was seriously shaken. For three years he did nothing, not even reading on science. At length he retired, giving up his last active work in 1865. From then until his death on August 25, 1867, he spent his time, with failing memory, "just waiting".

Sir James Young Simpson (1811 – 1870)



He introduced the use of chloroform. Pioneer of gynecology. Distinct meteorological observations.

He was born on June 7, 1811, at the village of Bathgate, Linlithgow, Scotland. His father James Simpson was a baker. He had spent his early years in the primitive and superstitious atmosphere of the Scotish country side. He observed the slaughter of animals and the burial alive of a cow because it was believed to save from affliction the other village cattle. These early impressions helped him in his determination in later life to conquer pain.

James Simpson was the seventh son of his father. As a boy he was quick at his studies and practical in everything he did. When he came home from school he would mind the bakery when his mother went out. Poor though they were, the Simpson family decided that James should be given a chance of making a name for himself, and they pooled their money to send him to Edinburgh University.

Although the sight of the tortures undergone by patients on the operating table shocked him. Simpson was indescribably moved by the agonies of the women patients he had to deal with, and the memory of an operation in which the knife was used in a case of childbirth never left him.

One night of November 4, 1847, Simpson took a small bottle of chloroform. It was poured out into the glasses, and the three men began inhalation. After a while, they were all of them struck. One after another of the doctors slid to the floor with a crash. Simpson was first to recover, and his first thought was for the success of his experiment.

In 1886 he was honoured with a baronet for the introduction of chloroform. The congratulatory letters for the baronetcy had hardly ceased coming in when they were followed by letters of condolence, for his eldest son, died suddenly a few days after and only a month later he lost his daughter, at the early age of seventeen.

Simpson was utterly shattered by these blows. His health broke down, though he continues to work until it was physically impossible to do so any longer, and on May 6, 1870, this man who had used sleep to conquer pain in others had to surrender, and he sank, not altogether regretfully, into that sleep from which no man could wake him.

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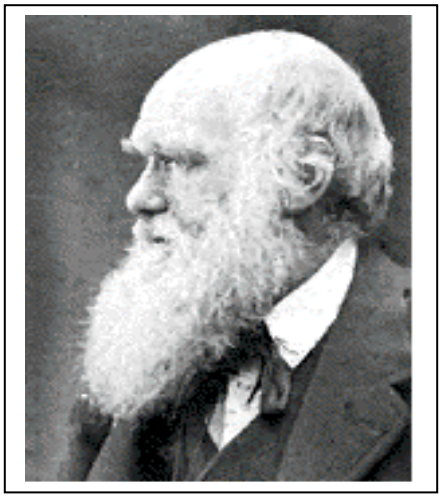
Charles Robert Darwin (1809 – 1882)



He gave us a new conception of creation. He set forth his theory of Natural Selection as the means of evolution which he outlined in 'Origin of Species'. Today parts of the theory have been modified.

Charles Darwin was born on February 12,1809. He was the fifth child in a family of six. His father was Erasmus Darwin, a physician. As a doctor he was famous. When Charles had only reached the age of eight, his mother died. He was looked after by his father and his elder sisters.

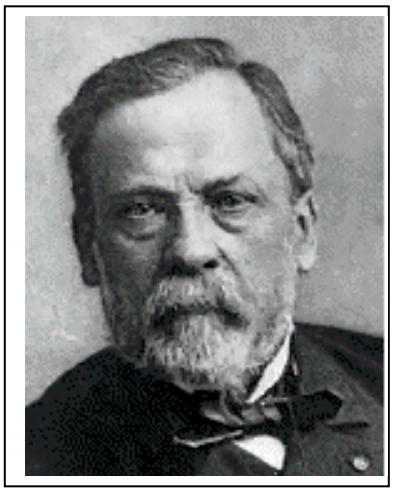
In 1818 he became a boarder at Shrewsbury School. He picked up education during his school life, from private lessons in Euclid and from Chemistry experiments in a home-made laboratory which his brother rigged up in a toolshed at home. He was actually rebuked at school for wasting his time upon it. He gave up a medical career and was told by his father, 'You care for nothing but shooting dogs and rat catching'. He said, "I was considered by all my masters and by my father a very ordinary boy, rather below the common standard in intellect".

In 1831 he joined an expedition as naturalist without pay. The voyage lasted five years. After visitation of many islands, Darwin returned with a magnificent collection.

Ill-health mainly dyspeptic trouble, dogged him all his life, although he was accustomed to conceal his suffering. It was his habit to work quietly in his peaceful retreat at Downe until at last his health broke down completely, and then he would recruit his strength with a short holiday and prepare for another spell of labor.

He worked steadily to the end. He divided his days into short spells of labor and rest, and he worked to a regular program. His own ending came on April 19, 1882, at Downe, and science mourned the thinker who had changed man's whole conception of the world.

Louis Pasteur (1822 – 1895)



He discovered the existence of bacteria in fermentation and put medical science on the tract of the cause of many diseases. He crushed the terrors of anthrax, hydrophobia, and rabies.

Pasteur was born on December 27, 1822, at Dole, Jura. He was the son of a tanner who had been a sergeant major in Napoleon's Army of the Peninsula.

Shortly after Pasteur's birth, his family removed to Arbois, and there he first attended school in the Latin Quarter of Paris, where homesickness and loneliness caused a breakdown in his health. The only brother died in infancy, encouraged by his parents and sisters, his youthful enthusiasms was not science but painting and drawing.

His whole interest lay in his work. Had it not been wife. Pasteur's constant vigilance at the required times, he would never have attended the meetings of the academics and committees to which he belonged. She only opposed him, and then sweetly and gently, when she thought his work was affecting his health. To him, silence was indispensable when he was working.

In 1865 Pasteur was requested by the French Government to investigate a disease which was attacking silk worms. Within three years he was successful. At this time he was stricken with semi-paralysis, but he was able to return to Paris and continue working.

Pasteur was so eager to secure specimens of the germ of rabies that on one occasion he actually sucked through a tube the saliva of a mad dog. The sublime courage of this act will be realized when it is remembered that it is through the saliva that the mad dog transmits the disease. He ended by discovering a curative serum.

By the time of Pasteur's death in 1895, about 20,000 people world wide had been treated for rabies, with fewer than 100 deaths.

His seventieth birthday was an international event, made even more moving by his increasing frailty and by the knowledge that for almost twenty-five years he had soldiered on with the serious physical disability of a left-sided paralysis, following an almost fatal stroke.

On September 27, 1895, when someone leaned over his bed to offer him a cup of milk, he said sadly: "I cannot', and with a look of perfect resignation and peace, seemed to fall asleep. He never again opened his eyes to the cares and sufferings of a world, which he had done so much to relieve and to conquer.

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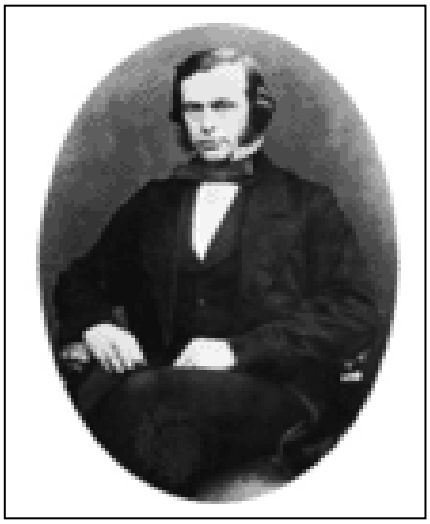
Joseph Baron Lister (1827 – 1912)



He applied the first anti-septic measures which are now the common place basis of one aseptic surgery. Previously the mortality was so terrific that if on 25 per cent of the patients operated in the hospital died, the hospitals thought to be congratulated.

Joseph Lister was born on April 5, 1827 at Upton Lane, West Ham. His father was Joseph Jackson Lister. As Joseph's family were Quakers, he could not go to any of the schools which might have assured him a career. He was educated privately and strictly, and grew up to be a young man of serious countenance. Of average height but slender build, he had a large, intellectual head, dark, luxuriant hair, and side whiskers. He wore the curious black coat favoured by the Quakers, and altogether presented a rather odd appearance.

In 1903 he had a serious illness from which he never really recovered, and for the remaining nine years of his life he was practically a cripple. He never wrote a book because his life was so crowded with work, and when his days of leisure came Lady Lister was not there to inspire him and help him as in the past. His faculties gradually began to fail him; and, like a tired child, he fell asleep on February 10, 1912.

The funeral took place in the Abbey, and the great building was thronged with highest names along with the poor and the halt and the lame, whose sufferings he had soothed and whose lives he had saved.

Joseph Priestley (1733 – 1804)

He was a chemist, ‘discovered’ oxygen. He made contributions to fields such as the study of electricity. Priestley wrote history books and spent time as a teacher.

Joseph Priestley was born on March 13, 1733 at Birstal in the environs of Leeds. His mother died when he was six, and his father, a cloth-dresser by trade, later arranged for Joseph to be brought up by his aunt in Heckmondwike. He attended local schools, making good educational progress despite a tubercular illness.

At the age of eleven, he had imprisoned spiders in bottles to ascertain how long they would survive without a replenished supply of air. The charcoal discovery was actually part of an experimental attempt to restore air which had passed over burning charcoal or through lungs.

Priestley’s career took him through contrasting environments as teacher, minister, tutor and librarian. He was given support by like-minded men. When, for example, he moved to Birmingham in 1780, it was through the considerable financial aid of such people.

Priestley believed in the possibility of the continual moral and material betterment of humanity through science, education, religious and political reforms. He maintained a high public profile as a leading religious Dissenter, and as a champion of political liberty in the age of the American and French Revolutions, gaining a notoriety which eventually resulted in the destruction of his house and laboratory in Birmingham in July 1791. The laboratory’s equipment was valued at more the 600 lbs, a figure which compares very favorably with valuations of public laboratories of the period. As he emphasized the importance of instruments for scientific teaching. He was also a political activist – a radical – who was finally forced to flee to America after being persecuted at home for his extreme views.

Priestley died on February 6, 1804. His life bore many features; discoverer, champion of liberty and free speech.

