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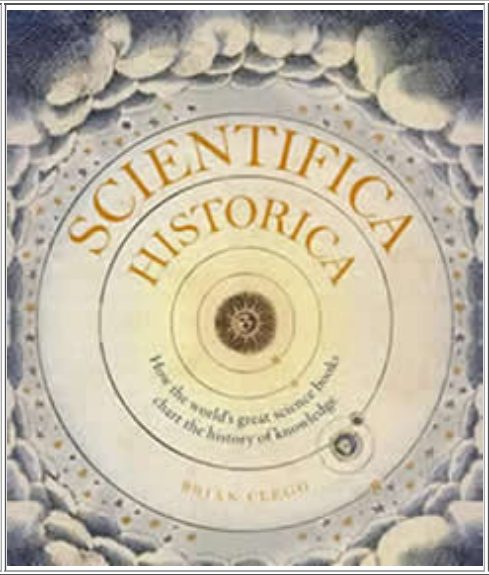

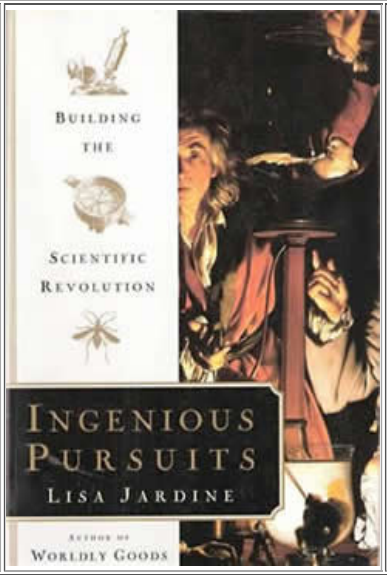

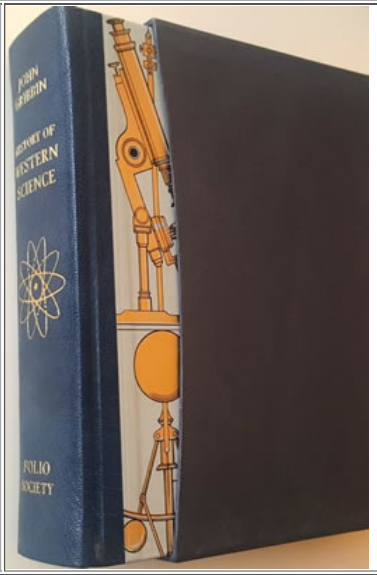

Historical list of discoveries in Science

Taken from Wikepedia article which covers the whole of history. [**For timeline of historic inventions** Click Here]

16th century

The Scientific Revolution occurs in Europe around this period, greatly accelerating the progress of science and contributing to the rationalization of the natural sciences.

- **16th century:** Gerolamo Cardano solves the general cubic equation (by reducing them to the case with zero quadratic term).
- **16th century:** Lodovico Ferrari solves the general quartic equation (by reducing it to the case with zero quartic term).
- **16th century:** François Viète discovers Vieta's formulas.
- **16th century:** François Viète discovers Viète's formula for π.[116]**1500:** Scipione del Ferro solves the special cubic equation x3=px+q$x^3 = px + q$.[117][118]
- **Late 16th century:** Tycho Brahe proves that comets are astronomical (and not atmospheric) phenomena.
- **1517:** Nicolaus Copernicus develops the quantity theory of money and states the earliest known form of Gresham's law: ("Bad money drowns out good").[119]
- **1543:** Nicolaus Copernicus develops a heliocentric model, rejecting Aristotle's Earth-centric view, would be the first quantitative heliocentric model in history.
- **1543:** Vesalius: pioneering research into human anatomy.
- **1545:** Gerolamo Cardano discovers complex numbers.[120]
- **1556:** Niccolò Tartaglia introduces parenthesis.
- **1557:** Robert Recorde introduces the equal sign.[121][122]
- **1564:** Gerolamo Cardano is the first to produce a systematic treatment of probability.[123]
- **1572:** Rafael Bombelli provides rules for complex arithmetic.[124]
- **1591:** François Viète's New algebra shows the modern notational algebraic manipulation.

17th century

- **1600:** William Gilbert: Earth's magnetic field.
- **1608:** Earliest record of an optical telescope.
- **1609:** Johannes Kepler: first two laws of planetary motion.

