

A Chemical Genealogy of Dr. Mary L. Good

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1. Introduction

They say you can learn a lot about where you're going by where you've been. If this is true, then it only make sense to learn as much about our history as possible. As students, we are constantly learning ideas and remembering concepts so quickly, that we likely do not take the time to think about and try to understand how they came about. Learning about how scientists affect one another and bring about new ideas helps us to learn more about the process behind it. If we can understand enough about this process, we will be much more likely to be able to potentially bring about new ideas and ways of thinking of our own.

2. Mary L. Good (1931-) Ph.D. University of Arkansas, 1955

I first became aware of what an astounding woman of science the University of Arkansas at Little Rock's campus had when hearing Dr. Good speak at an American Chemical Society-Student Affiliate meeting during my junior year. Her impressive resume and inspiring talk made a lasting impression on me and she was the first to come to mind when choosing a subject for a chemical genealogy.



Dr. Good received her first degree in chemistry from The University of Central Arkansas (formerly known as Arkansas State Teacher's College). She received her Master's degree and Ph.D. from The University of Arkansas in Inorganic and Radiochemistry in 1953 and 1955 respectively. She has also received honorary doctorates from more than twenty colleges and Universities

The first twenty-five years of her career were spent teaching and researching in

the Louisiana State University system. Since then, she has served on boards of trustees and directors for industrial research for companies such as Allied Signal, BiogenIdec, Lockheed Martin Energy Research Corporation, Delta Bank and Trust and Axiom.

Good has been appointed to many scientific policy positions including appointments under Presidents Carter, Reagan, and Bush, Sr.

She is a member of numerous national and international Chemical, Scientific, and Engineering societies. Notably, she is a past president of the American Chemical Society, a member of the American Institute of Chemists, The Royal Society of Chemistry, and a member of the executive committee for the International Union of Pure and Applied Chemistry .

Dr. Good is currently serving as the founding Dean of the College of Information Science and Systems Engineering (also known as the CyberCollege) at the University of Arkansas at Little Rock.

3. A Genealogy to 1453

Good received her Ph.D in Radiochemistry from the University of Arkansas in Fayetteville, Arkansas in 1955 under Dr. Raymond R. Edwards.

Raymond R. Edwards (1917-1980) Ph.D., MIT, 1942

Thesis Mentor: Charles Coryell

Edwards received his Ph.D. from the Massachusetts Institute of Technology under Dr. Charles Coryell in or about the year 1942 (the exact year could not be found). He worked at the Manhattan project's Oak Ridge Facility in Tennessee where Uranium 235 was separated from Uranium 238 to prepare the Uranium core used in the Hiroshima atomic bomb. He was one of 67 scientists at the facility to sign a petition to the president urging careful consideration when using

atomic weapons known as the Oak Ridge Petition:

“To the President of the United States:

We, the undersigned scientific personnel of the Clinton Laboratories, believe that the world-wide social and political consequences of the power of the weapon now being developed on this Project impose a special moral obligation on the government and people of the United States in introducing the weapon in warfare. It is further believed that the power of this weapon should be made known by demonstration to the peoples of the world, irrespective of the course of the present conflict, for in this way the body of world opinion may be made the determining factor in the absolute preservation of peace.

Therefore we recommend that before this weapon be used without restriction in the present conflict, its powers should be adequately described and demonstrated, and the Japanese nation should be given the opportunity to consider the consequences of further refusal to surrender. We feel that this course of action will heighten the effectiveness of the weapon in this war and will be of tremendous effect in the prevention of future wars”

He later went on to chair the Department of Chemistry and Biochemistry at the University of Arkansas at Fayetteville.

Charles DuBois Coryell (1912-1971) Ph.D. Cal Tech, 1935

Thesis Advisor: Linus Pauling

Noted for his studies on fission process, Charles D. Coryell taught at M.I.T. following graduation from Cal Tech. In 1942, he became Chief of the Fission Products Section of the Manhattan Project, first at the University of Chicago (1942-1946) and later, at Clinton Laboratories in Oak Ridge, Tennessee (1943-1946). The studies of J.A. Marinsky and L.E. Glendenin in his group led



papers from the wartime work of the

to the chemical identification of element 61, Promethium, the only element between 1 and 96 that had not yet been identified. With Dr. Nathan Sugarman, Dr. Coryell was co-editor of a volume of 336 research

Manhattan Project titled Radiochemical Studies: The Fission Projects. He returned to M.I.T. after the war, where he continued his investigations in fission fine-structure and beta decay theory until his death in 1971.

Photo: **Charles Coryell (left) with Linus Pauling**

Linus C. Pauling (1901-1994) Ph.D. Cal Tech, 1925

Thesis Advisor: Roscoe G. Dickinson

Considered one of the premier chemists of the twentieth century, his most notable accomplishment is being the only person ever to win two unshared Nobel Prizes. The first prize was in Chemistry in 1954 for his work in describing the nature of the chemical bond and the second prize for Peace in 1962 for his campaign against above ground nuclear testing. It is rumored that Pauling came up with his idea for the alpha and beta helix protein secondary structures while in bed fighting a cold. He studied many areas including biological molecules, molecular genetics, the structure of the atomic nucleus and was an activist for peace and lower emission vehicles. Later in life becoming diagnosed with Bright's disease, he became interested in medical research. In 1986, he published a popular book *How to Live Longer and Feel Better* that advocated very high doses of vitamin C.

