# LIBR 289 e-Portfolio

# Fall 2008

## Evidence for Competency L

LIBR 280 – History of Books and Libraries

Printed Literature on Medicine Assignment

May 1, 2007

Running Head: EARLY PRINTED LITERATURE ON MEDICINE

# Printed Literature on Medicine of the 16th through the 19th Centuries

by

Mildred Arencibia

San Jose State University

The Black Death of the fourteenth century was one of the most terrible epidemics of historic times as it affected the inhabitants of Asia, India, Arabia, Northern Africa and Europe. Its deathly grip put into perspective the ineffectiveness of medicine at the time and helped to effect a gradual change in the profession. With the advent of publishing and universities, professional societies were formed in all major European capitals, and scientists shared their research integrated with natural sciences by publishing in journals and books. This paper will explore such medical publications between the sixteenth through the nineteenth centuries.

The re-conquest of the classical Greek world of thought is considered by many scholars to be the most important achievement of the fifteenth and sixteenth centuries. In contrast to the intolerance of the Dark Ages, the Renaissance brought a renewed interest in studies, research and science. The medical profession became involved in this spirit and the best professionals devoted themselves to the study and translation of the works by Hippocrates, Galen, and others. The doctors of this era were cultivated gentlemen with interests that were not confined to medicine alone but that enriched the profession with natural history, chemistry, literature, and theology. Together they gave rise to the doctrines of human anatomy and physiology building upon the foundations of the Greek fathers.

Before delving into the work of the great physicians of the time, tribute must be given to certain artists, students of the human form, whose detailed work on biomechanics paved the way for the new wave of physicians to understand the working of the inner body. Among these personalities was Leonardo da Vinci (1452 – 1519), an Italian polymath, who counted among his many interests, science and anatomy. As an engineer and painter he conceived ideas far ahead of his own time such as the helicopter and the use of solar power. Likewise, his detailed anatomical drawings and sketches greatly advanced the study of the human body. His drawings reflected an

interest in mechanics which explain his obsession of explaining the human body with mechanical models. Perhaps what is most interesting of Da Vinci's work is that he undertook the study of anatomy at a time when it had the lowest priority in the medical hierarchy; dissecting a body was only viewed as a punishment and applied exclusively to condemned criminals, hereby elongating their sufferings into death during execution. This would all change later during sixteenth century.

One of the first great physicians of the time was Paracelsus (1493 – 1541), a Swiss alchemist, physician, astrologer, and occultist. Sometimes called the father of toxicology, he pioneered the use of chemicals and minerals in medicine, and pursued medical treatments such as wound drainage and infection prevention which were considered ludicrous at the time. Among his many books, he published one on surgery, *Die grosse Wundartzney* (Frankfurt: Hans Varnier, 1536) but he is best known for his treatises in alchemy. A good compendium of these works can be found in Arthur E. Waite's *The hermetic and alchemical writings of Paracelsus* (Chicago: Kessinger Publishing LLC, 2005) which contains a bibliographical preface, elucidatory notes, the large body of literature attributed to Paracelsus, and a copious vocabulary.

Some time after, Andreas Vesalius (1514 – 1564), a Belgian anatomist and physician, authored one of the most influential books on human anatomy, *De humani corporis fabrica* (Basileae: Ex officina I. Oporini, 1543) which emphasized dissection, the anatomical view of the body, and its functioning as a corporeal structure. Although his work was not the first to express views based on actual autopsy, it was enriched by highly detailed and intricate plates. An exhaustive English translation is that by W. F. Richardson, *On the fabric of the human body: A translation of De corporis humani fabrica* (San Francisco: Norman Publishing, 1998-ongoing).

Unquestionably one of the greatest surgeons of the Renaissance was Ambroise Paré (1509 – 1590), a French surgeon who was the official royal surgeon for three royals. His most

significant contributions to medicine were in amputation surgery, prosthetic sciences, and obstetrics. In 1545 and 1553, he published the first and second editions of his treatise on the treatment of wounds by firearms and arrows. In 1561 he also published his universal anatomy of the human body. Paré published other scholarly treatises on the treatment of wounds and illnesses. The best edition of Paré's works, which also contains biographical notices, is that of J. F. Malgaigne, *Oeuvres d'Ambroise Paré* (Paris: J. B. Baillière, 1840). An excellent English version is that translated by Thomas Johnson, *The collected works of Ambroise Paré* (London: Milford House, 1634).