- **1610:** Galileo Galilei: *Sidereus Nuncius*: telescopic observations.
- **1614:** John Napier: use of logarithms for calculation.
- **1619:** Johannes Kepler: third law of planetary motion.
- **1620:** Appearance of the first compound microscopes in Europe.
- **1628:** Willebrord Snellius: the law of refraction also known as Snell's law.
- **1628:** William Harvey: blood circulation.
- **1638:** Galileo Galilei: laws of falling bodies.
- **1643:** Evangelista Torricelli invents the mercury barometer.
- **1662:** Robert Boyle: Boyle's law of ideal gases.
- **1665:** *Philosophical Transactions of the Royal Society*: first peer reviewed scientific journal published.
- **1665:** Robert Hooke: discovers the cell.
- **1668:** Francesco Redi: disproved idea of spontaneous generation.
- **1669:** Nicholas Steno: proposes that fossils are organic remains embedded in layers of sediment, basis of stratigraphy.
- **1669:** Jan Swammerdam: epigenesis in insects.
- **1672:** Sir Isaac Newton: discovers that white light is a mixture of distinct coloured rays (the spectrum).
- **1673:** Christiaan Huygens: first study of oscillating system and design of pendulum clocks
- **1675:** Leibniz, Newton: infinitesimal calculus.
- **1675:** Anton van Leeuwenhoek: observes microorganisms using a refined simple microscope.
- **1676:** Ole Rømer: first measurement of the speed of light.
- **1687:** Sir Isaac Newton: classical mathematical description of the fundamental force of universal gravitation and the three physical laws of motion.

18th century

- **1735:** Carl Linnaeus described a new system for classifying plants in *Systema Naturae*.
- **1745:** Ewald Georg von Kleist first capacitor, the Leyden jar.
- **1749 – 1789:** Buffon wrote Histoire naturelle.
- **1750:** Joseph Black: describes latent heat.
- **1751:** Benjamin Franklin: lightning is electrical.
- **1755:** Immanuel Kant: Gaseous Hypothesis in Universal Natural History and Theory of Heaven.
- **1761:** Mikhail Lomonosov: discovery of the atmosphere of Venus.
- **1763:** Thomas Bayes: publishes the first version of Bayes' theorem, paving the way for Bayesian probability.
- **1771:** Charles Messier: publishes catalogue of astronomical objects (*Messier Objects*) now known to include galaxies, star clusters, and nebulae.
- **1778:** Antoine Lavoisier (and Joseph Priestley): discovery of oxygen leading to end of Phlogiston theory.
- **1781:** William Herschel announces discovery of Uranus, expanding the known boundaries of the Solar System for the first time in modern history.
- **1785:** William Withering: publishes the first definitive account of the use of foxglove (digitalis) for treating dropsy.
- **1787:** Jacques Charles: Charles's law of ideal gases.
- **1789:** Antoine Lavoisier: law of conservation of mass, basis for chemistry, and the beginning of modern chemistry.
- **1796:** Georges Cuvier: Establishes extinction as a fact.
- **1796:** Edward Jenner: smallpox historical accounting.
- **1796:** Hanaoka Seishū: develops general anaesthesia.
- **1800:** Alessandro Volta: discovers electrochemical series and invents the battery.

1800–1849

- **1802:** Jean-Baptiste Lamarck: teleological evolution.
- **1805:** John Dalton: Atomic Theory in (chemistry).
- **1820:** Hans Christian Ørsted discovers that a current passed through a wire will deflect the needle of a compass, establishing the deep relationship between electricity and magnetism (electromagnetism).
- **1820:** Michael Faraday and James Stoddart discover alloying iron with chromium produces a stainless steel resistant to oxidising elements (rust).
- **1821:** Thomas Johann Seebeck is the first to observe a property of semiconductors.[*citation needed*]
- **1824:** Carnot: described the Carnot cycle, the idealized heat engine.
- **1824:** Joseph Aspdin develops Portland cement (concrete), by heating ground limestone, clay and gypsum, in a kiln.
- **1827:** Évariste Galois development of group theory.
- **1827:** Georg Ohm: Ohm's law (Electricity).
- **1827:** Amedeo Avogadro: Avogadro's law (Gas law).
- **1828:** Friedrich Wöhler synthesized urea, refuting vitalism.
- **1830:** Nikolai Lobachevsky created Non-Euclidean geometry.
- **1831:** Michael Faraday discovers electromagnetic induction.
- **1833:** Anselme Payen isolates first enzyme, diastase.
- **1837:** Charles Babbage proposes a design for the construction of a Turing complete, general purpose Computer, to be called the Analytical Engine.
- **1838:** Matthias Schleiden: all plants are made of cells.
- **1838:** Friedrich Bessel: first successful measure of stellar parallax (to star 61 Cygni).
- **1842:** Christian Doppler: Doppler effect.
- **1843:** James Prescott Joule: Law of Conservation of energy (first law of thermodynamics), also 1847 – Helmholtz, Conservation of energy.
- **1846:** Johann Gottfried Galle and Heinrich Louis d'Arrest: discovery of Neptune.
- **1847:** George Boole: publishes *The Mathematical Analysis of Logic*, defining Boolean algebra; refined in his 1854 *The Laws of Thought*.
- **1848:** Lord Kelvin: absolute zero.