22

Alan Turing (1912 – 1954)

During World War II he applied his ideas on the nature of thought and logic to help create the first embryonic computers. From such primitive machines he envisioned a computer industry and machines capable of intelligent thought.

His father was an official in the Indian Civil Service, and his education was in traditional English preparatory and public schools which paid little attention to science. He emerged as a quiet, firm, intensely individual, and isolated person.

He was also a very unusual character, full of all sorts of quirks sometimes endearing and sometimes irritating. He was not a person who fitted in – either socially, or scientifically. He would certainly not fit into the picture of scientists busily making observations and correcting the results.

For Alan Turing the scientist was also – according to the law – a criminal who was caught by the police early in 1952. His crime came to light because he resisted a petty form of blackmail arising out of an affair with a young man in Manchester. Turing refused to say he had done wrong, but he had foolishly given the police a statement and had to plead guilty. He was given a year's probation.

The mathematician's war, like the physicists' war, had not ended in 1945 – although it remained a lot more secret. The disclosure of his crime obliged him to cease such work, and his visits abroad created further anxiety for the state. None of this explains his death in June 1954, but one can safely say that it took place against a background of acute pressures. He died by eating a cyanide-poisoned apple.

Ulugh Beg (1394 – 1449)

Its title meaning "great prince" and the name by which Muhammad Taragay, Mathematician and astronomer, came to be known in later life.

Beg was born at Sulaniyya , Iran on March 22, 1394 and was brought up at the court of his grandfather Timur. At the age of 15 Ulugh Beg became ruler of the city of Samarkand and the province of Maverannakhr.

Although his grandfather was interested in conquest, Ulugh Beg's leanings were towards science and, in particular, astronomy. In 1420 he founded "madrasa", in Samarkand.

The *Zij* of Ulugh Beg and his school is a large work that was originally written in the Tadzhik language. It consists of a theoretical section and the results of observations made at the Samarkand Observatory. Included in the work are tables of calendar calculations, of trigonometry, and the positions of planets, as well as a star catalogue.

Ulugh Beg and his collaborator Alkashi took great pains to determine accurately the sine of 1^{o} by two independent methods.
The catalogue of stars in the *Zij* contains 1,012 stars and includes 992 fixed stars whose positions Beg re-determined with unusual precision. This was the first star catalogue to be produced since that of al-Sufi, nearly five centuries earlier.

In 1447 he succeeded his father, Shah Rukh, to the Timurid throne, but he met a tragic and violent death when he was murdered at the instigation of his own son on October 27, 1449.

His three-storey observatory was reduced to ruins by the beginning next century.

24

Robert Hutchings Goddard (1882 - 1945)

An American engineer who realized that solid substances were too heavy to power rockets, and so designed the first liquid-fuelled rocket.

Raised by his old-line Yankee family in middle-class suburbs of Boston, Goddard was a studious child whose academic development was thwarted by ill health.

The American government was at first not interested in his ideas, but after his death Goddard's widow received over one million dollars for the use the government had made of his designs in the American Space programme.

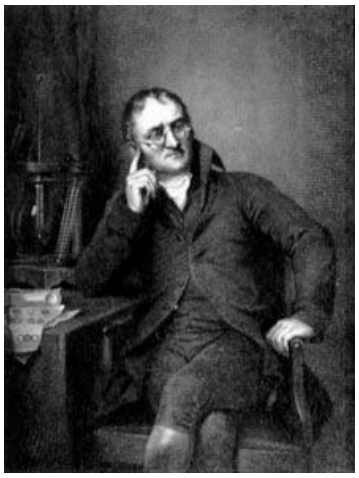
Goddard worked out the theory of rocket propulsion independently; and then almost alone he designed, built, tested, and flew the first liquid fuel rocket on 16 March 1926 in Massachusetts. Although Goddard seriously studied experimental physics throughout his life, whether teaching or doing applied research for the government, he began to dream of astronautics in 1899 and rocket engineering remained his prime preoccupation.

The publication in 1919 of his seminal paper "A Method of Reaching Extreme Altitudes" gave Goddard distorted publicity because he had suggested that jet propulsion could be used to attain escape velocity and that crashing a flash-powder missile on the moon could prove this theory. Sensitive to criticism of his moon-rocket idea, he worked quietly and steadily toward the perfection of his rocket technology and techniques.

During most of the 1930's Goddard demonstrated, despite many failures in his systematic static and light tests, progressively more sophisticated experimental boosters and payloads, reaching speeds of 700 miles per hour and altitudes above 8000 feet in several test flights.

By temperament and training Goddard was not a team worker, yet he laid the foundation from which team workers could launch men to the moon. The government awarded his estate one million dollars for all rights to the collection of over 200 Goddard patents.

John Dalton (1766 - 1844)



Dalton re-introduced the theory that matter is made of ‘atoms’, experimented with gases and investigated the force of steam.

John Dalton was the son of a humble Quaker hand-weaver living in the Cumberland village of Eagles Field. His strong mind received its scientific bent from the influence of two men, Elihu Robinson a Quaker and John Gough, a blind man of scientific interests, encouraged Dalton to record the meteorological observations which he continued to make for fifty-seven years until the day before he died. Dalton and his brother were both colour blind, and he was the first man to describe this condition in detail.

John Dalton was a self-taught scientist. He imagined that gas was made up of particles too small to be seen by the naked eye. At twenty-one he started keeping a daily weather record. He kept it until the day he died—making a total of some two hundred thousand observations!

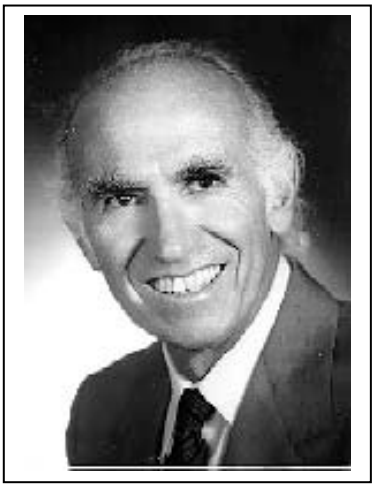
Dalton became a teacher of mathematics in the New College of Manchester. He was elected a member of the Literary and Philosophical Society of Manchester and later became its President. His earliest paper read to this society was on the subject of colour blindness. It is said that he went to a Manchester tailor for a suit of ‘some good strong drab cloth’ and, to amazement of the tailor, selected a piece of scarlet material used for hunting coats.

He used to spend his holidays walking on the Cumberland fells and he carried with him his home-made barometer and thermometer, to measure the atmospheric pressure and temperature, and would collect marsh gas from the floating island in Derwent waters.

Dalton lectured several times at the Royal Institution, but was not a success. He had no facility in devising impressive experimental demonstrations nor was he very competent in making work those, which he did attempt. His manners and speech were rough and sometimes crude. He lived a simple life, being rather shy but kindly, and said he “never found time” to marry.

26

Jonas Edward Salk (1914 - 1995)



Jonas Salk is an American scientist who successfully developed and introduced the first effective vaccine against the disease poliomyelitis (known as ‘polio’).

He was born in New York. to poor Russian-Jewish immigrant parents His parents were not wealthy, so Salk helped his family also paid for his college education by earning scholarships and working in his spare time. He also worked at a boys camp during the summer. He graduated from the New York School of Medicine in 1939, but instead of becoming a doctor he decided to devote himself to research into disease. As a child he was not interested in science. He was merely interested in things human, the human side of nature. After receiving my M.D. he was successful to find influenza vaccine even though people said that his work was unorthodox.

He started testing polio on monkeys. It took about 7 years to find the vaccine for polio. Then he tried testing the vaccine on his own three children, his wife, himself and his co-workers. He always said that never try anything on anyone unless you could try it on yourself. Later on he injected into one hundred and sixty adults and children. The next two to three months were the hardest ever to sleep, or eat, or anything, he was so afraid that something was going to go wrong and he was going to be blamed for many things. Some people started dying from polio even after receiving the vaccine, it was the only time in his life that he felt suicidal. Rumors were going around saying that all his research was fake. When he found out what went wrong, he fixed it. The following year nearly two million school children were injected as part of a mass-testing program.

Salk did not seek wealth or fame through his innovations, famously stating, "Who owns my polio vaccine? The people! Jonas Salk had dedicated his life to finding the cure for war--in his words, "Finding a cure for the cancer of the world." His scientific endeavors, great as they are, have become a secondary factor in Dr. Salk's life. He devotes most of his boundless energy traveling to international conferences and speaking to world leaders about the imminence of peace. Even after all his fame, fortune, recognition, and awards, his wife divorced in 1968. He remarried in 1970, unfortunately had no children.

Jonas Salk died on June 23, 1995 in La Jolla at the age of 80.

Sir Walter Raleigh (1552 - 1618)

Walter Raleigh was an English navigator and adventurer. His manners, good looks and charm won him the favour of Queen Elizabeth I, who gave him gifts of land and licenses to trade.

Raleigh was born in Devon, England. Raleigh's family was strongly Protestant and experienced a number of near-escapes during the reign of Queen Mary I of England. Once Raleigh's father had to hide in a tower to avoid being killed. Thus, during his childhood, Raleigh developed a hatred of Catholicism. Between 1579 and 1583, Raleigh took part in the suppression of the Desmond Rebellions. He was present at the siege of Smerwick, where he oversaw the slaughter of some 700 Italian soldiers after they had surrendered unconditionally.

In 1584 he organized expedition to explore and colonize Florida. Raleigh's plan for colonization in North Carolina and Virginia ended in failure at Roanoke Island, but paved the way for subsequent colonies. This led to the founding of Virginia, but none of colonists maintain the area. In 1596, Raleigh wounded during the capture of Cadiz.

