Alice Hamilton: Changing America's Views on Industrial Disease and Occupational Medicine

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In September of 1910, the International Congress on Occupational Diseases took place in Brussels, Belgium. When the topic of industrial hygiene in the United States came up, it was immediately dismissed with the comment, "Ça n'existe pas [It does not exist]." To the rest of the world, it was obvious that this was true. In the United States, cases of chemical poisoning and fatalities in the workplace were normal occurrences, yet nothing was being done about the lack of safety measures and medical examinations of the workers.

Most people, both workers and factory owners alike, were uneducated about the dangers of working with poisonous substances such as lead. Eventually, this led to the entire United States turning a blind eye to industrial disease. However, sixty years later the United States would pass the Occupational Safety and Health Act. What happened between 1910 and 1970 that changed America's views on Occupational Medicine? The answer is not a what, but a who: Alice Hamilton.

By single-handily conducting federal surveys for the government and recommending what laws should be established, Alice Hamilton took a stand against the lack of industrial hygiene and protection for laborers in the United States. Along the way, she educated workers, factory owners, and the general public about industrial disease and what safety measures could be set to prevent them. She became one of the world's leading experts in Occupational Medicine—practically creating the field in the United States—and is the reason America is no longer seen as the country that doesn't protect their laborers.

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Early Influences and Education

Growing up in Fort Wayne, Indiana, Alice Hamilton never studied science. However, she, her sisters and her cousins still practiced habits of the scientific approach. Never allowed to make a statement unless ready to defend it, the children were brought up to think for themselves and express their opinions.

Alice’s mother, Gertrude Pond, played an important role in shaping her into the woman she would become. Not afraid to speak about taboo subjects, Gertrude encouraged her daughters to prepare for careers and not be dependent on husbands like most women those days. An explanation for Alice’s desire to be of service and to make the world better comes from something Gertrude said:

There are two kinds of people, the ones who say, 'Somebody ought to do something about it, but why should it be I?' and those who say, 'Somebody must do something about it, then why not I?'

Hamilton chose to make a difference through medicine—not because she was scientifically-minded, but "because as a doctor I could go anywhere I pleased... and be quite sure that I could be of use anywhere."

She began her medical training in Fort Wayne with tutoring sessions from a local high school teacher and a few classes at a local medical school. She eventually

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4 Hamilton, Exploring the Dangerous, 31.

5 Veglahn, Women Scientists, 37.

6 Hamilton, Exploring the Dangerous, 32.

7 Ibid., 35, 38.

8 Veglahn, Women Scientists, 38.
graduated from University of Michigan’s medical school, deciding to pursue bacteriology and pathology instead of medicinal practice.\textsuperscript{9} As a woman, in order to establish a career in pathology, she was told she needed to pursue advance studies in Germany. Alice traveled there with her sister, Edith, where they faced discrimination for being female students. However, she was still able to do useful laboratory research.\textsuperscript{10}

After returning home, Alice was invited to teach pathology at the Women's Medical School of Northwestern University. She was delighted by the opportunity to move to Chicago which would allow her to live in Hull House,\textsuperscript{11} her dream for years.\textsuperscript{12}

**Time at Hull House**

It was at Hull House where Hamilton started and devoted her life to social work. As she once said, "At Hull-House one got into the labor movement as a matter of course, without realizing how or when."\textsuperscript{13} After fighting against the spread of cocaine,\textsuperscript{14} opening a well-baby clinic, and investigating a severe typhoid epidemic, which led to the reorganization of the Chicago Health Department,\textsuperscript{15} Hamilton turned her focus to issues of public health.

\textsuperscript{9} Hamilton, Exploring the Dangerous, 42-43.

\textsuperscript{10} Veglahn, Women Scientists, 39.

\textsuperscript{11} Hull House was a famous settlement house founded by Jane Addams. Dedicated people had the chance to provide educational, recreational and other social services to immigrants and poorer people.

\textsuperscript{12} Hamilton, Exploring the Dangerous, 53.

\textsuperscript{13} Ibid., 80.

\textsuperscript{14} Veglahn, Women Scientists, 40.

