

Biology 1.3

Who's who is biological science

Milestone discoveries in biology

“For the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead; so that they are without excuse” — Romans 1:20

A. Scientific philosophy and method

1. Nicolaus Copernicus 1473 – 1543, challenged the popular thinking of the day with heliocentricity backed by empirical observation. “I am aware that a philosopher's ideas are not subject to the judgment of ordinary persons, because it is his endeavour to seek the truth in all things, to the extent permitted to human reason by God” “For it is the duty of an astronomer to compose the history of the celestial motions through careful and expert study”
2. Sir Francis Bacon, the father of scientific method, 1561 – 1626, Scientific process comparing experimental group with a control group to discover and gain correct knowledge. Published *Novum Organon* to replace Aristotle's *Organon*. *Organon* is the collection of thoughts on logic. “God has, in fact, written two books, not just one. Of course, we are all familiar with the first book he wrote, namely Scripture. But he has written a second book called creation.” “God never wrought miracles to convince atheism, because his ordinary works convince it.” “It is true, that a little philosophy inclineth man's mind to atheism; but depth in philosophy bringeth men's minds about to religion. For while the mind of man looketh upon second causes scattered, it may sometimes rest in them, and go no further; but when it beholdeth the chain of them, confederate and linked together, it must needs fly to Providence and Deity...as atheism is in all respects hateful, so in this, that it depriveth human nature of the means to exalt itself above human frailty.”
3. Galileo Galilei 1564 1642, Father of Science. Advocated reliance on mathematical descriptions and empiricism to discover correct knowledge of creation. “I do not feel obliged to believe that the same God who has endowed us with senses, reason, and intellect has intended us to forgo their use and by some other means to give us knowledge which we can attain by them.”
4. Rene Descartes, 1596 – 1650, Father of Modern Philosophy, applied radical doubt to find a beginning point of natural knowledge. The one thing that could not be disputed was the fact he was thinking. Therefore, he proclaimed, *Cogito ergo Sum*, which means, “I think therefore I am.” From this beginning, he began to build his system of philosophy to determine truth. Some have suggested incorrectly that Descartes' approach implied that God's existence is a consequence of man's reasoning. However, Descartes believed in the existence God. God's existence is not determined by human reason. Rather, human reasoning is the consequence of God's existence and creation. Belief in God is man's responsibility, and God encourages the practice of responsible, rational thinking. In Isaiah 1:18, God says, “Come now, and let us reason together, saith the LORD...”
5. Isaac Newton, 1642 – 1727, one of the most influential scientists of all time and major leader in the scientific revolution. Named the man of the Millennium from A.D. 1,000 to A.D. 1999. Said, “God created everything by number, weight and measure.” “This most beautiful system of the sun, planets and comets, could only proceed from the counsel and dominion of an intelligent and powerful Being.” “He who thinks half-heartedly will not believe in God; but he who really thinks has to believe in God.” “Blind metaphysical necessity, which is certainly the same always and every where, could produce no variety of things. All that diversity of natural things which we find suited to different times and places could arise from nothing but the ideas and will of a Being, necessarily existing.”

B. Science of cellular life

1. Robert Hooke, 1665, coined the term “cell” to describe the basic unit of cork.
2. Antonie van Leeuwenhoek, 1676, father of microscopy first person to see cellular life.
3. Carolus Linnaeus, 1707-1778, Categorization and naming of life.
4. Matthias Schleiden, 1838, first proposed that all plants are composed of cells.
5. Theodor Schwann, 1839, first proposed that all animals are composed of cells.
6. Robert Remak, 1815-1865, showed that the origin of cells was from the division of pre-existing cells.
7. François-Vincent Raspail, 1794 – 1878, coined the phrase, *omnis cellula e cellula* (“every cell is derived from a [preexisting] cell”)
8. Louis Pasteur, 1822- 1895, father of microbiology, the famous swan neck flask disproved spontaneous generation. He concluded: ‘*omne vivum e vivo*’ (every living thing arises from a preexisting living thing).

9. Rudolph Virchow, 1855 first proposed cellular theory of life, which popularized Remak's idea and possibly plagiarized Raspail's phrase.

C. Science of genetics

1. Charles Darwin 1859 publishes his book on the theory of evolution titled, "The Origin of Species by Means of Natural Selection, or The Preservation of Favoured Races in the Struggle for Life"
2. Gregor Mendel 1822- 1884, Father of Genetics
3. Robert Koch, 1843-1910, the "father" of medical microbiology and is known for his many contributions to germ theory, bacteriology, and tropical medicine. Koch's postulates!
4. Francis Galton 1883 Charles Darwin's cousin, coins the term *eugenics* meaning well born or good heritage to encourage 'fitter' parents to have more children and discourage less fit parents from having children.

D. Science of germ based diseases

1. Ignaz Philipp Semmelweis (1818 –1865). In 1847, advocated hand washing before delivering babies.
2. Louis Pasteur in 1860 proposed germ based theory for disease.
3. Joseph Lister, father of modern surgery, in 1867, introduced antiseptic use for surgery.
4. Dmitri Ivanovsky 1892 discovers infectious non-bacterial agents in the tobacco plants.
5. Marcus Beijerinck 1898 coins the term 'virus' for the infectious tobacco plant agent.
6. Alexander Fleming 1928 discovered Penicillin

E. Darwin's Evolution theory influence on humanity

1. John Thomas Scopes 1925 Found guilty by the Tennessee court of violating a state law (Butler's Act) that bans the teaching of evolution.
2. Nazi Germany, July 14, 1933, The Law for the Prevention of Hereditarily Diseased Offspring, based on Darwinian evolution theory, was passed resulting in 400,000 forced sterilizations.
3. Charles R. Stockard 1937 president of the board of the Rockefeller Institute for Medical Research announced at the New York Academy of Medicine organized by the American Eugenics Society that the human race faced 'ultimate extermination' unless propagation of 'low grade and defective stocks' could be 'absolutely prevented.'(American Eugenics Society Papers, April 21, 1937, Bk 6.)
4. Margaret Sanger 1940 founder of the notorious Planned Parenthood promoted eugenics and Darwinian evolution theory in the human population saying, "Organized charity itself is the symptom of a malignant social disease...Instead of decreasing and aiming to eliminate the stocks [of people] that are most detrimental to the future of the race and the world, it tends to render them to a menacing degree dominant."

F. Science of the code of life

1. Oswald Avery, 1944, shows that DNA, not protein, is genetic material. "Fellows, you know there really is a God."
2. Watson and Crick 1953 publish first article on the structure of DNA.
3. U. S supreme court 1980 rules that genetically altered life forms can be patented.
4. Ananda Mohan Chakrabarty 1985 patented Super bug (oil eating bacteria).
5. Dolly 1996 first mammal clone by somatic cell nuclear transfer.
6. Zhiyuan Gong 1999 create GloFish by integrating jellyfish genes into zebra fish.
7. Human genome project 1960—2000 sequences genes and code of human DNA.
8. Mayo Clinic 2004 create hybrid pigs with human blood.
9. Cornell University 2008 genetically modify human embryo with fluorescent green protein
10. France 2009 use gene therapy to treat genetic disease in children.
11. Craig Venter 2010 succeed in inserting synthesized, artificial genome into bacteria.
12. ENCODE project 2012 over 80% of human genome not junk DNA as previously thought.
13. Narayana Annaluru et al. 2014 first completion of synthetic eukaryotic chromosome, synIII.