Early Women Chemists of the Northeast

Nina Macoby Fincher and Philip L. Anstrom

Department of Chemistry The American University Washington, D.C. 20016

ABSTRACT

The work of early women in chemistry, followed what would be considered traditional courses in chemistry or pharmacy. The line and career of women chemists to researchers who followed different pathways to research are discussed.

The early women chemists discussed are Eliza Dana, Marie Curie, and Lucy Pitter. They formed one of the early research groups in order to advance science and reputation for their work. Other women who followed a similar route are: Mabel Durfee Bentley (Wayne State), Mary Parsons (Texas A&M, and Indiana University), and Esther H. B. (death) andxd7.7x2.1.jpg

The chemical research was carried out on physical chemistry problems at various times. This research is described.

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In the early part of this century, chemistry was batching a man's discipline. It was not a field in which women were expected or allowed to excel. A few very talented women, however, struggled to become suc-
cessful chemists and pathfinders, and won. Their advance gave open the way for the amazing women chemists of today.

These women, coming from different back-
grounds, discovered very different routes to success and recognition. Although tal-
ented women were working nationwide, some of the greatest advances were made in the Northeast.
One of the most successful of the early research groups was that formed by the women of M. Holschey, including Emma Perry Carr, Mary Lucy Sherrill, and Lucy W. Peters.

Emma Perry Carr received most of her undergraduate and graduate instructions at the University of Chicago and graduated in 1905 with a B.S. in Chemistry. She earned her Ph.D. very late and immediately began a long teaching career at Mt. Ho-
loscy College, including 33 years as chair-
man of the Chemistry Department. During these years, she emphasized on group re-
search goals for her department, as well as her own, a reputation of excellence among
women's schools.

Her research was concentrated in the field of physical chemistry. The research that received for her in 1933 at the Carver Medal ever awarded was her study of the electronic spectra of aliphatic hydrocar-
bons through the use of absorption spectra in the far ultraviolet. After her first work was published, she had the support of the National Research Council and the Rockefeller Foundation. The research group that she put together, with the work of other professors and a long progression of students, became one of the best known of this type of group research. Even more sig-
nificant is the fact that her group was an institution concentrating on undergraduate
study. The research group contributed great theoretical basis of the strong relationships involved as ethylic substitution. Their advances were later applied by petrochemists.

Dr. Carr received ninety honors for her work, including four Distinguished Drous. The Northeastern Section of the American Chemical Society recognized her career, teaching career with the John Fiske Sec-

In 1952 she was a member of the Phi Beta Kappa, Sigma 25, an honorary member of Sigma Delta Epsilon, and Sigma Theta Pi, and thirty-other profes-
sional organizations. She was also a dele-
gate to the International Chemical Union in 1925, 1926, and 1936. Dr. Carr remained active in its program long after her retirement. She died in 1972 at the age of 97.

Mary Lucy Sherrill was a colleague of Dr. Carr. At Mt. Holschey she was in the re-
search group. She received her B.A.
M.A., at Randolph-Macon Women's College in 1908 and immediately began teaching there. In 1918, she went to the Women's College, University of North Carolina and in 1920, she became a member of the Edgewood Aramite for the Chemical Weather Service. Finally, in 1921, she embarked on her long teaching career at Mt. Holschey College where she remained for 44 years. She participated in her group research which studied ultraviolet-absorp-
tion spectra of unsaturated hydrocarbons. This work required a high standard of
sample purity. The accuracy of her work was later upheld by spectra prepared by the Ambrose Rockefeller Institute.

World War II was Mary Lucy Sherrill's best opportunity to gain recognition for her work. Supported by the Office of Naval Research, she and her students initiated research on certain anta-

tibiotic drugs. The synthesis of antibiotics, initially developed during World War II, was perhaps the most important of Mary Lucy She-
rill's career among her many honors, was the Justin Fiske Award for the
significant achievement in the teaching of Victoria
Chemist, awarded by the Northeastern Section of the American Chemical Society in 1957, and the Gavino Medal, awarded by the ACS in 1947. She died in 1984 at the age of 86.