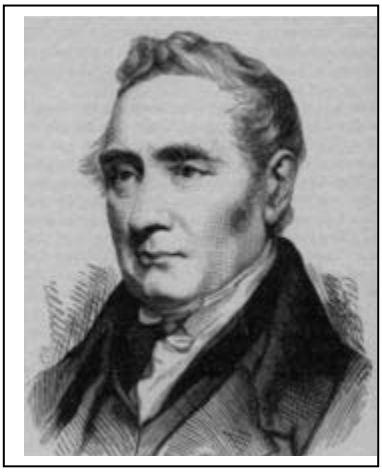
Raleigh fell briefly into disgrace when he was discovered to be having an affair with one of the Queen’s ladies-in-waiting, Elizabeth Throckmorton, who he later married. When, during the following year, the unauthorized marriage was discovered, the Queen ordered Raleigh imprisoned and Bess dismissed from court. Once at a dinner party at Horsey's, there was a heated discussion about religion which later gave rise to charges of atheism against Raleigh.

In 1595 he sailed to the West Indies looking for gold, but found none. After Elizabeth’s death, Raleigh was treated with suspicion by the new king James I, and imprisoned on a false charge of treason. He was released in 1616 to lead another expedition to the West Indies, but on his return he was executed on the same charge of treason. In 1616, during the initial attack on San Thome, Raleigh's son Walter was struck by a bullet and killed.

Raleigh was beheaded with an axe at Whitehall on 29 October 1618. "Let us dispatch," he asked his executioner. After he was allowed to see the axe that would behead him, he mused: "This is a sharp Medicine, but it is a Physician for all diseases and miseries". Sir Walter's final words were: “Strike man, strike!” His execution was seen by many, both at the time and since, as unnecessary and unjust.

28

George Stephenson (1781 - 1848)



George Stephenson was a mechanical engineer who developed and built the first successful railway locomotive and is known as the "Father of Railways".

George Stephenson, the son of a colliery fireman, was born at Wylam, near Newcastle and began working in a coal mine as a fireman at the age of only seven. He never went to regular school. He showed a natural gift for mending and inventing machines. George's first employment was herding cows, keeping them off the colliery's horse-drawn wagon way. When he was fourteen he joined his father at the Dewley Colliery. George was an ambitious boy and at the age of eighteen he began attending evening classes where he learnt to read and write.
He also showed natural gifts for fighting - willing to wrestle any brawny pitman who dared to cross him. As a young man he used his wages to pay for the education, which he had never received as a child, and meanwhile invented several improvements to equipment used in the mines.

In 1802 Stephenson became a colliery engineman. Later that year he married Frances Henderson, a servant at a local farm. To earn extra money, in the evenings, he repaired clocks and watches. In 1803, his only son, Robert was born. Frances suffered from poor health and she died of consumption in 1806.

Stephenson's early efforts in locomotive design were confined to constructing locomotives to haul loads in coal mines. He devised one of the first miner's safety lamps but shared credit for this invention with the British inventor Sir Humphry Davy. Stephenson built his railway engine in 1814. It was capable of a steady six miles per hour. In 1825 he built the world's first public railway, between Stockton and Darlington in Yorkshire, although for some years horses were used to pull the carriages. In 1829 Stephenson's design of a steam engine 'Rocket' which hauled both freight and passengers at a greater speed than had any locomotive constructed up to that time and won a prize for achieving a speed of 30 mph.

Davies visited the scenes of Stephenson's boyhood and days of fame, produced much original research and created a memorable human portrait.

Stephenson's second wife died in 1845. George Stephenson married for a third time just before he died at Tapton House, Chesterfield on 12th August, 1848.

Richard Trevithick (1771 - 1833)

British mechanical engineer and inventor, and one of the pioneers of railroad locomotion.

He was born in 1771 in Illogan, Cornwall, where there were many tin mines, and he made several inventions and improvements in mining equipment. He was tall and athletic, interested more in sports than learning at school. He grew to a height of six feet two inches, and was commonly called the "Cornish Giant". A man of prodigious strength, Trevithick was one of the best wrestlers in Cornwall. Richard worked with his father in Wheal Treasury mine, but it became obvious that the younger Trevithick had an aptitude for engineering.
In 1796 he exhibited improved models of the engines developed by James Watt. Encouraged by his success, Trevithick produced a larger steam road locomotive, the *Puffing Devil*. On Christmas Eve, 1801, his new locomotive took him and some friends on a short journey. It could not hold steam for long, which made its use impractical. In 1802 he developed a steam engine, which he used to power railway and road vehicles. Trevithick showed his designs to several leading scientists, including James Watt. Watt argued that his use of steam at high pressure was dangerous and he used his influence to get Parliamentary to ban his experiments.

The next attempt was the fancifully named *Catch Me Who Can*. This engine reached speeds of 12 miles per hour, but it, too, proved too heavy for its rails. Unfortunately, he and his inventions were forgotten when he went to South America. Discouraged by lack of financial backing, Trevithick returned to Cornwall. There he developed a new version of the Cornish engine, which was used worldwide in stationary mining applications.

For the next several years Richard Trevithick lurched from one financial failure to the next, until he finally died on April 22, 1833 in Dartford. He was so destitute at the time of his death that it took a collection by local workmen to prevent this tireless inventor from hasty burial in an unmarked pauper's grave at Dartford, Kent, where he was working when he died. Like many great men and women, Trevithick did not get the recognition he deserved during his lifetime. Indeed, his worth has only recently been recognized by many history books.

30

James Hargreaves (1720 - 1778)

Hargreaves was an illiterate carpenter and weaver. He invented a machine called the 'spinning jenny', which could spin several threads of cotton at once.

James Hargreaves was born in Oswaldtwistle, near Blackburn. He received no formal education and was never taught how to read or write. He was poor and had a large family. He moved to Stanhill in Lancashire, North of England, looking for work and raised a family there, working as a spinner and carpenter.

Hargreaves spent some time considering how to improve the process. It is claimed that one day his daughter Jenny, accidentally knocked over the family spinning wheel. As Hargreaves watched the overturned machine, he noticed that the spindle continued to spin as normal with the spindle now pointed upright, even though it had now been turned over by the fall. Hargreaves realized there was no particular reason the spindles had to be horizontal, as they always had been, and he could place them vertically in a row and it gave Hargreaves the idea that a whole line of spindles could be worked off one wheel. By turning a single wheel, the operator could now spin eight threads at once. Later, improvements were made that enabled the number to be increased to eighty. In 1764 Hargreaves built what became known as the Spinning-Jenny. The spinning jenny was the first machine that accurately simulated the drafting motion of human fingers. Hargreaves kept the machine secret for some time, but produced a number for his own growing industry. The price of yarn fell, angering the large spinning community in Blackburn. This made him unpopular with other spinners, who thought they might lose their jobs. Eventually they marched on his house and smashed his machines. The attackers were workers fearing being unemployed by the Spinning-Jenny, forcing him to flee to Nottingham in 1767. There he set up shop producing jennies in secret.

Hargreaves did not apply for a patent for his Spinning Jenny until 1770 and therefore others copied his ideas without paying him any money.
Although the thread that the machine produced was coarse and lacked strength, still it was so effective in increasing the efforts of a worker's labor that Karl Marx cited it as the cause behind the elimination of slavery.

It is estimated that by the time James Hargreaves died poor in 1778, over 20,000 Spinning-Jenny machines were being used in Britain.

Yuri Alekseevich Gagarin (1934 - 1968)

Gagarin was a Soviet cosmonaut who in 1961 became the first man to travel in space.

He was the son of a carpenter, born in a village near Smolensk, Russia. He grew up on a collective farm. When Yuri was seven years old, the German armies invaded Russia. Yuri's father joined the army, while his mother took him away from the fighting.
In high-school, trained metalworker and enrolled at an industrial college. He has a natural talent for flying.

He graduated from the Soviet air force as pilot. Gagarins abilities as a pilot were beyond normal. He passed through tough and difficult training-periods. As a part of the psychological training, he sat in a soundless, lightless room for 24 hours.

The first manned space flight took place on 12th April 1961. Gagarin was launched into orbit aboard the spacecraft 'Vostok I' and completed a single circuit of the Earth. The flight lasted one hour and 48 minutes before the craft, ejected at an altitude of 7 kilometers and landed by parachute. Upon return, the capsule itself landed too heavily, with an impact making it impossible for humans to remain inside during landing.

Gagarin was sitting in a tin-can on top of a bomb. Imagine leaving Earth before anyone had done it before! Nobody could tell what would happen to him; nobody really knew how the brain would function in weightlessness, or how the body would adapt. He was not given control of his craft. They didn't want to risk the cosmonaut losing control over himself while in space, and thus endangering the mission.

In the official Soviet documents, there is no mention of the parachute ejection. A trivial lie, due to the international rules for aviation records, which stated that "The pilot remains in his craft from launch to landing". This rule, if applied, would have "disqualified" Gagarins space-flight.

Gagarin made no other space flights, and was killed in an aircraft accident. He died seven years later, on march 7, 1968 in an airplane accident, flying the MIG-15 as a test-pilot. By then he was 34 years old.

I see Earth. It's so beautiful! –the first words spoken from a man in space

32

Andreas Vesalius (1514 - 1564)

Vesalius was an anatomist, physician, and founder of modern human anatomy. He was one of the first to dissect dead bodies.

Vesalius was born in Brussels, Belgium, which was part of the Holy Romman Empire, to a family of physicians. His father was the illegitimate son of Emperor Maximillian's Royal Physician. He persuaded to learn Greek and Latin being family tradition. In 1528 Vesalius entered the University of Leuven taking arts, but he decided to pursue a career in medicine at the University of Paris. During this time he developed his interest in anatomy, and was often found examining bones at the Cemetery of the Innocents. He was forced to leave Paris in 1536 due to the opening of hostilities between the Holy Roman Empire and France, and returned to Leuven. Here he completed his thesis, but he left after a dispute with his professor. After settling briefly in Venice in 1536, he moved to University of Padua to study for his doctorate.

He published his meticulous drawings of his work for his students.When this reached Paris one of his former professors published an attack on this version. In 1538 he also published a letter on venesection, or bloodletting. This was a popular treatment for almost any illness, but there was some debate about where to take the blood from. Vesalius, undeterred, went on to stir up more controversy, this time disproving not just Galen but also Mondino de Liuzzi and even Aristotle; all three had made assumptions about the functions and structure of the heart that were clearly wrong. Vesalius was only 30 years old when the first edition of *Fabrica* was published. Duke Cosimo I de' Medici to persuaded him to move to the expanding university in Pisa, which he turned down. Vesalius took up a position in the court, where he had to deal with the other physicians mocking him as being a barber.