1850–1899

- **1856:** Robert Forester Mushet develops a process for the decarbonisation, and re-carbonisation of iron, through the addition of a calculated quantity of spiegeleisen, to produce cheap, consistently high quality steel.
- **1858:** Rudolf Virchow: cells can only arise from pre-existing cells.
- **1859:** Charles Darwin and Alfred Wallace: Theory of evolution by natural selection.
- **1861:** Louis Pasteur: Germ theory.
- **1861:** John Tyndall: Experiments in Radiant Energy that reinforced the Greenhouse effect.
- **1864:** James Clerk Maxwell: Theory of electromagnetism.
- **1865:** Gregor Mendel: Mendel's laws of inheritance, basis for genetics.
- **1865:** Rudolf Clausius: Definition of entropy.
- **1868:** Robert Forester Mushet discovers that alloying steel with tungsten produces a harder, more durable alloy.
- **1869:** Dmitri Mendeleev: Periodic table.
- **1871:** Lord Rayleigh: Diffuse sky radiation (Rayleigh scattering) explains why sky appears blue.
- **1873:** Johannes Diderik van der Waals: was one of the first to postulate an intermolecular force: the van der Waals force.
- **1873:** Frederick Guthrie discovers thermionic emission.
- **1873:** Willoughby Smith discovers photoconductivity.
- **1875:** William Crookes invented the Crookes tube and studied cathode rays.

- **1876:** Josiah Willard Gibbs founded chemical thermodynamics, the phase rule.
- **1877:** Ludwig Boltzmann: Statistical definition of entropy.
- **1880s:** John Hopkinson develops three-phase electrical supplies, mathematically proves how multiple AC dynamos can be connected in parallel, improves permanent magnets, and dynamo efficiency, by the addition of tungsten, and describes how temperature effects magnetism (Hopkinson effect).
- **1880:** Pierre Curie and Jacques Curie: Piezoelectricity.
- **1884:** Jacobus Henricus van 't Hoff: discovered the laws of chemical dynamics and osmotic pressure in solutions (in his work "Études de dynamique chimique").
- **1887:** Albert A. Michelson and Edward W. Morley: Michelson–Morley experiment which showed a lack of evidence for the aether.
- **1888:** Friedrich Reinitzer discovers liquid crystals.
- **1892:** Dmitri Ivanovsky discovers viruses.
- **1895:** Wilhelm Conrad Röntgen discovers x-rays.
- **1896:** Henri Becquerel discovers radioactivity
- **1896:** Svante Arrhenius derives the basic principles of the greenhouse effect
- **1897:** J.J. Thomson discovers the electron in cathode rays
- **1898:** Martinus Beijerinck: concluded that a virus is infectious—replicating in the host—and thus not a mere toxin, and gave it the name "virus"
- **1898:** J.J. Thomson proposed the plum pudding model of an atom
- **1898:** Marie Curie discovered radium and polonium
- **1898:** J. J. O'Donnell discovers and documents the order-of-sequence for the sound of an approaching tornado