A contemporary of Paré was Michael Servetus (1511 – 1553), a Spanish theologian, physician and humanist. He was the first to describe pulmonary circulation although this fact was not widely recognized at the time for several reasons. One was that the description was first published in his theological treatise *Christianismi restitutio* (Vienne: Arnoullet & Gueroult, 1553) not in a book of medicine. The other reason was that most of his manuscripts were destroyed after he was convicted and executed of heresy by the French Inquisition. This work has been translated into many languages but the only substantial section of it rendered into English is the part related to the circulation of the blood found in translator Charles Donald O'Malley's *Michael Servetus: A translation of his geographical, medical and astrological writings* (Chicago: Kessinger Publishing LLC, 2006). His findings in circulation would not be regarded again for nearly a century when William Harvey rediscovered them.

The works discussed earlier sparked a renewed interest on the working of the human bodies to the extent that many physicians started developing specialties. Georg Bartisch (1535 – 1607) was a German ophthalmologist who published the first systematic work on ocular disease, optics, and surgery, *Ophthalmodouleia* (Dresden: German School, 1583) which included copious

woodcuts depicting eye disease, surgical methodology, and instrumentation and is considered one of the finest illustrated medical books of the sixteenth century. Donald L. Blanchard's volume three of the *History of ophthalmology: The monographs* (Ostend, Belgium: J. P. Wayenborgh Press, 1996) series is a remarkable translation of Bartisch's original work in vernacular German dialect and it contains beautiful color prints of the original drawings.

In London, William Harvey (1578 – 1657), an English doctor, hypothesized how blood circulated through the body. He followed the methodology of the ancient Greeks to fashion his ideas of human anatomy as demonstrated by John Shackelford in his work *William Harvey and the mechanics of the heart* (New York: Oxford University Press, 2003). His book penned in Latin, *Exercitatio anatomica de motu cordis et sanguinis in animalibus* (Frankfurt: Guilielmi Fitzeri, 1628), is one of the greatest and most famous contributions to physiology as it explained the doctrine of blood circulation. A great English translation can be found in *On the motion of the heart and blood in animals* (Chicago: Kessinger Publishing LLC, 2005).

The field of medicine owes quite a lot to the more exact observations and interpretations of the following four personalities of the seventeenth century, who may have not all have been physicians but who were avid defenders of the scientific revolution.

One of these men was Lord Francis Bacon (1561 – 1626), an English philosopher, statesman, and essayist, who is best known for developing the scientific method, the planned methodology for scientific inquiry. His major works are compiled by Brian Vickers (Ed.) in *Francis Bacon: The major works* (Chicago: Oxford University Press, 2002) in an authoritative edition with interesting annotations, vocabulary, and revealing biographical tidbits.

Another of these contributors to the advancement of medicine, was René Descartes (1596 – 1650), a French philosopher, mathematician, scientist, and writer, who in his *Description of the*

*human body* (in *Descartes: The World and Other Writings*, Ed. Stephen Gaukroger, 2006, Cambridge, MA: Cambridge University Press), an unfinished treatise written in the 1640s, described the heart as the cause of all movement within the body and posited that the arteries and veins were pipes which carried nourishment around the body.

Thomas Sydenham (1624 – 1689) was an English physician who has been referred to as the English Hippocrates. His book *Observationes medicinae* published in 1676 included his methods for curing epidemic diseases such as the plague. Many collected editions of his works exist. One of the best is the two volume work by editor R. G. Latham and translated from the Latin into English by Dr. Greenhill, *The works of Thomas Sydenham*, M.D. (London: Sydenham Society, 1848).

Robert Boyle (1627 – 1691) was a British scientist who invented the experimental method. His published over forty books on pneumatics, chemistry and many other scientific topics that were influential in providing empirical support for a mechanical view of nature. A small compilation of his works dealing with science and experiments can be found in *Works of the honorable Robert Boyle* (Chicago: Kessinger Publishing LLC, 2003).