Lucy W. Post was the third member of her family to hold the title of professor. She received her B.A. and M.A. from Mt. Holyoke College in 1918 and 1921 respectively, and her Ph.D. in organic chemistry from the University of Oregon in 1924. Post spent a year at the University of California, working under Dr. W. H. P. Coats, where she conducted research on the internal respiration of marine algae. She was appointed as an assistant professor at Mt. Holyoke in 1928, became associate professor in 1931, and was promoted to professor in 1938. She served as chairman of the chemistry department from 1938 to 1948.

Post's research focused on the synthesis of organic compounds and the study of their chemical properties. She was particularly interested in the synthesis of complex organic molecules, such as those found in natural products. Her work contributed to the development of new synthetic methods for the production of drugs and other important chemicals. Post was awarded the first of several awards for her research in 1929, and she was elected to the National Academy of Sciences in 1948.

Post was a dedicated teacher and mentor, and her students were highly successful. Many of her students went on to become prominent scientists in their own right, including Dr. Venetia B. Staley, who was the first woman to receive a Ph.D. in chemistry from the University of California in 1935. Post was also a strong advocate for women's rights, and she was one of the first women to receive a Ph.D. in chemistry from a major university.

In addition to her teaching and research, Post was a committed philanthropist and community leader. She served as president of the Mt. Holyoke College Alumni Association, and she was a member of the Board of Trustees of the American Chemical Society. Post was also a founding member of the Women's Board of the American Chemical Society, and she served as its first president.

Post's contributions to the field of chemistry and to her community were recognized with numerous awards, including the ACS's Medal of Honor, the Gavino Medal, and the Robert A. Millikan Award. She was also honored with the presentation of the first of several honorary degrees, including a Doctor of Science from the University of Oregon in 1957.

In 1934, Post began work at Staal-Kenttig, Inc., in New York City, where she continued her research until her retirement in 1965. She was elected to the National Academy of Sciences in 1951 and was a member of the National Academy of Sciences, the American Chemical Society, and the American Institute of Chemists. She received the Silver Snoopy from the American Astronaut in 1970. She died in 1974.

Mary Locke Post received recognition as the first woman member of the Staal-Kenttig Institute for Cancer Research. She received her undergraduate training at Smith College, graduating in 1929. Her doctoral degree was awarded by the University of Wisconsin in 1939, where she then became the first woman chemist to teach at the University of Wisconsin. During World War II, under the auspices of the National Defense Research Council's Committee on Medical Research, she researched the properties of human serum albumin and the potential of intravenous administration of plasma globulins which is now a treatment for many diseases. In 1945, Dr. Postmann began work at Staal-Kenttig, Inc., in New York City, where she continued her research until her retirement in 1965. She was elected to the National Academy of Sciences in 1951 and was a member of the National Academy of Sciences, the American Chemical Society, and the American Institute of Chemists. She received the Silver Snoopy from the American Astronaut in 1970. She died in 1974.
the obvious. For a short time, they were even called "Prysmian particles" before they were formally named. Using ultracentrifugal analysis and electron microscopic analysis, she showed that the ribs of normal and abnormal mammalian tissues differed in some ways. In 1966, Dr. Petersen became a full Professor of Biochemistry at Sloan-Kettering Institute Graduate School of Medical Sciences at Cornell University where she worked until her retirement in 1975.

Dr. Petersen received the Garvan Medal in 1964 for her work in cellular chemistry. She also received the Alfred P. Sloan Award in Cancer Research in 1964 for her work linking ribosomes to cancer. In 1974, Dr. Petersen founded the Memorial Sloan-Kettering Organization for Professional Women. She died in 1975 in the age of 67.

Mary Lenasia Caldwell has been recognized for her work in carbohydrate and enzymology. She received her A.B. from Western College for Women in 1913 and her A.M. and Ph.D. from Columbia University in 1919 and 1921 respectively. She began her teaching career at Columbia in 1922 that continued until her death in 1972.