1900–1949

- **1900:** Max Planck: explains the emission spectrum of a black body
- **1905:** Albert Einstein: theory of special relativity, explanation of Brownian motion, and photoelectric effect
- **1906:** Walther Nernst: Third law of thermodynamics
- **1907:** Alfred Bertheim: Arsphenamine, the first modern chemotherapeutic agent
- **1909:** Fritz Haber: Haber Process for industrial production of ammonia
- **1909:** Robert Andrews Millikan: conducts the oil drop experiment and determines the charge on an electron
- **1910:** Williamina Fleming: the first white dwarf, 40 Eridani B
- **1911:** Ernest Rutherford: Atomic nucleus
- **1911:** Heike Kamerlingh Onnes: Superconductivity
- **1912:** Alfred Wegener: Continental drift
- **1912:** Max von Laue: x-ray diffraction
- **1912:** Vesto Slipher: galactic redshifts
- **1912:** Henrietta Swan Leavitt: Cepheid variable period-luminosity relation
- **1913:** Henry Moseley: defined atomic number
- **1913:** Niels Bohr: Model of the atom
- **1915:** Albert Einstein: theory of general relativity – also David Hilbert
- **1915:** Karl Schwarzschild: discovery of the Schwarzschild radius leading to the identification of black holes
- **1918:** Emmy Noether: Noether's theorem – conditions under which the conservation laws are valid
- **1920:** Arthur Eddington: Stellar nucleosynthesis
- **1922:** Frederick Banting, Charles Best, James Collip, John Macleod: isolation and production of insulin to control diabetes
- **1924:** Wolfgang Pauli: quantum Pauli exclusion principle
- **1924:** Edwin Hubble: the discovery that the Milky Way is just one of many galaxies
- **1925:** Erwin Schrödinger: Schrödinger equation (quantum mechanics)
- **1925:** Cecilia Payne-Gaposchkin: Discovery of the composition of the Sun and that hydrogen is the most abundant element in the Universe
- **1927:** Werner Heisenberg: Uncertainty principle (quantum mechanics)

- **1927:** Georges Lemaître: Theory of the Big Bang
- **1928:** Paul Dirac: Dirac equation (quantum mechanics)
- **1929:** Edwin Hubble: Hubble's law of the expanding universe
- **1929:** Alexander Fleming: Penicillin, the first beta-lactam antibiotic
- **1929:** Lars Onsager's reciprocal relations, a potential fourth law of thermodynamics
- **1930:** Subrahmanyan Chandrasekhar discovers his eponymous limit of the maximum mass of a white dwarf star
- **1931:** Kurt Gödel: incompleteness theorems prove formal axiomatic systems are incomplete
- **1932:** James Chadwick: Discovery of the neutron
- **1932:** Karl Guthe Jansky discovers the first astronomical radio source, Sagittarius A
- **1932:** Ernest Walton and John Cockcroft: Nuclear fission by proton bombardment
- **1934:** Enrico Fermi: Nuclear fission by neutron irradiation
- **1934:** Clive McCay: Calorie restriction extends the maximum lifespan of another species
- **1938:** Otto Hahn, Lise Meitner and Fritz Strassmann: Nuclear fission of heavy nuclei
- **1938:** Isidor Rabi: Nuclear magnetic resonance
- **1943:** Oswald Avery proves that DNA is the genetic material of the chromosome
- **1945:** Howard Florey Mass production of penicillin
- **1947:** William Shockley, John Bardeen and Walter Brattain invent the first transistor
- **1948:** Claude Elwood Shannon: 'A mathematical theory of communication' a seminal paper in Information theory.
- **1948:** Richard Feynman, Julian Schwinger, Sin-Itiro Tomonaga and Freeman Dyson: Quantum electrodynamics