Marcello Malpighi (1628 – 1694), was an Italian doctor who was the father of comparative physiology, microscopic anatomy, histology, and embriology. Many microscopic anatomical features are named after him including the Maplpighi skin layer, two different Malpighian corpuscles in the kidneys and the spleen, as well as the Malpighian tubules in the excretory system of insects. A good text with biographical annotations and English translations of some of his most important works is Howard B. Adelman's five volume work *Marcello Malpighi and the evolution of embriology* (Ithaca, New York: Cornell University Press, 1966).

The dawn of the eighteenth century continued to bring developments in science and medicine with the research and discoveries in the area of chemistry and its relationship to medicine being the most significant.

Carl Linnaeus (1707 – 1778) was a Swedish botanist, physician and zoologist who is known as the father of modern taxonomy and one of the fathers of ecology. In 1735 he published *Systema naturae* (The Netherlands: Theodorum Haak). By the time of its tenth publication in 1758, it contained over four thousand species of animals, including humans whom he placed among primates, and more than seven thousand species of plants. A facsimile reproduction of the work can be found *Systema Naturae 1735: Facsimile of the first edition with an introduction and a English translation of the "Observationes"* (The Netherlands: Hes & De Graff, 2003).

Antoine-Laurent Lavoisier (1743 – 1794), a French nobleman, was the father of modern chemistry. He stated the first version of the law of the conservation of mass, co-discovered and named the elements of oxygen and hydrogen, discovered the composition of water and the air, introduced the metric system, helped reform chemical nomenclature, invented the periodic table which at the time included thirty three chemical elements, and performed experiments on human respiratory gas exchange. In 1789 he published what is considered to be the first modern chemical textbook *Traité élémentaire de chimie* (Paris: Cuchet). A thorough and detailed English translation is Robert Kerr's *Elementary treatise of chemistry* (New York: Dover Publications, 1965).

A partner of Lavoisier was Joseph Priestley (1733 – 1804), an English chemist and philosopher who made important contributions to physical science. He co-discovered the element of oxygen with Lavoisier. In 1796 he published a medical treatise *Considerations on the doctrine of phlogiston and decomposition of water* (Philadelphia: Thomas Dobson) which attempted to

explain oxidation processes such as combustion, the rusting of metals, and their effects on human body chemical composition.

Despite the medical advances that took place in science and medicine in the seventeenth and eighteenth centuries, it was only in the nineteenth century that medicine itself became scientific. This was largely the result of the integration of the natural sciences into medical theory.

Jean-Baptiste Lamarck (1744 – 1829) was French naturalist who was an early proponent of evolution and natural biological laws, and who also posited the theory of heredity. This last discovery would be of great influence on the research on human inherited traits as related to disease, and the subsequent development of specific medical treatments. His most famous work was *Philosophie zoologique* (Paris: Dentu) first published in 1809 which has been translated by Hugh Elliot as *Zoological philosophy: An exposition with regard to the natural history of animals* with exquisite introductory essays by David L. Hull and Richard W. Burkhardt Jr. (Chicago: University of Chicago Press, 1984).

Within the nascent field of epidemiology Edward Jenner (1749 – 1823) was an English country doctor who is most famous for introducing the first smallpox vaccine which was one of the greatest killers of mankind at the time. His research has survived mostly in the form of letters and small papers that were never officially published. However, great posthumous books can be found on the doctor and his life saving discovery. One of these is George F. Smith's *The man who saved the world from smallpox: Doctor Edward Jenner* (Lincoln, Nebraska: iUniverse, Inc., 2004).

A previously unknown branch of medicine dermatology was developed thanks to Jean-Louis Marc Alibert (1768 – 1837) a French dermatologist. Alibert was a pioneer in diagnosing

and treating skin disorders such as leprosy and mycosis fungoides, and developed a system for classifying skin diseases according to appearance, families, generations and species known as the tree of dermatoses. He was a prolific writer and his best known work, rich with illustrations and detailed prognosis, is *Descriptions des maladies de la peau observées à l'Hôpital Saint-Louis et exposition des meilleures méthodes suivies pour leur traitement* (Paris: Wahlen, 1825), the largest and most spectacular of the early classics of dermatology.