Living in a working class district, Hamilton "could not fail to hear tales of the dangers that working men faced, of cases of carbon monoxide gassing in the great steel mills, of painters disabled by lead palsy, of pneumonia and rheumatism among the men in the stockyards," sparking her interest in industrial disease. After reading Sir Thomas Oliver's *Exploring the Dangerous Trades*, Hamilton pursued the subject, discovering lead poisoning and other diseases were common in American industries. However, "There were no laws about occupational safety, no system for inspecting factories, and no plans for workers' compensation for injuries." Although interest in occupational health had been heightened due to the Progressive Movement, industrial disease was still not considered a problem and Occupational Medicine was not deemed a respectable profession in America. However, in European countries like Germany and England the field was a recognized branch of medicine and there were laws to protect laborers and systems to inspect factories. Yet, Americans still believed factories in the United States were better than those overseas.

Horrified with her discoveries, Alice Hamilton set out to change America's views on industrial disease.


20 Wilson, The Book, 58.

21 Veglahn, Women Scientists, 41.
Career

In 1908, on her mission to publicize and prevent the hazards of industrialization, Hamilton found an ally in Professor Charles Henderson of the University of Chicago. He, too, desired to have protections set in place for the American workforce, and he managed to persuade Illinois governor Charles Deneen to create the Illinois Occupational Disease Commission—the first of its kind in any state. Dr. Henderson appointed Hamilton and five other physicians who, along with himself, created a preliminary report containing thirty known toxic substances. This investigation revealed the need for a larger study, and in 1910 Hamilton was appointed supervisor of a group of scientists and physicians that conducted a survey on industrial diseases in Illinois.

They investigated poisons including lead, arsenic, brass, carbon monoxide, the cyanides, and turpentine. After visiting plants, reading hospital records, and interviewing labor leaders and doctors in working-class districts, the commission created a final report recommending proper ventilation, temperature and humidity control, and sanitary measures. It also included a draft occupational health law, and a similar, but less

22 There have been multiple discrepancies between sources of what year Hamilton joined the Commission and later supervised it. Dates have ranged from 1907-1910.
25 Hamilton, Exploring the Dangerous, 120.
inclusive bill was passed soon after: the Illinois Occupational Disease Act of 1911.26

Victims of industrial disease now had to be provided with financial compensation, which led to employers getting insurance to cover the compensation cost. In turn, the insurance companies insisted that factories set precautions. Finally, some safety measures had been set in the dangerous trades. By the late 1930's, all states would have laws similar to Illinois'.27

In 1910 the Commission had sent Hamilton to the International Congress on Occupational Diseases in Belgium to visit lead plants in England. There, she met Charles O'Neill, commissioner of labor in the U.S. Department of Commerce.28 Impressed with her work for the Illinois Commission, he asked her to conduct a similar survey for the Federal government across all the states, investigating first the lead trades and then other poisonous occupations. Hamilton agreed, "and never went back to the laboratory."29

In this position, Hamilton would later be able to implement both regulatory and voluntary reforms, but there were still many obstacles.

I had, as a Federal agent, no right to enter any establishment—that must depend on the courtesy of the employer. I must discover for myself where the plants were, and the method of investigation to be followed. The time devoted to each survey, that and all else, was left to my discretion. Nobody would keep tabs on me, I should not even receive a salary; only when the report was ready for publication would the government buy it from me at a price to be decided on.30

27 Veglahn, Women Scientists, 41.
28 Until 1912 there was no Department of Labor, only a Bureau.
29 Hamilton, Exploring the Dangerous, 128.
30 Ibid.
Despite the challenges of her work, Hamilton enjoyed her freedom and turned down other offers that had larger salaries but more restrictions.

For the next ten years, Hamilton carried on detailed investigations from the Atlantic to the Pacific, discovering what the dangerous trades were and how they were dangerous. During World War I, she studied plants that were manufacturing explosives, and “by 1915 Alice Hamilton had become the foremost American authority on lead poisoning and one of a handful of prominent specialists in industrial disease.”\(^\text{31}\) Four years later, Harvard Medical School\(^\text{32}\) created a degree program in industrial hygiene. Like the Illinois Commission, it was the first of its kind. Breaking the university’s tradition of having an all-male faculty, Hamilton was offered the post of assistant professor of Industrial Medicine, although she was denied privileges male professors enjoyed. With the agreement that the job would only be for one semester each year so she could continue her surveys, Hamilton became Harvard’s first woman professor in any field.\(^\text{33}\)

**Work on Lead Poisoning**

Throughout her career, Hamilton investigated hazards posed by exposure to the toxic effects of aniline dyes, picric acid, arsenic, carbon monoxide, and many other industrial poisons.\(^\text{34}\) However, her greatest work was on lead poisoning.