In 1565 that Vesalius was performing an autopsy on an aristocrat in Spain when it was found that the heart was still beating, leading to the Inquisition condemning him to death. The story went on to claim that Philip II had the sentence transformed into a pilgrimage.

After struggling for many days, on his way home, with the adverse winds in the Ionian Sea, he was wrecked on the island of Zakynthos. Here he soon died in such debt that, if a benefactor had not paid for a funeral, his remains would have been thrown to the animals. At the time of his death he was scarcely fifty years of age.

Count Alessandro Volta (1745 - 1827)

Volta was an Italian scientist who made important discoveries about electricity. He came up with the theory of electric currents and invented the first battery.

Count Alessandro Volta was born in Como, Lombardy. He was born to nobility that had moved down in social station. Unlike his siblings, young Alessandro did not enter the church.

His young childhood did not show the makings of a prodigy. It was not until the age of four that he talked, and his family was convinced that he was retarded. However, at the age of seven when his father died, he was at the level of other children and then began to march ahead. By the age of fourteen, he made up his mind to be a physicist.

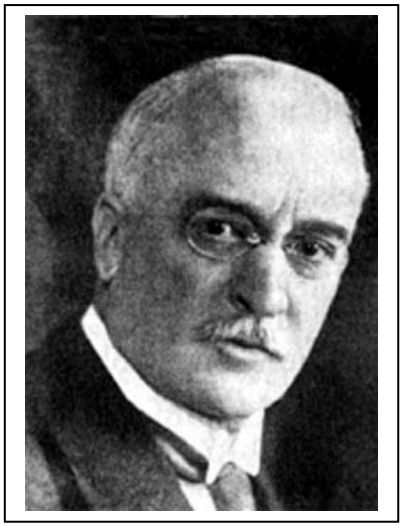
In 1774, he was appointed professor of physics in the Como high school and the next year he invented electrophorous, a charge- accumulating machine. Volta was the first to isolate the compound methane, a major constituent of natural gas.

The major feat of his life involved not static electricity, but dynamic electricity- the electric current. Following the experiments of Galvani, who was a friend of his and sent copies of his papers on the subject, Volta attacked the question of whether the electric current resulting when muscle was in contact with two different metals arose from the tissue or from the metals. To check this he decided in 1794 to make use of the metals alone, without the tissue. He found at once that an electric current resulted and maintained that it therefore had nothing to do with life or tissue. This sparked a controversy between the two Italians with the German Humboldt, the chief of Galvani's supporters, and the Frenchman Coulomb, the chief of Volta's. The weight of the evidence leaned more and more heavily toward Volta, and Galvani died embittered.

For a while he was a professor at the university of Pavia, but he did most of his work at his home in the beautiful lakeside town of Como. The Voltaic pile was Volta's life accomplishment. Volta received his greatest honor, however, at the hands of no ruler, but of his fellow scientists.

34

Rudolph Diesel (1858 - 1913)



An engineer and the inventor of the type of internal combustion engine.

Born in Paris. His parents went to England after the Battle of Sedan (1870). They lived in poverty. He went to stay with an uncle at Augsbury. He attended school there until, in 1875, he went to Munich for studying thermodynamics. After graduation he worked as plant manager in a firm. He became interested in the design of an expansion engine based on ammonia. It was unsuccessful, but it paved the way for his latter developments. He envisioned an engine in which air is compressed to such a degree that there is an extreme rise in temperature. Diesel designed his engine in response to the heavy resource consumption and inefficiency of the steam engine.

In 1893 he published an account of a heat engine, and persuaded two great firms to support him in its development. His work was displayed in the Munich exhibition in 1898, and interest in it was worldwide. Diesel early became a millionaire. In 1899 he found a new factory, but owing to Diesel's ill health it was a failure. His experiments with the engine nearly killed him when an early model exploded.

At Augsburg, on August 10, 1893, Diesel's prime model, ran on its own power for the first time. Diesel spent two more years at improvements and on the last day of 1896 demonstrated another model with the spectacular, if theoretical, mechanical efficiency of 75.6 percent, in contrast to the then-prevailing efficiency of the steam engine of 10 percent or less.

Diesel died before his invention was fully exploited. He died under mysterious circumstances in 1913. Some considered a possible political motivation. Diesel did not agree with the politics of Germany and was reluctant to see his engine used by their Naval fleet. With his political support directed towards France and Britain, he was on his way to England to arrange for them to use his engine. He vanished during an overnight crossing of the English Channel on the mail steamer Dresden from Antwerp to Harwich. Whether by accident, suicide or at the hand of others, the world had lost a brilliant engineer and biofuel visionary.

Diogenes of Sinope (412 – 323 BC)

Diogenes was an ancient Greek philosopher, generally considered the founder of the Cynics, a school of philosophy.

He was born at Sinop, Turkey, a town on the Black Sea, and grew up in poverty. He studied in Athens, where he was a disciple of Greek philosopher Antisthenes, about whom Plato says in *Phaedo* was present at the death of Socrates. Diogenes plunged into a life of austerity, wearing coarse clothing, begged for food, and sleeping on bare ground in the open streets or under porticoes. He eventually made his home in a disused bathtub! He destroyed the single wooden bowl he possessed on seeing a peasant boy drink from the hollow of his hands.

He taught by living example that wisdom and happiness belong to the man who is independent of society. Diogenes scorned not only family and political social organization, but property rights and reputation. He laughed at those who studied truth but did not practice it, and according to a popular story, he walked through Athens in broad daylight carrying a lighted lamp, looking for an honest man.

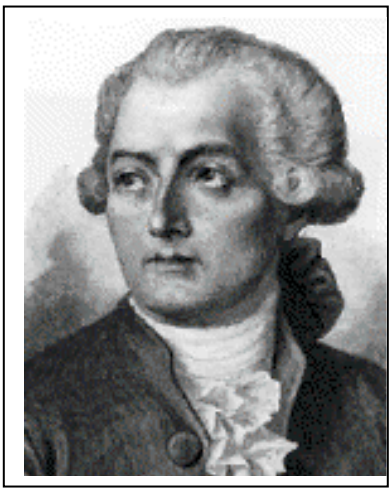
Diogenes believed human beings live artificially and hypocritically and would do well to study the dog. He was exiled from Sinope for "adulterating the coinage". He rejected normal ideas about human decency. Detractors have said he was an obnoxious ragpicker and an offensive churl.

Alexander the Great traveled to see him, and was so impressed that he left saying that if he had not been Alexander the Great, he would have liked to have been Diogene. He followed his own advice when in later life he was captured by pirates while on a voyage and sold as a slave to Xeniades of Corinth. The philosopher was appointed tutor to his children, remaining in Corinth for the rest of his life.

No writings of Diogenes survived even though he is reported to have authored a number of books. At the end, Diogenes made fun of people's excessive concern with the "proper" treatment of the dead. He became ill from eating raw octopus, and to have suffered an infected dog bite. When asked how he wished to be buried, he left instructions to be thrown outside the city wall so wild animals could feast on his body. The Corinthians erected to his memory a pillar on which rested a dog of Parian marble.

36

Antoine Laurent Lavoisier (1743 – 1794)



Antoine Lavoisier was a great French chemist. From the 1770s, he changed the face of chemistry. He was the leading light among the Parisian scientists of the 1780s. He contributed in the reform of chemical nomenclature.

Antoine Laurent Lavoisier was born in August 26, 1743 in Paris, France. His father was a lawyer. He attended one of the best schools in France, the College des Quatre Nations. There he received a sound classical and literary education and gained a prize in rhetoric. In the senior school he was able to study mathematics and astronomy. He learned mineralogy and chemistry after leaving school, when he was able to take advantage of public lectures.

After leaving school he had followed the family tradition and studied law. He found that nobody was willing to pay him to make chemical experiments, so in 1768 he accepted a job as a 'Farmer General', or tax collector. Lavoisier's paid employment, therefore, was not as a chemist but as an inspector of taxes. He was able to finance his experiments with the profits of the tax business. He would get up early in order to devote two hours to science before going to his paid employment; he would regularly set aside a further three hours in the evening. But one day a week he would spend the entire day in the laboratory. Lavoisier concluded in 1783 that respiration is a slow combustion. In the last years of his life he carried out further respiration experiments on himself and his assistant.

He never held a teaching position, yet through his book he was to teach the new chemistry to the next generation. Lavoisier's greatest unpopularity came from his deep involvement in the tax Farm. When he was arrested in 1793, during the 'Terror', it was not as a chemist but as a tax official, and when he was sentenced to the guillotine (a machine used for beheading criminals) on 8th May 1794, he was executed as a lackey of the old regime rather than as a symbol of the new science. The wonder is that Lavoisier's exceptional scientific talents did not save him. The tragic death of Lavoisier and the happy survival of his colleagues proved something of an embarrassment to them. The mathematician Lagrange said shortly after the execution of the chemist that it had taken only an instant to cut off his head but it might take a hundred years to produce a man of equal talent.

Ross Nazir Ullah (1951 –)

College lecturer in Physics and philanthropist. Did pioneer work to establish ethical values and innovative technology in different colleges. Books written for college students include F.Sc. and B.Sc. Initiated CD/DVD for College Physics practicals.

Born in the village Martin Pur, Sheikhupura. His father Nazir Ullah was an ordained Pastor, then changed his profession to Accountant. At the time of his birth, his mother has to bear difficult time by traveling from city to the village.

Ross did his early education in public schools. Learned ethical values and discipline during studying F.Sc. from Forman Christian College. He has to lower these values, when gone to Punjab University for graduation and post graduation. No wife and children. The Institutions he served were his wife and students taught, were his children.

Started his career from Forman Christian College. When moved to Chakwal College, once again he has to revert and lower the values for the survival over there. He had to face two times unjustified government transfers. His passion for his students is much harder to bear for him than all other tough times. In 1981, 2nd of January, when unjustly transferred from Chakwal, College students made great agitation in favour of him. As a result government had to transfer two principals to calm down the situation.