In the other side of the world, William Beaumont (1785 – 1853), an American surgeon, made great strides in the field of human digestion being known as the father of gastric physiology. His 1833's *Experiments and observations on the gastric juice and the physiology of digestion* (Chicago: Kessinger Publishing LLC, 2003) includes his medical observations, gastric ailments, role of digestive juices, and the inner workings of hunger, thirst, and satiety among others.

Without a doubt, one of the most celebrated medical discoveries of the nineteenth century was that of anesthesia. Doctors could now take the time to perform surgeries in contrast to the harried procedures of before. As such, it could also become more accurate and could now explore the forbidden areas of the abdomen, chest, and brain. Sir James Young Simpson (1811 – 1870), a Scottish professor of obstetrics in Edinburgh, introduced the usage of chloroform during childbirth in 1847. He also improved the design of obstetrical forceps and fought to follow hygiene procedures as a way of preventing septicemia contracted during labor. He published several papers all of which are available as free downloads from The Royal College of Surgeons of Edinburgh website.

Carl Ludwig (1816 – 1895) was a German physician and physiologist who continued already existing research on blood pressure, urinary excretions, and the use of anesthesia.

Ludwig introduced a variety of new methods and apparatuses to the practice of medicine such as the kymograph and the mercurial blood pump. His most celebrated work, *Textbook of human physiology* (London: Longman, 1852 – 1856), a two volume work, rejects the notion that animals and humans are powered by special vital forces proposing instead that the laws of chemistry, physics and biology could explain all systems and processes.

Gregor Mendel (1822 – 1884) was a Moravian priest and scientist, best known as the father of modern genetics for his study of the inheritance of traits in pea plants. The importance of his discovery was not realized until the twentieth century. In 1866 his paper *Versuche über pflanzen-hybriden* (Verhandlungen des naturforschenden Vereins Brünn, 4, 3–47) was published. An English translation by Roger B. Blumberg, *Experiments on plant hybridization* (n.d.), is available at the Mendel Web organization's website.

One of the great medical advances of this century was the establishment of epidemiological theories of disease. Louis Pasteur (1822 – 1895) was a French chemist best known for his research in microbiology, pasteurization, bacteriology, and for developing the vaccine against rabies. His extensive six tomes *Ouvres complétes* (1922 – 1939) can be downloaded from the Bibliothèque Nationale de France's website. In *Louis Pasteur: Hunting killer gems* (Columbus, Ohio: McGraw-Hill, 2000) E. A. M. Jakab traces Pasteur's career and the process that led him to believe that germs are the causes of many diseases.

Another microbiologist, Robert Koch (1843- 1910) was a German physician best known for the discovery of the anthrax bacillus, the tuberculosis bacillus, and the cholera bacterium. Another of his great contributions to bacteriology were the *Mitt kaiser gesundh* (Journal of Hygiene, 1884, 2(1-88), 14, 319-333) which were the four criteria known as Koch's postulates to be considered when establishing disease causation by microorganisms. A. S. Evans reviewed the

postulates in his article *Causation and disease: the Henle-Koch postulates revisited* (Yale Journal of Biology and Medicine: 1976, 49, 175–195).

Curiously, medical discoveries in the area of immunology were not confined to Europe only. For example, Carlos J. Finlay (1833 – 1815) was a Cuban physician and scientist who in 1881 wrote a paper, *El mosquito hipotéticamente considerado como agente de transmisión de la fiebre amarilla* (Anales de la Real Academia de Ciencias Médicas Físicas y Naturales de la Habana, 18, 147-169, outlining his theory that the *Aedes Aegypti* mosquito was the carrier of the yellow and dengue fever diseases. His discovery helped governments all over the world to control and eradicate the prevalence of mosquito borne diseases. George M. Sternberg's *Dr. Finlay's mosquito inoculations* (American Journal of the Medical Sciences CII, 1891, 6, 629-630) offers a condensed and annotated version in English of the original paper written by Finlay.

In 1895 German physicist Wilhelm Conrad Röntgen (1845 – 1923) produced the electromagnetic radiation in wavelength range that is known as X-rays. Today, Röntgen is considered the father of diagnostic radiology, the medical specialty which uses imaging to diagnose disease. He published a total of 3 papers on X-rays between 1895 and 1897. The original paper *Über eine neue art von strahlen* was published in the Austrian medical journal Sitzungs-Berichte Physmed Gessellschaft zu Würzburg in 1895. A 1896 English translation of it, *On a new kind of rays*, can be found in the journal Nature (53, 274-276).