Roscoe Gilkey Dickinson (1894-1945) Ph.D. Cal Tech, 1920

Thesis Advisor: Arthur Amos Noyes

Dickinson, known primarily for his work on X-ray crystallography was the first student to receive a Ph.D from the California Institute of Technology (Cal Tech) which had recently become Cal Tech after changing its name from Throop College. As a professor of Chemistry at Cal Tech he was the thesis advisor to two notable chemists including Linus C. Pauling and Arnold O. Beckmann. Beckmann



went on to become the inventor of the pH meter. His doctoral research involved the study of the crystal structures of wulfenite, scheelite, sodium chlorate and sodium bromate

Arthur Amos Noyes (1866-1936) Ph.D. Leipzig, 1890

Thesis Advisor: Wilhelm Ostwald

Noyes was an American chemist served as the acting president of Massachusetts Institute of Technology from 1907-1909. He served as a professor of Chemistry at Cal Tech from 1919-1936 where he had a major influence on the educational philosophy and core curriculum there. Along with Willis Rodney Whitney, he formulated the Noyes-Whitney equation that relates of dissolution of solids in relation to the properties of the solid and medium. This equation is used frequently in pharmaceutical sciences.



Friedrich Wilhelm Ostwald (1853-1932) Ph.D. University of Tartu

Thesis Advisor: Carl Schmidt

Born in modern-day Latvia, but of German decent, Ostwald won the 1909 Nobel Prize in Chemistry for his work on chemical catalysis, chemical equilibria, and reaction velocities. He was a professor Chemistry at the University of Tartu, where he received his Ph.D, from 1875-1881 and at the Riga Polytechnicum



from 1881-1887. He is usually credited with inventing the Ostwald process to manufacture nitric acid and terming the word "mole."

Carl Schmidt (1822-1894) Ph.D. University of Giessen, 1844

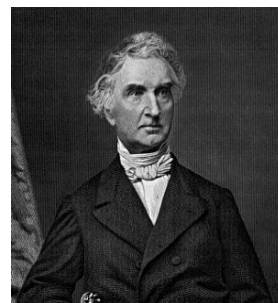
Thesis Advisor: Justus von Liebig

Schmidt was a German chemist that most notably determined crystal habits of many important biochemicals such as uric acid, oxalic acid and its salts, lactic acid, cholesterol, and stearin. He also studied alcoholic fermentation and chemistry of metabolism and digestion and observed that animal and plant cell constituents are chemically similar. He studied chemical changes in blood associated with cholera, dysentery, diabetes, and arsenic poisoning.

Baron Justus von Liebig (1803-1873) Ph.D. University of Erlangen 1922

Thesis Advisor: Karl Wilhelm Gottlob Kastner

As a professor at Giessen, he devised the modern laboratory teaching method and for this is regarded as one of the greatest teachers of Chemistry in history. He is also known for several contributions to go the agricultural industry. He discovered Nitrogen as an essential plant nutrient and is known as the "father of the fertilizer industry." He formulated the Law of the Minimum to describe the effect of individual nutrients on crops. The University of Giessen is now officially named after him *Justus-Liebig-Universität-Giessen*.



Karl Wilhelm Gottlob Kastner (1783-1857) Ph.D. University of Jena, 1805

Thesis Advisor: Johann Gottling

After receiving his doctorate from the University of Jena, he went on to teach at the

University. His frequent changing of universities in some cases were rumored to be politically motivated. From Jena, he moved to the Universities of Heidelberg, Halle, Bonn, and Erlangen. As the thesis advisor to von Liebig, he is the reason that Liebig traveled from the University of Bonn to the University of Erlangen to finish his doctorate. His teaching career not only involved chemistry but also mathematics, zoology, mineralogy, geology, and pharmacy.

Johann Friedrich August Gottling (1753-1809) Apothecary Degree, Langensalza, 1775

Mentor: Johann Christian Wiegleb

Gottling developed and sold chemical assay kits and studied processes for extracting sugar from beets, to supplement his meager university salary. He studied the chemistry of sulfur, arsenic, phosphorus, and mercury. He wrote texts on analytical chemistry and studied oxidation of organic compounds by nitric acid. He was one of first in Germany to take a stand against the phlogiston hypothesis and for the new chemistry of Lavoisier.

Johann Christian Wiegleb (1732-1800) Apothecary Langensalza, 1765

Mentor: Ernst Gottfried Baldinger

Wiegleb was a druggist who worked during the age of scientific enlightenment and was one of the first to operate a chemistry and science based pharmacy. Wiegleb founded the first private chemical teaching-institution for the scientific training of druggists in 1779 and a textbook for the students, "A Handbook of General Chemistry."