\(^{32}\) After 1928, the program was moved to Harvard School of Public Health.

\(^{33}\) Barbara Sicherman, Alice Hamilton: A Life in Letters (Urbana: U of Illionois P, 2003), 4-5.

Lead enters the body slowly, accumulating and causing severe poisoning. With acute lead poisoning, victims suffer from a pallor, loss of appetite, loss of strength, headaches, pain in the limbs, and constipation. The trouble continues and victims may be struck with agonizing "lead colic" attacks, although someone can still be severely poisoned without ever having colic. If victims leave their occupations for a safer one they may recover completely, but sometimes just one attack can leave permanent damage. However, if they continue on with the same work chronic lead poisoning is developed:

Chronic lead poisoning is essentially a disease of the blood vessels, leading to degeneration of the organs, to atrophy of the digestive glands, hardening of the liver and kidneys, derangement of the heart, and premature senility.

In either form, at its worst, lead poisoning attacks the nervous system, which can lead to headaches, dizziness, disturbances of sight, loss of consciousness, paralysis, and convulsions, which can be fatal or end in insanity.

In the crowded, ill-ventilated, neglected factories in America where lead was used, almost no provisions were made to protect workers from lead poisoning. Floors and surfaces were white from years of lead dust. Hot water, soap, and towels, vital for removing lead from the hands, were seldom provided. Without separate dining halls, lunches were kept and eaten in rooms caked with dust. With no lockers to store them in,

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37 Hamilton, Lead Poisoning, 10.
clothes were exposed to lead. A lack of basic safety provisions like these endangered unnecessary amounts of people.\textsuperscript{38}

Employers had little concern for the health of their workers.\textsuperscript{39} No medical care was provided for the employees,\textsuperscript{40} and companies didn't want to admit any fault for unsafe working conditions.\textsuperscript{41} It was expected that the majority would quit within a few months,\textsuperscript{42} and the law said a person knowingly took a risk by going to work in an industrial job.\textsuperscript{43} However, many laborers were immigrants who never knew the chemicals they worked with were dangerous.\textsuperscript{44} Yet, these injustices grew to be accepted by the employers, employees, doctors, government, and people of the United States.

To conduct her surveys Hamilton engaged in "shoe-leather epidemiology." She first learned the technical side of an industry, then went to inspect factories and observe and document the processes. She established which industries used lead, then created statistics of the shockingly high morbidity and mortality rates by going through sketchy, almost non-existent\textsuperscript{45} hospital records, examining workers, and visiting their homes and families.\textsuperscript{46} Doing this with the industries of lead smelting, the manufacture of storage batteries, white-lead, potteries, tile works, and sanitary ware factories, she published

\begin{itemize}
\item \textsuperscript{38}Hamilton, Lead Poisoning, 7, 29, 30.
\item \textsuperscript{39}Veglahn, Women Scientists, 42.
\item \textsuperscript{40}Hamilton, Lead Poisoning, 7.
\item \textsuperscript{41}Veglahn, Women Scientists, 42.
\item \textsuperscript{42}Hamilton, Exploring the Dangerous, 131.
\item \textsuperscript{43}Veglahn, Women Scientists, 42.
\item \textsuperscript{44}Hamilton, Exploring the Dangerous, 124.
\item \textsuperscript{45}Many hospital records only identified patients with their first names, such as "Joe" or "Karl."
\item \textsuperscript{46}BLS and Alice," 25.
\end{itemize}
her finding in books bought by the U.S. Bureau of Labor. Included were recommendations for the regulations of factories, based on plants she observed in England and Germany from her visits during war times and for conferences. To get rid of beliefs that American factories were more advanced than European ones, Hamilton compared them in her books, including occupational safety laws European countries had established that weren't present in America.\textsuperscript{47}

Besides revealing the extent of lead poisoning to the public and government, Hamilton personally persuaded factory owners to voluntarily implement safer working conditions. One story is of Edward Cornish, president of the National Lead Companies, who was first "indignant and incredulous" when told his men were being poisoned. However, once presented with twenty-two severe cases, he later reformed all his plants, including employing doctors to provide weekly inspections of the men.\textsuperscript{48}

**Later Years**

After her program was cancelled in 1921 when pro-business Republicans regained control of the White House,\textsuperscript{49} Hamilton continued to teach at Harvard and also became a consultant for the General Electric Company.\textsuperscript{50} In 1925 she published *Industrial Poisons in the United States*, the first American textbook about industrial disease, becoming one of the two leading authorities in the world.\textsuperscript{51} During this time,

\textsuperscript{47} Hamilton, Lead Poisoning.