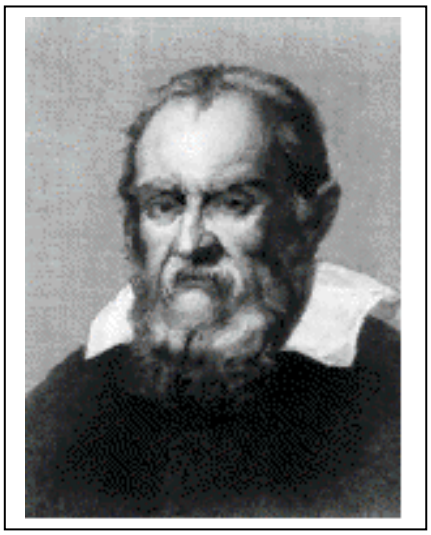
Remained 'alien' throughout his 30 years' government service in 5 different colleges; being city guy, non-local and sometimes discriminatory attitude of locals. In Chakwal, contaminated water made his stomach permanently weak. In Jalalpur Jattan, the city of looms, 24-hours constant brain effecting noise of looms gave him calm-less brain. In Shakargarh, the border-area, shameful attitude of locals made him penniless. In Gujar Khan, near atomic plant, caught *only* Hepatitis-A..

In 1987 went to Winnipeg, Canada. Instead of waiting one year for the admission in Ph.D in Physics, he opted to spend 2½ years in Municipal Engineering Technology program, but did not get the Diploma because he had to come back to Pakistan.

From the start of his service till retirement, remained two increments less from his colleagues and did not get his due promotion to grade 19 until now, due to Departmental inefficiency. In 2006 he took retirement from the government department 5 years early. Again started his career as a college lecturer by reverting once again to good values, but unable to fit himself in Forman Christian College. And next…

38

Galileo Galilei (1564 – 1642)



He was an Italian mathematician; physicist and astronomer who discovered the laws of falling bodies and the parabolic trajectories of projectiles. Perfected the telescope and showed men the new worlds of the heavens.

Galileo was born at Pisa in Italy in February 18, 1564. His father was a philosopher of some attainments.

First educated privately at home in Pisa, when later the family moved to Florence, Galileo was sent away to school at the age of fourteen at the Jesuit Monastary in Vallombrosa, but his father strongly objected and immediately moved his son back to Florence.

The young student was intended to devote his time to medicine, but a study of the works of Euclid turned his mind into other channels. In spite of parental opposition, Galileo had private tuition in mathematics and made rapid progress.

One of his first discoveries, in 1583, he watched the oscillation of a lamp suspended from the cathedral roof by timing the swings against pulse. He discovered that a pendulum have same time period.

And it was while at the University that he also earned himself the nickname ‘The Wrangler’, this because he would argue with his lecturers, questioning their blind acceptance of the opinions of Aristotle and Galen.

By dropping two different sized rocks from the top of the ‘Leaning Tower’ in Pisa he showed that all falling objects take same time to fall to the ground. In doing so, the followers of Aristotelian philosophy and the members of the university were so outraged that he lost his job.

Some of Galileo’s enemies even refuse to look through his telescope. They thought it was bewitched.

Galileo's public lectures covered the agreed syllabus, but he also supplemented his income by private lectures on military engineering, mechanics and, possibly, on astronomy. In this way he was able to offset his debts caused by having to pay a dowry when his sister married, and support his household.

His most significant contribution to science was the evidence he provided proved that, like the other planets, the Earth orbited around the Sun and was not the center of the Universe. His position represented such a departure from accepted thought that he was tried by the Inquisition in Rome, ordered to recant, and forced to spend the last eight years of his life under house arrest. After he had become blind, Galileo was permitted to have his two friends (a geometrician and a physicist) to live with him. He managed to keep up his correspondence, and his mind remained active.

Besides sentencing Galileo, the ecclesiastical authorities banned all Galileo's books, including the 'Dialogue'.

In spite of his readiness to forgive, Galileo's quick temper and caustic tongue made him enemies, though it is clear that he was loved by his students and by a host of friends and acquaintances. Galileo was a martyr of science, or more correctly he was a martyr to entrenched opinion. Enemies could not understand the independence of thought necessary to formulate a scientific picture of the world.

'Who can doubt that it will lead to the worst disorders when minds created free by God are compelled to submit slavishly to an outside will? When we are told to deny our senses and subject them to the whim of others?

--- from Galileo's 'Dialogue'.

In 1637 he made his last astronomical discovery about moon, a few months later he was blind. He was dictating his latest theories on the impact of matter to his two friends, when the end came. He contracted a slow fever and died on January 8, 1642 in the city of Florence.

40

Sir Isaac Newton (1642 – 1727)

Our knowledge of the law of gravity, of the principle by which the whole universe of sun, moon, earth, and stars exist and move, is due to in the main to one man —Isaac Newton.

In 1642 Galileo died. In the same year a child was born into the home of a Lincolnshire farmer.

On Chrismas Day Hannah Newton of Woolsthorpe, England, gave birth to a son, Isaac. Three years later, Mrs. Newton married again, and the boy was left in charge of his grandmother. He got no affection and care from his parents. He was a sickly, shy boy, and sent to the Grammar School at Grantham, he seems to have taken little interest in his books and to have felt himself inferior to the majority of his classmates.

In 1656 Barnabas Smith, the step-father whom he had hardly known, died, and his mother was left alone with the cares and worries of a farm. The help of the boy of fourteen was required to keep things going, and she withdrew Isaac from the grammar school.

As a boy Isaac was fond of making mechanical toys. He built, for example, a wooden windmill and used a mouse to turn the sails! He also built water-clocks and sundials. This was good experience, as later he had to build much of his experimental apparatus himself. His uncle saw that Isaac was not really suited to farming, and eventually persuaded his mother to let him return to school. One day Isaac was being pestered by the class bully, who kicked him in the stomach. Isaac, who could stand for this no longer, challenged the aggressor to a fight and proceeded to beat him up! This success seemed to give Isaac a new confidence in his physical and mental capabilities! He never looked back. From school he went to Trinity College, Cambridge.

Because of the plague in 1665 the University was closed and Newton returned home for two years of ‘private study’. He spent those years reading, writing and thinking. [There in the autumn of 1665 or 1666, he was sitting in an orchard when an apple dripped from a tree. This event first set Newton thinking about gravity and at the age of 23 he was able to develop laws describing gravity and the movements of the planets and the tides]. It was in those two years of quiet, before he was 25 years old, that the foundations were laid for all his great

discoveries. At the age of 27 Newton was appointed Professor of Mathematics at Cambridge. He became so absorbed by his subject that he often forgot about things such as meals. Many amusing stories suggest that he became very absent-minded and unpractical about every-day things. He once cut a hole in the door of the house to allow the cat to come in and out. When the cat had kittens he cut a number of smaller holes- one for each kitten!

Before he was thirty he was internationally celebrated for his experiments on light, but it was above all as a mathematician that Newton earned his unparalleled place in history. Once publication of a paper led to considerable controversy which lasted for many years. Newton was tired of them. “I was so persecuted”, he writes, “with discussions arising out of my theory of light, that I blamed my own imprudence for parting with so substantial a blessing as my quiet, to run after my shadow”.

During these years Newton’s financial position was not particularly good, for he had been obliged to ask the Royal Society to excuse him the subscription of one shilling per week. In February 1675, he was admitted Fellow of the Society.

From 1692 to 1694 Newton’s work was interrupted by an extremely serious illness, during which he suffered from insomnia and from a nervous disorder so severe that it was rumored, not only in England but in scientific circles abroad, that he had gone out of his mind and had been interned in a mental hospital.

Newton’s great genius lay in his ability to take the discoveries and theories of other men and fit them into a single, logical pattern. He, however, recognized his indebtedness to other men. He once said, ‘If I have seen farther than other men it is because I have stood on the shoulders of giants’.

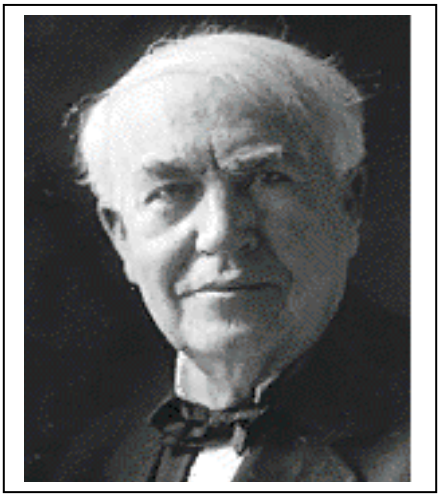
Early in 1727 Newton again fell seriously ill. His health had been failing for some time, and he died in Kensington on March 20, 1727. He was buried in Westminister Abbey on March 28, where a monument was erected to his memory in 1731.

A tribute to the memory of the world’s greatest natural philosopher is the epitaph inscribed on a tablet in the room where Newton was born:

Nature and Nature’s laws lay hid in night;
God said: ‘Let Newton be’ and all was light.

42

Thomas Alva Edison (1847 – 1931)



During his life, he patented well over 1000 inventions. For example, electrical volt recorder, automatic repeating telegraph, printing telegraph, phonograph, light bulb, etc.

Thomas Alva Edison was born on February 11, 1847, at Milan, Ohio. His mother was of Scots descent, his father of Dutch. When he was seven years old the family moved to Port Huron, Michigan and there young Thomas went to school for three months. During those three months he was well at the bottom of the class, and the teacher described him a “addled”.

He then left school, and his future education was obtained from his mother and by his own experimental observations. As an experimenter he started young: he tried to imitate a hen by sitting on some eggs to hatch then, and he dosed the family odd-job man with Seidlitz powders to see if the gases generated by them would enable him to fly!

At the age of only twelve, Edison became a railway newspaper boy. He began to assemble a laboratory which cost money. So with the money he earned by selling newspaper, he bought some second-hand type from a printer. He installed a tiny printing plant on the train and produced his own paper, the ‘Grand Trunk Herald’. He also had a miniature laboratory in the luggage coach, while in his spare time he was experimenting with telegraphy.