Ernst Gottfried Baldinger (1738-1804) M.D. University of Jena, 1760

Mentor: Christoph Mangold

Baldinger studied medicine at the University of Jena where he later went on to teach. He was also the superintendent of a

Prussian military hospital near Torgau. He authored more than 80 treatises, *De Militum Morbis* being the most noteworthy, as well as numerous papers in various collections and journals.

Christoph Andreas Mangold (1719-1767) M.D. University of Erfurt, 1751

Mentor: Georg Erhardt Hamberger

Mangold was a professor of chemistry, philosophy and anatomy. He also studied the chemistry of gunpowder and cinnabar in addition to medicine. He was first to propose comparing symptoms and medical tests of patients with those of previous patients to diagnose disease and that a therapy cannot necessarily be judge by the disappearance of symptoms.

Georg Erhardt Hamberger (1697-1755) M.D. University of Jena, 1721

Mentor: Johann Adolph Wedel

Hamberger was an M.D. that went on to become a professor of medicine, surgery and botany. He studied the science of respiration, especially the breathing mechanism, including the function of thorax and intercostal muscles and the pleural sac.

Johann Adolph Wedel (1675-1747) M.D., University of Jena, 1697

Mentor: Georg Wolfgang Wedel

Wedel was a professor of medicine at the University of Jena that published texts on fermentation, camphor experiments, magnesium carbonate, the combustion of sulfur, and many other medical science topics.

Georg Wolfgang Wedel (1645-1721) M.D. University of Jena, 1669

Mentor: Werner Rolfinck

Wedel taught surgery, botany, theoretical medicine, practical medicine, and chemistry at Jena where he received his M.D. He authored numerous papers on alchemy

and pharmaceutical chemistry. Outside of medicine and chemistry, he accurately translated a Greek edition of the bible into German.

Werner Rolfinck (1599-1673) M.D. Padua 1625

Mentor: Adriaan van den Spieghel

Rolfinck was the first ever professor of Chemistry at the University of Jena where he also taught anatomy, surgery, and botany. He reportedly gave lectures that featured the dissection of executed criminals, which was found to be very controversial. He was the first to demonstrate the location of cataracts in the lens of the eye. Rolfinck used logical thinking, opposing alchemical and superstitious thinking, transmutation, resuscitation from ashes, and obtaining oil from precious stones.

Adriaan van den Spieghel (1578-1625) M.D. Padua, 1603

Mentor: Girolamo Fabrici

This Flemish professor of anatomy, surgery and botany wrote texts on plant anatomy and an influential text on anatomy, *De humani corporis fabrica* (published posthumously). He also gave comprehensive descriptions of malaria and tapeworms and wrote a treatise on human embryology.

Girolamo Fabrici (1537-1619) M.D., Padua, 1559

Mentor: Gabriel Fallopio

He was an Italian anatomist that eventually became a professor of anatomy and surgery at Padua in 1562. By dissection of animals, Fabrici investigated the formation of the fetus and was known as the “father of embryology” in Italian medical



science. He also discovered the membranous folds of interior veins that prevent blood from flowing backward into the heart.

Gabriele Fallopio (1523-1562) M.D. Ferrara, 1542

Mentor: Antonio Musa Brassavola

Also known by his Latin name, Fallopius, he was one of the most important anatomists and physicians of the sixteenth century. Financial difficulties led to him joining the clergy in order to continue to study medicine. He primarily studied the anatomy of the head, including the internal ear, the lachrymal passages of the eye, and the ethmoid bone of the nose. The canal through which the facial nerve passes after leaving the auditory nerve is named for him.

Antonio Musa Brasavola (1500-1555) M.D./Ph.D. Ferrara, 1520

Mentor: Nicolo da Longo

Brasavola was the physician to popes and royalty, including Francis I of France, Kaiser Charles V of Germany, King Henry VIII of England, and Popes Paul III, Leo X, Clemens VII, and Julius III. He introduced the use of plants for medicinal purposes and organized the famed botanical gardens of Belvedere.

Nicolo da Lonigo (1428-1524) M.D./Ph.D., Padua, 1453

Mentor: Pelope

Longo is largely accredited with the reformation that happened in medicine during the sixteenth century. He was a professor of mathematics, Greek philosophy, and medicine who translated Greek medical texts by Galen and Hippocrates into Latin. He was the first to write publications on syphilis, which had recently appeared in Europe.

Pelope

Pelope was known to be practicing medicine in Padua in the 1450's, but not much else about him is known.

3. Conclusions

It really is amazing to have found in my research people who were responsible for ideas and discoveries that I learn and study on a daily basis and to think that in a way, we are all connected. Could they have known what an impact they would have? It brings about the reality that one time, years ago, they were students just like me looking back at the great men and women of science before them and wondering if they too were capable of doing something great.

References

Biography, photo and information on Raymond R. Edwards and Charles Coryell courtesy of Mary Good.

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Oak Ridge Petition, July 1945 courtesy of <http://www.bio.indiana.edu/Gest/>

Photo of Linus Pauling and Charles Coryell
Courtesy of University of Oregon
<http://osulibrary.oregonstate.edu/specialcollections/>

Biographical Information on Charles D. Coryell
Courtesy of University of Chicago Library. "The Charles Coryell Papers."