\textsuperscript{48} Hamilton, Exploring the Dangerous, 10-11.

\textsuperscript{49} Bois, "Alice Hamilton," Distinguished Women of Past and Present.

\textsuperscript{50} Hamilton, Exploring the Dangerous, 290.

\textsuperscript{51} Veglahn, Women Scientists, 43.
she also served on the League of Nations Health Committee and was asked to review industrial hygiene in the Soviet Union.\textsuperscript{52}

After retiring from Harvard in 1935, Hamilton returned to the Department of Labor where she worked as a medical consultant for the Division of Labor Standards,\textsuperscript{53} which was created in the New Deal.\textsuperscript{54} She conducted her last survey, investigating the viscose rayon industry.\textsuperscript{55} After publishing her autobiography, Hamilton served as President of National Consumers' League.\textsuperscript{56}

Throughout her life, Hamilton was socially and politically active. She spoke out on many controversial issues, signed petitions, and wrote to congressmen and newspapers.\textsuperscript{57} Hamilton lived though both World Wars, the Cold War, and the Vietnam War. Because she publicity supported "the right of people to hold and express unpopular views," her activities were followed by the FBI well into her nineties.\textsuperscript{58}


\textsuperscript{53} Later redesignated a bureau, the Division of Labor Standards promoted good working conditions.

\textsuperscript{54} In the New Deal, Secretary of Labor Frances Perkins created many programs and reforms that involved the Department of Labor.

\textsuperscript{55} "Alice Hamilton." Dictionary of American Biography.


\textsuperscript{57} ACS Network, "Alice Hamilton," American Chemical Society.

On her 100th birthday, Hamilton was sent a telegram from President Nixon, praising her "lasting contributions of the well being of our people and of men and women everywhere."59

Lasting Influence

Three months after Hamilton's death, the Occupational Safety and Health Act of 1970 was passed. A major law, it protects almost every employee and makes sure workplaces are hazard-free. Today, these protections have extended even further. The U.S. Department of Labor and U.S. Public Health Service oversee industrial dangers, and every state has laws to protect laborers from injury and disease. Workers will never again accept the treacherous conditions that were considered normal just 100 years ago, and employers are no longer uneducated about the dangers of industrialization.60

Almost all of this is due to the work of Alice Hamilton. A pioneer in industrial health, a founder of Occupational Medicine, and a leading expert on lead poisoning, Hamilton was never afraid to take a stand for what she believed in, even when it went against the beliefs of an entire nation. Although it was considered preposterous for a woman to challenge authority as she did, Hamilton's success made it easier for women to be taken seriously. Her success led to a better, safer America.

59BLS and Alice," 27.

60 Veglahn, Women Scientists, 45.
Annotated Bibliography

Primary Sources


This primary source book was written by Alice Hamilton. From this autobiography, I learned about all aspects of her life. I was able to learn about her thoughts and beliefs, and read the story of her life in great detail. It helped me organize my research by seeing what parts were most important to her work, and in what order events occurred.


This book was written by Alice Hamilton for the U.S. Bureau of Labor. She used her research from the surveys she conducted to educate people on lead poisoning. I learned the sanitary conditions of and what work was done in potteries, tile works, and porcelain enameled sanitary ware factories. I learned the dangers of these industries, the symptoms of lead poisoning, and was able to read about typical lead poisoning cases that workers in these trades suffered from. In this book, many charts were contained with information about the amount of workers
with lead poisoning within these industries. I was also able to read a description of different potteries, tile works, and porcelain enameled sanitary ware factories in Europe, and how the sanitary conditions and amount of lead poisoning there compared to the conditions and amount in America. Finally, I learned what Alice Hamilton suggested to be done to improve working conditions here, and was able to read the regulations regarding these industries present in Great Britain.