His travelling laboratory brought disaster. One day the train lurched suddenly: a stick of phosphorus was thrown onto the floor and ignited: the coach caught fire. The angry conductor flung his laboratory and printing press onto the next station and soundly boxed Edison’s ears: from that buffeting came the deafness that afflicted Edison throughout his life.

Edison arrived in New York penniless and hungry. For two nights he slept in the battery room of the Gold Indicator Company. On the third day he was

sitting in the office when transmitter brake down, he repaired the machine. After some time he was made manager of the entire plant.

After the death of his wife in 1884 his wonderful amazing work minimized.

Edison made over 1,600 test of various minerals and ores, and “I speak without exaggeration when I say that I have constructed three thousand different theories in connection with the electric light. Yet in two cases only did my experiments prove the truth of my theory”.

Till his death on October 18, 1931, he was actively engaged in research. If his achievements are his memorial, let that be his epitaph.

A Tribute to Mothers

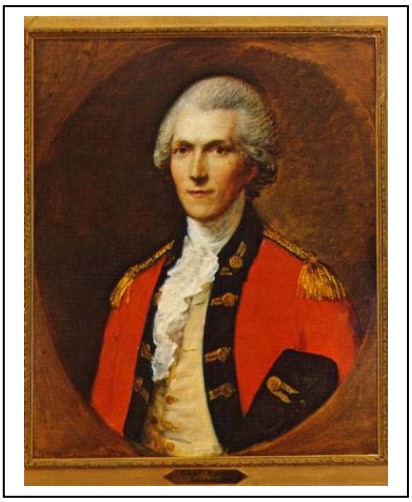
A partially deaf boy came home from school one day carrying a note from officials at the school. The note suggested that the parents take the boy out of school, claiming that he was "too stupid to learn."
The boy's mother read the note and said, "My son Tom isn't 'too stupid to learn.' I'll teach him myself." And so she did.
When Tom died many years later, the people of the United States of America paid tribute to him by turning off the nation's lights for one full minute. You see, this Tom had invented the light bulb-and not only that, but motion pictures and the record player. In all, **Thomas Edison** had more than one thousand patents to his credit.

Taken from -God's Little Devotional Book for Moms

Genius is one percent inspiration and ninety-nine percent perspiration.
–Edison

44

Benjamin Thomson (1753 - 1814)



Benjamin Thomson known by the name Count Rumford. Applied scientist, social engineer, philanthropist, public benefactor and founder of first public school system.

He brought up in a poor family.

We are in debt to him for many of our domestic comforts. Central heating, the smokeless chimney, the kitchen oven and range, the double boiler, the pressure cooker, the drip coffee-pot, thermal underwater. Every college student is in his debt, for it was Rumford who invented the modern dining hall, steam table and formulated the recipe for a nitrous soup (which can still be obtained in Munich). His many inventions revolutionized household life, though they all remained unpatented because he viewed patents as fundamentally selfish.

He was either poor or under a stigma from his birth until 1772, when he quit his job as a clerk in Boston to become a schoolmaster. In 1775, he abandoned his wife, child and the wealthiest estate in New Hampshire to avoid being tarred and feathered; in 1782 he resigned his high position in the British government—under Secretary of State—and fled from London under suspicion of spying fro the French. In 1783, he abandoned his personal troop to wander through Europe. In 1795, he was forced to flee from Munich where he was chamberlain. In 1802, he had to resign his position as director of the Royal Institution and quit London, more or less penniless.

Count Rumford’s ideas on heating, lighting, cooking and other domestic technologies, were described voluminously in scientific papers and personal essays.

He set out to raise money for an institution to teach artisans. The King contributed along with his friends, and it was named the Royal Institution. Early, he ran into problems. The subscribers wanted the institution to teach

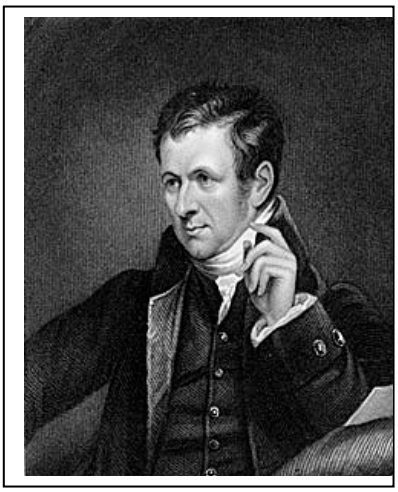
them new science, while Rumford wanted it to serve the needs of artisans. The subscribers won out.

Late in life, Rumford married Lavoisier's widow. The couple was totally incompatible, and when the marriage went bad Rumford taunted her with the deficiencies in his predecessor's theory.

Why is someone who did so much for science and society so little known? In spite of many virtues, he suffered from some character defects. He was an unprincipled opportunist, a ruthless self-promoter and over-bearing arrogant. He had hardly any friends, and upon his death he was promptly forgotten. He died in 1814 neither in rags nor in riches but in comfortable seclusion.

46

Humphry Davy (1778 - 1829)



British chemist who discovered several chemical elements and compounds, and became one of the greatest exponent of the scientific method. Best remembered for his contributions to the understanding of electrochemistry and for his invention of a safety lamp for miners. Davy discovered boron; proved that diamond is composed of carbon.

Born in Penzance, England after haphazard schooling Davy was apprenticed in 1795 to Binigham Borlase, an able apothecary-surgeon who later qualified as a physician.

Humphry Davy's father of yeoman stock, was a woodcarver in Cornwall, but earned little by it and lost many speculations in farming and tin mining. After his death in 1794 Grace Davy managed a milliner's shop until she inherited a small state.

Schools in Cornwall in the late eighteenth century were not very good, but Davy emerged at fifteen with a fair knowledge of the classics.

Young Davy was apprenticed to a surgeon. He was interested in many things but decided to study chemistry after reading Lavoisier's book on the subject in 1797. He started experimenting with gases. One way in which he studied them was by breathing them in. this was very dangerous and could have killed him, but it led him to discover the "laughing gas". Soon a more serious use was found for it, as a anesthetic.

In 1812 he married a wealthy bluestocking widow, Jane Apreece, but the marriage was childless and not happy. His health was good, aside from a serious illness, probably typhus, at the end of 1807; but in 1826 he suffered a stroke from which he never fully recovered.

In the course of his researches Davy tried breathing nitrous oxide and discovered its anesthetic properties. Samuel Mitchill, an American, had suggested that this gas was the principle of contagion, which must prove instantly fatal to anyone who respired it. Davy was not convinced by Mitchill's arguments and therefore made the experiment. The accurate and painstaking analysis of Berzelius would not have been possible to one with Davy's temperament; in addition, he lacked formal training and, more important, he always wanted to be original and creative. These researches were interrupted in 1801, when Davy was appointed as a lecturer at the Royal Institution. He was a great lecturer, and very good-looking, so that people flocked to hear his chemistry lectures.

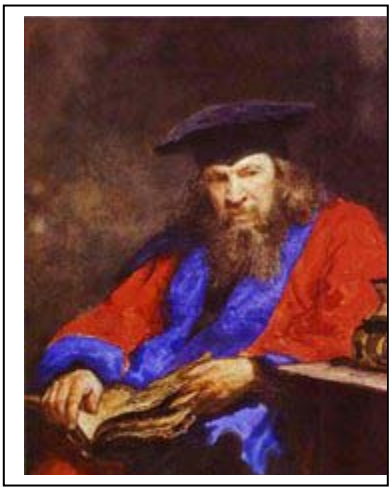
In 1815, Davy was asked to turn his attention to the explosions in coal mines, which had recently been the cause of a number of disasters.

He found that if pieces of more electropositive metals were fixed to the copper plates, the seawater did not attack the copper, but the discovery was never taken up. The affair provided more ammunition for Davy's enemies, who considered him arrogant and high-handed. A sad business was Davy's opposition to Faraday's election as a fellow of the Royal Society in 1824, for he had been generous to Faraday and really liked him. The affair reveals Davy's isolation and unhappiness. In 1826 he delivered his last Bakerian Lecture. The nearest he came to a definite theory of matter was in a dialogue unfinished at his death, in which he adopted a quasi-Boscovichean atomism.

Soon afterward Davy suffered his first stroke, and thereafter his life consisted of lonely journeys around Europe in search of health, fishing, and shooting. He died in Geneva, Switzerland.

48

Dmitri Mendeleyev (1834 - 1907)



Made the Periodic Table of elements.

Born Tobolsk, Siberia (now Tyumen Oblast), Russia.

Mendeleev was the fourteenth and last child of Ivan Pavlovich Mendeleev, a teacher of Russian literature and Maria Dmitrievna Kornileva, who herself owned a glass factory near Tobolsk.

Dmitri Mendeleyev's life started with a series of disasters. His father died when he was fifteen, and shortly afterwards the factory his mother ran burned down. She took him to start a new life in Leningrad. The university turned down this country lad from Siberia, and he went to the Technical School—where he received prizes for science. He studied advanced chemistry at university, and became a chemistry teacher. He wrote his own textbook in 1870. it was the finest chemistry book ever written in Russia and greatly improved the standard of teaching.

The Russian government was very proud of him but he had a hot temper and was often in trouble with authorities. In 1890 he lost his university job because of his support for his students, who were being oppressed, and he died before the Revolution. He never joined the Imperial Academy of Science in his own country, but was given many honours abroad. The English gave him the Davy and Faraday Medals.

His hot temper led him into a quarrel with an important official of the ministry of Education, and his first teaching assignment was therefore to the Simferopol Gymnasium, which was closed because of the Crimean War.

After two months in the Crimea, where he was unable to work, Mendeleev went to Odessa as a teacher in the lyceum, and there took up the continuation of his early scientific work.

A number of other chemists specializing in the system of the elements either attacked Mendeleev's periodic law or disputed his priority. He had no patience with disputes over priority, and although by taste an internationalist in science, he engaged in such disputes only when others denigrated Russian achievements.

In 1880 he added an investigation of the coal industry to his practical concerns. None of his efforts toward the development of domestic industry was successful, however; the czarist government chose to dismiss his remarkable ideas and projects as "professional dreams".