Dr. Caldwell began her research on malt amylase in 1918—research that was to take her a lifetime. She said group research, including the work of many graduate students, which was paid for by foundation and industrial grants. Enzymology has been changed radically by her research. Many of these techniques are now standard practice in universities and industry. She studied the properties and reactions of purified amyloids, becoming the first to prepare crystalline pancreatic amylase. The research group also showed that amyloids were present, and identified what triggered their activity. Finally, they demonstrated that all alpha-amylases have the same active mechanism.

Mary Caldwell received the Garvan Medal in 1963 for her outstanding contributions in the field of enzymology.

In reality, Dr. Caldwell had two careers. One was her research; the other was her dedication to the administrative duties of the Chemistry Department at Columbia.

She served for over thirty years as an instructor in charge of assigning teaching assistants and guiding graduate admissions and research. At the same time, Dr. Caldwell served as secretary of the department and as a financial advisor to graduate study. Katherine B. Weatherly earned her B.S. from the University of Mississippi in 1947 and her M.S. from the University of Chicago in 1958. In 1958, she became the first woman to receive a Ph.D. in Physics from Cambridge. She began her research career as the first woman at General Electric's research laboratories in 1958. She got this position with the help of friends in GE and the labor shortage caused by World War II. She assisted Dr. Irving Langmuir in his work on monomolecular films. This group research, involving several other prominent chemists at GE, resulted in the production of "insensible" glass in 1958, a product now standard in all automobile and equipment. Silicon dioxide, four-thick layers of transparent soap are applied to lenses in order to cut down on reflection. She devised a method and a process to measure the thickness of one or two thickness films of colored glasses. Other research included the improvement of tungsten filaments in light bulbs, continuing on into Wagner's work, and developing a new smoke screen during the Second World War.

Katherine B. Weatherly received the American Association of University Women Achievement Award in 1963 and the Garvie Medal in 1951 for her work with monomolecular films. She died at the age of 81 in 1979.

Germaine B. Miller earned advanced degrees in Biochemistry and Pharmacology. She received her B.A. at Hunter College in 1937 and her M.S. at New York University. After 4 years of studying from company to company, she found herself at the Burroughs Wellcome Company Research Laboratories in the Hudson Valley. The manpower shortage during the war was so severe that she helped to land a good research job at Burroughs Wellcome. She synthesized 

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\text{Allaispinop} (\text{Allopurinol}) \text{ which destroys the formation of arachidonic acid. This drug is effective against gout and other diseases.}
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Antibiotic (isoniazid), another of its kinds, is an immunosuppressant used in humans and animals. In fact, it was utilized in the first human heart transplant. It also is a potent treatment for leprosy, a disease that causes many parts of India to be considered a drug-resistant disease. The isoniazid is also effective in the treatment of tuberculosis and other forms of leprosy.

Sarah Rabin received her A.B. and Ph.D. from Cornell University in 1934 and 1937, respectively. She began teaching at Long Island College in 1930 and headed to Columbia University’s College of Physicians and Surgeons in 1938. Then in 1945, she moved to New York University’s College of Medicine. In 1948, she was appointed as a professor of biochemistry in 1954. The same year, she joined the Public Health Research Institute of New York City.

Dr. Rabin’s research in the area of amino acids metabolism has gained recognition for her as well as her colleagues. Her first work studied the formation of cyanine and formamide. Later, she isolated isozymes to research in amino acid metabolism in 1944. In 1949, the initial research in the utilization of enzymes in proteins was a great step toward the eventual discovery of the mechanism of urea synthesis. Aware of this research, she helped to study infants’ mental deficiency associated with one of these enzymes.

Dr. Rabin received the Carl Neuberg Medal of the Society of European Chemists in 1939. She was also the recipient of the Guggenheim Foundation in 1951 for her research on the effect of enzymes on protein production. In 1939, Gertrude B. Elkin received her Ph.D. in chemistry and physics from the Massachusetts Institute of Technology. In 1936, she met her husband, John D. Rockefeller, Jr., and in 1942, she became a naturalized citizen. She graduated from the Rockefeller Institute in New York that same year where she remained until her death in 1974 at the age of 62.