This book was written by Alice Hamilton for the U.S. Bureau of Labor. Using research from the surveys she conducted, she provided descriptions of the different processes that took place in the manufacture of storage batteries. I learned about the hygienic conditions of the factories and to what extent lead poisoning occurred. I was also able to read descriptions of storage battery factories in Great Britain and Germany, as well as the regulations for the manufacture of storage batteries in Great Britain and France. This included pictures that helped me better visualize the factories.

This book was written by Alice Hamilton for the U.S. Bureau of Labor. In it were descriptions of dangerous processes in the smelting industry that exposed workers to lead poisoning, as well as suggested preventative measures. Also included were chapters on the equipment used, accompanied by corresponding images. I learned what other poisons were encountered in the industry besides lead, and read about lead poisoning in the smelting industries of Austria, Great Britain, and Germany. Finally, I was able to read the German regulations for lead-smelting works, the newly-implemented New Jersey regulations for lead and copper industries, the French regulations relating to precautions against industrial lead poisoning, and the provisions for medical inspection and care in English, German, and French smelters.


This book was written by Alice Hamilton for the U.S. Bureau of Labor. In it, I read about lead poisoning and how it affects men and women differently, and I learned more about how lead enters the body. There were sections on different lead industries and trades where lead was used. In these sections, I was able to read about whether or not women were employed in the trade, what type of lead was used, the rate of lead poisoning, and how dangerous it was. I also read a set of rules Alice Hamilton believed should be enforced in every lead industry where women were to be employed.
Secondary Sources


This database article consists of a brief summary of Alice Hamilton's life. It helped me understand what she is best known for, and also helped me discover what more I could learn about Alice Hamilton as it served as a basis for my research.


This database article consisted of a short biography of Alice Hamilton. It helped to give me a sense of her life story, including her family, education, career, and later years.


This biography provided me with new information regarding Alice Hamilton's time at Hull House and her studies abroad. I became aware of the discrimination she faced as a woman
while trying to study in Germany, and I also learned what Hull House was and more about the work Alice Hamilton did while living there.


This lengthier biography consisted of many, more detailed chapters of Alice Hamilton's life. I learned that she opened a well-baby clinic at Hull House, but, more importantly, I learned about the dangers of industrialization that she stood up to. I read about the symptoms of lead, mercury, and phosphorus poisoning. Then, I learned about what exactly Alice Hamilton did to stand up against bad working conditions. I read what investigations she preformed and how she conducted them. I also became aware of what she did as a social activist involving the World Wars and other controversial issues.


While reading this journal I learned about the influence European factories had on Alice Hamilton about the working conditions in the United States. I also gained more knowledge about the Federal Bureau of Labor Statistics, where she worked. I became aware of the physical risks
and opposition she faced while performing her investigations, and also learned of other work she
did besides for the Bureau of Labor.


In this web article I learned more about Alice Hamilton's time teaching at Harvard
University and about different awards she received for her work.

Television Networks, www.biography.com/people/alice-hamilton-9326498#death-and-

In this short biography I learned a little bit about what is done today in tribute to Alice
Hamilton's work.

14 Mar. 2013, womensvoicesforchange.org/alice-hamilton-exploring-the-dangerous-

In this brief biography I read more about the effects of industrial poisoning and disease
that Alice Hamilton was trying to prevent.

This is a resource from the Harvard University Library. It included a timeline which allowed me to gain a sense of when Alice Hamilton moved from one stage of her life to another.


This database article allowed me to learn more about the way factories were run and what dangers they contained.


This was a section about the history of the United States Department of Labor from their website. I learned a lot about the Illinois Occupational Disease Commission. I read about who
worked in it along with Alice Hamilton, what was investigated, and what part Alice Hamilton had in it. I also learned about the impact the Progressive Movement had on the development of the Department of Labor and Hamilton's work.


From this short biography I learned about who Alice Hamilton was able to work with at Hull House. I also read about where she conducted her investigations and how she was able to gather information.


From this database article I read more about how Alice Hamilton became interested in Occupational Medicine.

This biography contained many letters written to and from Alice Hamilton from various people in her life. They provided direct insight into her life, accompanying the detailed biography that helped me become more learned about her work and life.


This book contained a biography on Alice Hamilton. It was useful because it summarized the events of her life that were told in great detail in books solely about Alice Hamilton, but was much less vague than the short biographies I found in databases.


This book contained a short biography on Alice Hamilton that included all of her main accomplishments. It also included a short timeline of her life.