Sigmund Freud (1856 – 1939) was an Austrian neurologist and psychiatrist who is widely regarded as the father of psychoanalysis. Freud is best known for his theories of the unconscious mind, psychosexual development, defense mechanisms, and his therapeutic techniques. He also popularized psychotherapy, the idea that a person could solve certain psychological issues just by talking about them. He was a prolific writer and many of his works are still studied in

psychology these days. One of his first, co-authored with Joseph Breuer, was *Studien über hysterie* (Leipzig, Germany: Deuticke, 1895) where the authors recognized that hysteria stemmed from traumas in the patient's past. An English translation by Nicola Luckhurst and Rachel Bowlby which is full of insight and revealing biographical annotations, is *Studies in hysteria* (London: Penguin Classics, 2004). Before the end of the century, Freud also published *Die traumdeutung* (Leipzig, Germany: Deuticke, 1899) which publicized his theory of dream interpretation which Freud believed was the road to the unconscious. Countless English translations have been published since. An excellent one is *The interpretation of dreams* (included in The basic writings of *Sigmund Freud: Psychopathology of Everyday Life, the Interpretation of Dreams, and Three Contributions To the Theory of Sex* (New York: Modern Library, 1995) translated by A. A. Brill.

Besides the ones mentioned in this paper, there were many other physicians and scientists who played a pivotal role in advancing humanity's collective medical knowledge. Thanks to their understanding of the complex relationships linking health, disease, demography, geography, ecology, and economics, we are now capable of successfully treating many medical conditions and, in many cases, eliminating the incidence of certain diseases. The embracement of the scientific method or evidence based medicine, transformed the practice of medicine from obscure speculation into accurate diagnosis, and helped establish a solid basis for the great medical advances of the twentieth century. We have a lot to thank these medical pioneers for.

References

Adelman, H. B. (1966). *Marcello Malpighi and the evolution of embriology*. Ithaca, New York: Cornell University Press.

Alibert, J. L. M. (1825). *Descriptions des maladies de la peau observées à l'Hôpital Saint-Louis et exposition des meilleures méthodes suivies pour leur traitement*. Paris: Wahlen.

Bartisch, G. (1583). *Ophthalmodouleia*. Dresden: German School.

Beaumont,W. (2003). *Experiments and observations on the gastric juice and the physiology of digestion*. Chicago: Kessinger Publishing LLC. (Original work published in 1833).

Blanchard, D. L. (1996). *History of ophthalmology: The monographs*. Ostend, Belgium: J. P. Wayenborgh Press.

Bibliothèque Nationale de France (n.d.). *Louis Pasteur: Ouvres completes*. Retrieved April 30, 2007, from http://gallica.bnf.fr/ark:/12148/bpt6k7356c

Boyle, R. (2003). *Works of the honorable Robert Boyle*. Chicago: Kessinger Publishing LLC. (Original works published in 1660-1675).

Evans, A. S. (1976). Causation and disease: the Henle-Koch postulates revisited. *Yale Journal of Biology and Medicine*, 49, 175–195.

Finlay, C. J. (1881). El mosquito hipotéticamente considerado como agent de transmisión de la fiebre amarilla. *Anales de la Real Academia de Ciencias Médicas Físicas y Naturales de la Habana*, 18, 147-169.

Freud, S. (1899). *Die traumdeutung*. Leipzig, Germany: Deuticke.

Freud. S. (1995). *The basic writings of Sigmund Freud: Psychopathology of everyday life, the interpretation of dreams, and three contributions to the theory of sex* (A. A. Brill. Trans.). New York: Modern Library.

Freud, S. & Breuer, J. (2004). *Studies in hysteria* (N. Luckhurst and R. Bowlby, Trans.). London: Penguin Classics.

Freud, S. & Breuer, J. (1895). *Studien über hysterie*. Leipzig, Germany: Deuticke.

Gaukroger, S. (Ed.). (2006). *Descartes: The world and other writings*. Cambridge, MA: Cambridge University Press.