She used electromicroscopy in several research projects on proteins. She also aided in the first link phosphorylation with the stabilization of protein syntheses, showing that the phosphate group in protein forms a diester in the polyphosphate chain, creating a loop. She then thoroughly researched the structure of protein. She described its atomic arrangement, its use in digestion, and the structure and properties of proteins when it is activated.

She authored many publications on protein and enzyme chemistry. Dr. Perlman received the Garvan Medal in 1951 for her studies on the protein syntheses. Mary Engle Pennington was one of the first chemists to study the structures of proteins and carbohydrates. She received her Ph.D. at the University of Pennsylvania in 1933. In 1933, she began teaching at Women’s Medical College, specializing in bacteriology. She was consulted by doctors nationwide, and by the city of Philadelphia, for the care of perishable foods, including the refrigeration of milk. In 1948, Dr. Perlman helped to implement the Federal Food and Drug Act, by setting up and directing a laboratory for the Department of Agriculture. This installation re-researched methods of assuring the quality of such perishables as eggs, poultry, and fish. This work led to many improvements in the food storage and transportation industries. Dr. Pennington was a U.S. delegate to the first three meetings of the International Congress of Refrigeration.

In 1979, she became the manager of the research and development division of the American Baking Company in New York. Finally, in 1933, she established her own office in New York as a private consultant on the bacteriology of perishables. She maintained this office until her death in 1952. During World War II, she was called by the War Shipping Administration as Director of the Refrigeration Bureau of the National Association of Ice Industries, which she refers to in her autobiography.

Mary Pennington was a member of numerous professional societies and the author of many publications. She was the recipient of the Garvan Medal in 1947.

Helena M. Drees has made substantial advances in the field of cancer research and nutrition. She was born in a Bavaria of Germany.
College in 1917 and her M.S. and Ph.D. from George Washington University in 1929 and 1935 respectively. Her first teaching experience was at Mrs. Hilty's College in 1939 and 1920 where she taught anatomy. She then returned to Washington, D.C., and was employed at the Washington Laboratory in its department of Chemistry under Dr. Carl Voegelin. After a few years, she left the laboratory to work at George Washington University where she remained until 1930. In 1942, she rejoined Dr. Voegelin, then at the National Cancer Institute where she helped with the establishment of its chemotherapy program.12

Her research work has laid the groundwork for other research projects. She showed the relationship between vitamin B and N-acetylaminosulfide in the production of peripheral tyrosine metabolism. This research led to various studies in the chemical effects of this reaction. In 1936, she devised a method through biochemistry by synthesizing the effect of tyrosine in humans. Expecting to find a nontoxic dietary substitute. Instead, she found that the amino acid is extremely toxic. This discovery added a new field in medical research and pharmacology. In 1943, Dr. Dyer collected and released a document for treatment into an index of curative chemotherapy. Later, she has shown that there is an inverse relationship between the level of serum glutamic-oxalacetic transaminase (GOT) and the growth rate of tumors.13

The result of Dr. Hilty’s research has been overly published. Today she is working as a consultant at the Washington D.C. area. She is a member of the AAAS, Sigma Xi, Iota Sigma Pi, and other professional societies.14

The laws and careers of women have inspired other talented women to enter a field that was once closed to them. Although their careers were very different, some similarities are apparent in their different paths to recognition. First, the influence of the two world wars on the supply of talented men and on the supply of good research jobs seems to have been a crucial factor in many of these women’s “first break” and added new opportunities for others who had been restricted from science in chemistry. Among these women were Mary Perren, Katherine Bledig, Gerty Cori, Gerty Cori Perett, and Mary Patten. Another similarity is the use of group research. The women of Mrs. Hilty's College are perhaps the best but not the only example.

References

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