In 1880 he was defeated in an election for extraordinary membership of St. Petersburg Academy of Sciences, by the reactionary majority of members of the physics and mathematics section, who had come to fear his democratic tendencies. In the course of the protests that followed this event, he published an article and some twenty other scientific institutions elected Mendeleev an honorary member. In 1890 disorders broke out among the students at the University of St. Peterburg and Mendeleev undertook to deliver a student petition to the ministry of education. He was given a rude and insulting answer, tantamount to a demand for his personal resignation; he thus left the university, where he had taught for more than 30 years. On 3rd April 1890 Mendeleev gave his last lecture to the students of the general chemistry course.

50

Adams Helen Keller (1880 - 1968)

Helen Keller was a deaf and blind author and teacher whose determination to overcome her handicaps made her a role model for millions of people and became an American heroine.

She was born in Tuscumbia, a small rural town in Northwest Alabama, USA, she was born with full sight and hearing.and became deaf and blind at the age of only 19 months as the result of an attack of scarlet fever.

At the time of Helen's birth the family were far from wealthy with Captain Keller earning a living as both a cotton plantation owner and the editor of a weekly local newspaper. Helen's mother, as well as working on the plantation, would save money by making her own food.
The following few years proved very hard for Helen and her family. Helen became a very difficult child, smashing dishes and lamps and terrorising the whole household with her screaming and temper tantrums. Relatives regarded her as a monster and thought she should be put into an institution.

By the time Helen was six her family had become desperate. Looking after Helen was proving too much for them. A specialist doctor gave confirmation that Helen would never see or hear again but were told not to give up hope, the doctor believed Helen could be taught and he advised them to visit a local expert. This expert was Alexander Graham Bell, the inventor of the telephone, Bell was now concentrating on what he considered his true vocation, the teaching of deaf children.

She was educated by a woman named Anne Sullivan, and learned to speak and to read Braille. Also she tried to control Helen's continuing bad behaviour.
Of particular Helen's table manners. She had taken to eating with her hands and from the plates of everyone at the table.

Although she learned to understand what somebody else was saying by touching their lips and throat, her efforts to speak herself proved at this stage to be unsuccessful. This was later attributed to the fact that Helen's vocal chords were not properly trained prior to her being taught to speak. Unfortunately though, Helen's speech never really improved beyond the sounds that only Anne and others very close to her could understand.

In 1900 Helen entered Radcliffe College, becoming the first deafblind person to have ever enrolled and graduated at an institution of higher learning. Life at Radcliffe was very difficult, the huge amount of work involved led to deterioration in Anne's eyesight. During that time at the College Helen began to write the story about her life both in braille and on a normal typewriter.

In 1905 John Macy and Anne were married. She was some twenty years younger than her husband. In 1918 Helen, Anne and John moved to Forest Hills in New York. Helen made extensive fundraising tours for the American Foundation for the Blind. She traveled all over the world to over 39 countries. She campaigned tirelessly to alleviate the living and working conditions of blind people, who at that time were usually badly educated and living in asylums. They offered to make a film in Hollywood. It unfortunately did not prove to be the financial success that they had hoped for.

Helen met every US President from Grover Cleveland to Lyndon B. Johnson and was friends with many famous figures including Alexander Graham Bell.

Whilst away during this time Helen learnt of the fire that destroyed their home at Arcan Ridge. Although the house would be rebuilt, as well as the many mementoes that Helen lost, also destroyed was the latest book that Helen had been working on about Anne Sullivan, called "Teacher".

She has shown millions of people that disability need not be the end of the world. In Helen's own words:
"The public must learn that the blind man is neither genius nor a freak nor an idiot. He has a mind that can be educated, a hand which can be trained, ambitions which it is right for him to strive to realise, and it is the duty of the public to help him make the best of himself so that he can win light through work."

She is remembered as an advocate for people with disabilities, as well as numerous causes. She was a suffragist, a pacifist, and a birth control supporter In October 1961 Helen suffered the first of a series of strokes, and her public life was to draw to a close. She was to spend her remaining years being cared for at her home in Arcan Ridge. All the while Anne's health was getting worse, and with the news of the death of John Macy in 1932, although their marriage had broken up some years before, her spirit was finally broken. She died peacefully in her sleep on June 1, 1968, at Arcan Ridge. Today Helen's final resting place is a popular tourist attraction.

52

Pierre Simon Laplace (1749 – 1827)

A French mathematician and astronomer who made a number of important discoveries about the movements of the planets and put forward a theory of origin of the Solar System.

Pierre Simon Laplace was born in Beaumont-en-Auge, Normandy, the son of a poor farmer. He became connected with the military school of his town, first as a day pupil, then as teacher. He became an usher in that school.

His father expected him to make a career in the Church or the army. At the age of 16 Laplace entered Caen University, where he discovered his mathematical talents and his love of the subject. Credit for this must go largely to two teachers of mathematics at Caen.

When he became distinguished he had the pettiness to hold himself aloof both from his relatives and from those who had assisted him. Once he knew that mathematics was to be his subject, Laplace left Caen without taking his degree, and went to Paris. Although Laplace was only 19 years old when he arrived in Paris he quickly impressed d'Alembert. Not only did d'Alembert begin to direct Laplace's mathematical studies, he also tried to find him a position to earn enough money to support himself in Paris.

The year 1771 marks Laplace's first attempt to gain election to the Académie des Sciences but Vandermonde was preferred. Laplace tried again in 1772 but this time Cousin was elected. Laplace felt very angry at being passed over in favour of a mathematician who was so clearly markedly inferior to him.
The 1780s Laplace made him one of the most important and influential scientists that the world has seen. It was not achieved, however, with good relationships with his colleagues. Laplace was rapidly making much of his own life's work obsolete and this did nothing to improve relations, they saw his changes of views as merely attempts to win favour. Although he wanted to repay by stressing the importance of d'Alembert's work, for the help and support he had given.
It does appear that Laplace was not modest about his abilities and achievements, and he probably failed to recognise the effect of his attitude on his colleagues.

That Laplace was vain and selfish is not denied by his warmest admirers; his conduct to the benefactors of his youth and his political friends was ungrateful and contemptible. When he refused to sign the document of the French Academy of Sciences supporting freedom of the press in 1826, he lost the remaining friends he had in politics.

Laplace married on 15 May 1788. His wife, Marie-Charlotte de Courty de Romanges, was 20 years younger than the 39 year old Laplace. At the time that his influence was decreasing, personal tragedy struck Laplace. His only daughter, Sophie-Suzanne, had married the Marquis de Portes and she died in childbirth in 1813.

He did not return to Paris until after July 1794. Although Laplace managed to avoid the fate of some of his colleagues during the Revolution, such as Lavoisier who was guillotined in May 1794 while Laplace was out of Paris, he did have some difficult times.

Laplace had always changed his views with the changing political events of the time, modifying his opinions to fit in with the frequent political changes which were typical of this period. In 1814 Laplace supported the restoration of the Bourbon monarchy and cast his vote in the Senate against Napoleon. The Hundred Days were an embarrassment to him the following year and he conveniently left Paris for the critical period.

He never concealed his views on religion, philosophy, or science, however distasteful they might be to the authorities in power; it should be also added that towards the close of his life, and especially to the work of his pupils, Laplace was both generous and appreciative, and in one case suppressed a paper of his own in order that a pupil might have the sole credit of the investigation During an access of revolutionary suspicion, he was removed from the commission of weights and measures

Laplace proved that planetary motions are stable, and that perturbations produced by mutual influence of planets or by external bodies, such as comets, are only temporary.

Laplace died in Paris. Few events would cause the Academy to cancel a meeting but they did on that day as a mark of respect for one of the greatest scientists of all time. On his deathbed it is said that he uttered:
"The knowledge we have of things is small indeed, while that of which we are still ignorant is immense." The date was March 5, 1827.

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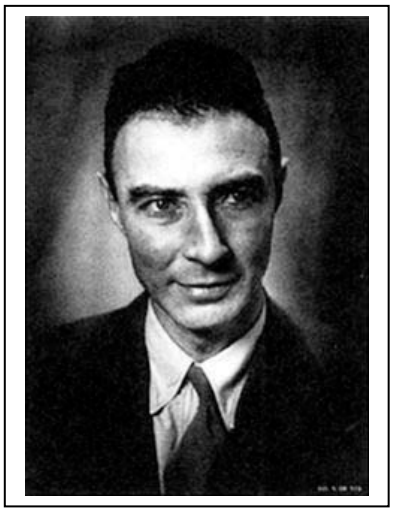
James Robert Oppenheimer (1904 - 1967)



Oppenheimer was an American scientist who became an expert on nuclear physics. From 1943 to 1945 he was director of the Los Alamos laboratory in the United States, where the first atomic bombs were constructed.

Oppenheimer was born to Julius Oppenheimer who had emigrated to the United States from Germany and Ella Friedman, a painter. Oppenheimer studied at the Ethical Culture Society School. He entered Harvard University one year late due to an attack of colitis. During the interim, he went with a former English teacher to recuperate in New Mexico, where he fell in love with horseback riding and the mountains and plateau of the Southwest.

At Harvard, he majored in chemistry, but also studied topics beyond science, including Greek, architecture, classics, art, and literature. He made up for the delay caused by his illness, taking six courses each term and graduating in just three years. Oppenheimer's clumsiness in the laboratory made it apparent that his forte was theoretical, not experimental physics, so he left in 1926 for the University of Göttingen to study under Max Born. He was enthusiastic in discussions, sometimes to the point of taking over seminar sessions, a fact that used to irritate a few of Born's pupils. In 1927 Oppenheimer obtained his Ph.D. at the young age of 22.

At the University of Leiden, the Netherlands, where he impressed those there by giving lectures in Dutch despite having little experience with the language. There he was given the nickname of "Opje," which was later Anglicized by his students as "Oppie". Oppenheimer's papers were considered difficult to understand. He was sometimes criticized for making mathematical mistakes, presumably out of haste.