Harvey, W. (1628). *Exercitatio anatomica de motu cordis et sanguinis in animalibus*. Frankfurt: Gvilielmi Fitzeri.

Harvey W. (2005). *On the motion of the heart and blood in animals* (no Trans.). Chicago: Kessinger Publishing LLC. (Original work published in 1628).

Jakab, E. A. M. (2000). *Louis Pasteur: Hunting killer gems*. Columbus, Ohio: McGraw-Hill.

Koch, R. (1884). Mitt kaiser gesundh. *Journal of Hygiene*, 2(1-88), 14, 319-333.

Lamarck, J. B. (1809). *Philosophie zoologique*. Paris: Dentu.

Lamarck, J. B. (1984). *Zoological philosophy: An exposition with regard to the natural history of animals* (H. Elliot, Trans.). Chicago: University of Chicago Press, 1984. (Original work published in 1809).

Latham, R. G. (1848). *The works of Thomas Sydenham* (D. Greenhill, Trans.). London: Sydenham Society. (Original work published in 1676).

Lavoisier, A. L. (1965). *Elementary treatise of chemistry* (R. Kerr, Trans.). New York: Dover Publications. (Original work published in 1789).

Lavoisier, A. L. (1789). *Traité élémentaire de chimie*. Paris: Cuchet).

Linnaeus, C. (1735). *Systema naturae*. The Netherlands: Theodorum Haak.

Linnaeus, C. (2003). *Systema Naturae 1735: Facsimile of the first edition with an introduction and an English translation of the "Observationes."* The Netherlands: Hes & De Graff. (Original work published in 1735).

Ludwig, C. (1852-1856). *Textbook of human physiology*. London: Longman.

Malgaigne, J. F. (Ed.). (1840). *Oeuvres d'Ambroise Paré.* Paris: J. B. Baillière. (Original works published 1541-1561).

Mendel, G. (n.d.). *Experiments on plant hybridization (*R. B. Blumberg, Trans.). Retrieved April 28, 2007 from http://www.mendelweb.org/Mendel.html.

Mendel, G. (1866). Versuche über pflanzen-hybriden. *Verhandlungen des naturforschenden Vereins Brünn*, 4, 3–47.

Paracelsus. (1536). *Die grosse wundartzney*. Frankfurt: Hans Varnier.

Paré, A. (1634). *The collected works of Ambroise Paré* (T. Johnson, Trans.). London: Milford House. (Original works published 1541-1561).

Priestley, J. (1796). *Considerations on the doctrine of phlogiston and decomposition of water*. Philadelphia: Thomas Dobson.

Röntgen, W. C. (1896). On a new kind of rays (A. Stanton, Trans.). *Nature*. 53, 274-276.

Servetus, M. (1553). *Christianismi restitutio*. Vienne: Arnoullet & Gueroult.

Servetus, M. (2006). *Michael Servetus: A translation of his geographical, medical and astrological writings* (C. D. O'Malley, Trans.). Chicago: Kessinger Publishing LLC.

Shackelford, J. (2003). *William Harvey and the mechanics of the heart*. Chicago: Oxford University Press.

Smith, G. F. (2004). *The man who saved the world from smallpox: Doctor Edward Jenner*. Lincoln, Nebraska: iUniverse, Inc.

Sternberg, G. M. (1891). Dr. Finlay's mosquito inoculations. *American Journal of the Medical Sciences CII*, 6, 629-630.

The Royal College of Surgeons of Edinburgh (n.d.). *Papers of Sir James Young Simpson*. Retrieved April 29, 2007 from http://www.rcsed.ac.uk/site/761/default.aspx

Vesalius, A. (1543). *De humani corporis fabrica*. Basileae: Ex officina I. Oporini.

Vesalius, A. (1998-ongoing). *On the fabric of the human body: A translation of De corporis humani fabrica* (W. F. Richardson, Trans.). San Francisco: Norman Publishing. (Original work published in 1543).

Vickers, B. (Ed.). (2002). *Francis Bacon: The major works*. Chicago: Oxford University Press.

Waite, A. E. (2005). *The hermetic and alchemical writings of Paracelsus*. Chicago: Kessinger Publishing LLC.