1950–1999

- **1951:** George Otto Gey propagates first cancer cell line, HeLa
- **1952:** Jonas Salk: developed and tested first polio vaccine
- **1952:** Stanley Miller: demonstrated that the building blocks of life could arise from primeval soup in the conditions present during early Earth (Miller-Urey experiment)
- **1952:** Frederick Sanger: demonstrated that proteins are sequences of amino acids
- **1953:** James Watson, Francis Crick, Maurice Wilkins and Rosalind Franklin: helical structure of DNA, basis for molecular biology
- **1957:** Chien Shiung Wu: demonstrated that parity, and thus charge conjugation and time-reversals, are violated for weak interactions
- **1962:** Riccardo Giacconi and his team discover the first cosmic x-ray source, Scorpius X-1
- **1963:** Lawrence Morley, Fred Vine, and Drummond Matthews: Paleomagnetic stripes in ocean crust as evidence of plate tectonics (Vine–Matthews–Morley hypothesis).
- **1964:** Murray Gell-Mann and George Zweig: postulates quarks, leading to the Standard Model
- **1964:** Arno Penzias and Robert Woodrow Wilson: detection of CMBR providing experimental evidence for the Big Bang
- **1965:** Leonard Hayflick: normal cells divide only a certain number of times: the Hayflick limit
- **1967:** Jocelyn Bell Burnell and Antony Hewish discover first pulsar
- **1967:** Vela nuclear test detection satellites discover the first gamma-ray burst
- **1970:** James H. Ellis proposed the possibility of "non-secret encryption", more commonly termed public-key cryptography, a concept that would be implemented by his GCHQ colleague Clifford Cocks in 1973, in what would become known as the RSA algorithm, with key exchange added by a third colleague Malcolm J. Williamson, in 1975.
- **1971:** Place cells in the brain are discovered by John O'Keefe
- **1974:** Russell Alan Hulse and Joseph Hooton Taylor, Jr. discover indirect evidence for gravitational wave radiation in the Hulse–Taylor binary
- **1977:** Frederick Sanger sequences the first DNA genome of an organism using Sanger sequencing
- **1980:** Klaus von Klitzing discovered the quantum Hall effect
- **1982:** Donald C. Backer et al. discover the first millisecond pulsar
- **1983:** Kary Mullis invents the polymerase chain reaction, a key discovery in molecular biology
- **1986:** Karl Müller and Johannes Bednorz: Discovery of High-temperature superconductivity
- **1988:** Bart van Wees [nl] and colleagues at TU Delft and Philips Research discovered the quantized conductance in a two-dimensional electron gas.

- **1990:** Mary-Claire King discovers the link between heritable breast cancers and a gene found on chromosome 17q21.
- **1992:** Aleksander Wolszczan and Dale Frail observe the first pulsar planets (this was the first confirmed discovery of planets outside the Solar System)
- **1994:** Andrew Wiles proves Fermat's Last Theorem
- **1995:** Michel Mayor and Didier Queloz definitively observe the first extrasolar planet around a main sequence star
- **1995:** Eric Cornell, Carl Wieman and Wolfgang Ketterle attained the first Bose-Einstein Condensate with atomic gases, so called fifth state of matter at an extremely low temperature.
- **1996:** Roslin Institute: Dolly the sheep was cloned.
- **1997:** CDF and DØ experiments at Fermilab: Top quark.
- **1998:** Supernova Cosmology Project and the High-Z Supernova Search Team: discovery of the accelerated expansion of the Universe and dark energy
- **2000:** The Tau neutrino is discovered by the DONUT collaboration

21st century

See also: List of years in science § 2000s, and Breakthrough of the Year § Breakthrough of the Year

- **2001:** The first draft of the Human Genome Project is published.
- **2003:** Grigori Perelman presents proof of the Poincaré Conjecture.
- **2003:** The Human Genome Project sequences the human genome with a 92% accuracy.
- **2004:** Ben Green and Terence Tao announce their proof on arithmetic progressions in prime numbers known as the Green–Tao Theorem.
- **2004:** Andre Geim and Konstantin Novoselov isolated graphene, a monolayer of carbon atoms, and studied its quantum electrical properties.
- **2005:** Grid cells in the brain are discovered by Edvard Moser and May-Britt Moser.
- **2010:** The first self-replicating, synthetic bacterial cells are constructed.
- **2010:** The Neanderthal Genome Project presented preliminary genetic evidence that interbreeding likely occurred and that a small but significant portion of Neanderthal admixture is present in modern non-African populations.
- **2012:** Higgs boson is discovered at CERN (confirmed to 99.999% certainty)
- **2012:** Photonic molecules are discovered at MIT
- **2014:** Exotic hadrons are discovered at the LHCb
- **2014:** Photonic metamaterials are discovered to make passive daytime radiative cooling possible by Raman et al.
- **2016:** The LIGO team detects gravitational waves from a black hole merger
- **2017:** Gravitational wave signal GW170817 is observed by the LIGO/Virgo collaboration. This is the first instance of a gravitational wave event observed to have a simultaneous electromagnetic signal when space telescopes like Hubble observed lights coming from the event, thereby marking a significant breakthrough for multi-messenger astronomy.
- **2019:** The first image of a black hole is captured, using eight different telescopes taking simultaneous pictures, timed with extremely precise atomic clocks.
- **2020:** NASA and SOFIA (Stratospheric Observatory for Infrared Astronomy) discover about 350 mL of surface water in one of the Moon's largest visible craters.
- **2022:** The standard reference gene, GRCh38.p14, of the human genome, is fully sequenced and contains 3.1 billion base pairs.