Before his Berkeley professorship began, Oppenheimer was diagnosed with a mild case of tuberculosis. But he was also emotionally troubled throughout his life, and professed to experiencing periods of depression. A tall, thin chain smoker who often neglected to eat during periods of intellectual discomfort and concentration.

The collaboration of Oppenheimer and Pauling was nipped in the bud when Pauling began to suspect that Oppenheimer was becoming too close to his wife. One of the incident disquieted Oppenheimer. Pauling said about him as a pacifist.

Oppenheimer was marked by many of his friends as having a self-destructive tendency, and during numerous periods of his life worried his colleagues and associates with his melancholy and insecurity. Oppenheimer developed numerous affectations, seemingly in an attempt to convince those around him—or possibly himself—of his self-worth.

He was said to be mesmerizing, hypnotic in private interaction but often frigid in more public settings. Some of his associates saw him as an aloof and impressive genius and an aesthete; and others saw him as a pretentious and insecure poseur. His students almost always fell into the former category, adopting "Oppie's" affectations, from his way of walking to talking. Abraham Pais says that Oppenheimer himself thought that one of his failures at the institute was a failure to bring together scholars from the natural sciences and the humanities.

Many people thought that Oppenheimer's discoveries and research were not commensurate with his inherent abilities and talents. Oppenheimer's critics have accused him of equivocating between 1949, when he opposed the development of the hydrogen bomb, and 1951, when he supported it. Some have made this a case for reinforcing their opinions about his moral inconsistency. In his role as a political advisor, Oppenheimer made numerous enemies.

He argued for the sharing of all nuclear technology between nations, and particularly between the United States and the Soviet Union. In 1953 he was suddenly accused of disloyalty by the American government of being a security risk and President Dwight D. Eisenhower asked him to resign, and forbidden to see secret documents, but he was later cleared.

After the 1954 security hearings, Oppenheimer started to retreat to a simpler life. In 1957, he purchased a piece of land on Gibney Beach in the island of St John in the Virgin Islands. He built a spartan vacation home on the beach, where he would spend holidays, usually months at a time, with his wife Kitty.

Oppenheimer never won a Nobel Prize. His scientific attentions often changed rapidly and he never worked long enough on any one topic to achieve enough headway to merit the Nobel Prize.

Robert Oppenheimer died of throat cancer at age 62 in Princeton, New Jersey, in 1967. His funeral was attended by many of his scientific, political, and military associates.

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Dr. Harvey Crippen (1862 - 1910)

Doctor and wife poisoner.

Crippen was born in Coldwater, Michigan, USA. A graduate of Michigan University. In 1885 Crippen became a homeopathic doctor and started working for a homeopath pharmaceutical company.

His second wife was Belle Elmore. She was a music-hall artiste and would-be opera singer. A rather overbearing woman, she tried to control every aspect of her husband's life. She openly had affairs, about which he did not complain very much. In 1900, Crippen and his spouse moved to England. Unfortunately, his U.S. medical qualification was insufficient to obtain a doctor's position in the UK. The couple moved to Holloway, London where they had lodgers to compensate for Crippen's rather measly income. Crippen was not a homeopath in the classic sense in that he used many potions aside from homeopathic remedies. He worked as dentist, partly as an agent for a patent-medicine firm.

After a party at their home on January 31, 1910, Belle disappeared. Hawley Crippen told everyone she had returned to the United States, and later added that she had died in California and had been cremated. Meanwhile, his lover, Ethel le Neve came and began openly wearing Belle's clothes and jewelery. The police were informed of Belle's disappearance by her friend, strongwoman Vulcana. The house was searched but nothing was found, and the doctor was interviewed, police Chief Inspector Walter Dew was satisfied. However, Crippen and le Neve panicked and fled across the Atlantic on the Canadian Pacific liner *Montrose*, with le Neve disguised as a boy.

Their disappearance led Scotland Yard to perform another three searches of the house. During the fourth and final search, they found the remains of a human body, buried under the brick floor of the basement. Mrs. Crippen had to be identified from a piece of skin from her abdomen, because her head, limbs and skeleton were never recovered. Sir Bernard Spilsbury found traces of hyoscine, a calming drug.

The captain of the *Montrose* saw a newspaper report about the wanted pair in a foreign newspaper, and became suspicious of two of his passengers who had boarded at Antwerp. He sent a message via the Marconi telegraph on 22 July which read: "Have

strong suspicion that Crippen London Cellar murderer and accomplice are amongst saloon passengers. Moustache shaved off, growing a beard. Accomplice dressed as a boy, voice, manner and build undoubtedly a girl." This was the first time that the wireless had been used to catch a criminal.

As the *Montrose* entered the British territorial waters of the St Lawrence River Inspector Dew, disguised as a pilot, came aboard. This was Crippen's second mistake concerning his evasion. Had he sailed directly to the United States, it would have required an international arrest warrant followed by extradition proceedings, complicated by the fact that he was a US citizen. The captain invited Crippen to meet the pilots as they came aboard. Dew removed his pilot's cap and said, "Good morning, Dr Crippen. Do you know me? I'm Inspector Dew from Scotland Yard." After a pause Crippen replied, "Thank God it's over. The suspense has been too great. I couldn't stand it any longer." He then held out his wrists for the handcuffs. Crippen and le Neve were arrested on board the *Montrose* on 31 July 1910. After discovering the circumstances of his arrest, when Crippen alighted he cursed both Captain Kendall and his ship.

He explained that his wife had eloped with a lover and he had felt too humiliated to admit this. Belle was about to leave him, taking half his life savings. She was also in the way of his affair. Crippen's trial revealed the startlingly meticulous manner in which he had disposed of his wife's body. After killing her, he professionally removed her bones and limbs, which he then burned in the kitchen stove. Her organs were dissolved in acid in the bathtub, and her head was placed in a handbag and thrown overboard during a day trip to Dieppe, France. Throughout the proceedings and at his sentencing, Crippen showed no remorse, only concern for Ethel's reputation and prospects. At his request, her photograph was placed in his coffin and buried with him.

Crippen and le Neve were tried separately at the Central Criminal Court, Old Bailey, London. After just 27 minutes of deliberations, the jury found Crippen guilty of murder. Dr. Crippen, was hanged in Pentonville, England, on November 23, 1910 for murdering his wife. He has gone down in history as the first criminal to be captured with the aid of wireless communication.

Captain Kendall later became master of the *Empress of Ireland* which was wrecked on the 29 May 1914, with the loss of 1,012 lives. She sank off Father Point, Quebec, the exact place where Crippen was arrested. Kendall survived the disaster.

On 28 December 1914, a storm raged and the *Montrose* broke her moorings. She sank in the English Channel. The last sailor to leave the *Montrose* before she broke up was named Crippen!.

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Gregor Johann Mendel (1822 - 1884)

Austrian monk, whose experimental scientific work became the basis of modern hereditary theory. He investigated variation, heredity, and evolution in plants at the monastery's experimental garden.

Mendel was born into a German-speaking family in Heizendorf, Czechoslovakia. He was born into a poor farming family. At that time it was difficult for poor families to obtain a good education and the young Mendel saw the only way to escape a life of poverty was to enter the monastery at Brno in Czechoslovakia. During his childhood Mendel worked as a gardener, and as a young man attended the Philosophical Institute in Olomouc.

To enable him to further his education, the abbot arranged for Mendel to attend the University of Vienna to get a teaching diploma. However, Mendel did not perform well. He was nervous and the University did not consider him a clever student. Mendel's examiner failed him with the comments, " he lacks insight and the requisite clarity of knowledge". This must have been devastating to the young Mendel, who in 1853 had to return to the monastery as a failure. As this was a teaching order, Mendel had to decide whether to stay on at the monastery as a failed teacher - or return to what?

On his return to Brno in 1854 Mendel was appointed a teacher of physics and natural history in the Technical School. In 1856 he prepared himself for the university examination again, but he became seriously ill and did not take it.

Gregor Mendel, who is known as the "father of modern genetics", was inspired by both his professors at university and his colleagues at the monastery to study variation in plants, and he conducted his study in the monastery's garden. Between 1856 and 1863 Mendel cultivated and tested some 29,000 pea plants. Mendel cultivated and tested at least 28,000 pea plants, carefully analyzing seed and plant characteristics. His experiments brought forth two eneralisations which later became known as Mendel's Laws of Inheritance and led him to coin

two terms used in present day genetics: *dominance*, for a trait that shows up in an offspring, and *recessiveness*, for a trait masked by a dominant gene. Mendel published his findings in 1866, but their full significance was not realized until the late 1920s and the early 1930s.
Elevated as abbot in 1868, his scientific work largely ended as Mendel became consumed with his increased administrative responsibilities, especially a dispute with the civil government over their attempt to impose special taxes on religious institutions.

Mendel read his paper, "Experiments on Plant Hybridization", at two meetings and received plenty of criticism. His experimental results have later been the object of considerable dispute. Mendel showed the laws of inheritance in a simple mathematical ratio. People had thought that characteristics were passed on by chance. In 1865, he proudly announced his findings to the local Natural History Society in Brno, at first Mendel's work was rejected, and no one took any notice. Mendel was very disappointed.

He did make some attempt to contact scientists abroad by sending them reprints of his work but this was a uphill struggle for an unknown author writing in an unknown journal.

In 1874 the government proclaimed a new law relating to the contribution of the cloisters to the religious fund. Mendel refused to pay the high assessed taxes and thus, from the end of 1875, got himself into trouble with the provincial government and with the Ministry of Education in Vienna. The result of this conflict was the lasting sequestration of the landed monasterial property.
The long struggle over taxation had a serious effect on Mendel's health.

Mendel lived around the same time as the British naturalist Charles Darwin (1809 – 1882) and many have considered a historical evolutionary synthesis of Darwinian natural selection and Mendelian genetics during their lifetimes.

When died on Jan. 6, 1884, in Brno, Czech Republic, from chronic nephritis, mourned by his fellow monks and the towns people—but unknown to the world of science. He death was without any public recognition of his outstanding scientific achievements. The new abbot of the monastery burned all Mendel's papers. His work lay unrecognised for about 34 years. When a Dutch scientist, also working on heredity, discovered his papers and Mendel’s work became famous.