

Clara Cynthia Benson

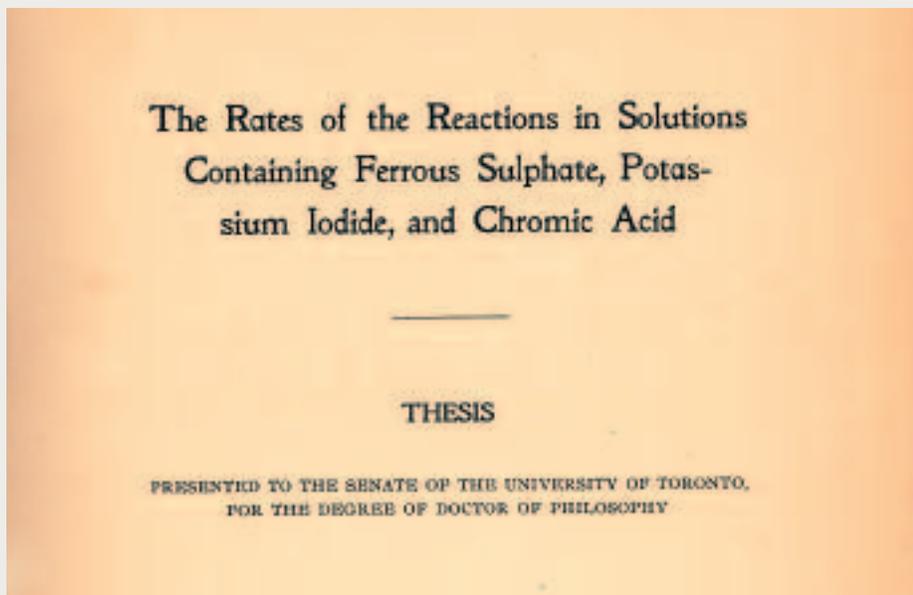
Dr. Clara Benson was one of only four Canadians and the only woman in the group of 81 “charter” scientists, who formed the American Society of Biological Chemists (ASBC, now ASBMB) in December of 1906. At 31, she was also among the youngest. Trained in physical chemistry at the University of Toronto (U of T), she had switched to physiological chemistry as a result of her initial academic appointment to teach in household science. This

in Canada and at the University as a pioneer in the genesis of higher education opportunities for women at that institution.

Clara Cynthia Benson, born June 5, 1875 in Port Hope, Ontario, Canada, was the eldest of four children of Thomas Moore Benson and Laura Abigail Fuller (there being two half sisters by Thomas Benson’s first wife, who died in 1870). Thomas Benson was a successful barrister and eventually a judge in Port Hope. She was educated

She then enrolled as a doctoral student. The University had only introduced the Ph.D. degree in 1897, and Clara Benson was one of the earliest students to be accepted into this doctoral program. Coincidentally, it was the intervention of Prof. A. B. Macallum that allowed the stalled proposal of President James Loudon, who had introduced such a degree program into the University senate 15 years earlier, to be reactivated in 1896, and thus make it possible for her to enroll a few years later. Macallum himself directed the first Ph.D. candidate at U of T (F. H. Scott, his thesis completed in 1899 on the cytochemistry of nerve cells) and would eventually also direct Maud Menten, famed for her subsequent contributions to enzyme kinetics, as a medical student and J. B. Collip, who played a key role in the isolation of insulin with Macleod, Banting and Best.

Clara Benson’s doctoral studies were done under the direction of Prof. William Lash Miller, who directed more doctoral students (6) in the early days (up until 1916) than any other member of the U of T faculty. Many of his students went onto distinguished careers in science and eventually the Chemistry Building at U of T was named for him. Her dissertation work was published (May, 1903) in the *Journal of Physical Chemistry* and was entitled “The Rates of the Reactions in Solutions Containing Ferrous Sulphate, Potassium Iodide and Chromic Acid” (See Figure 1). She was awarded



First page of thesis. Courtesy U of T.

brought her under the tutelage of Archibald Byron Macallum, which would prove to be an important step in her academic development. She would eventually go on to an impressive career in teaching, research and administration in food science at her alma mater, and is well-remembered

at Port Hope High School and matriculated in University College of U of T in 1895. She majored in mathematics, chemistry and physics, a most unusual course of study for a woman in those days, and indeed was the first woman to receive a Bachelor of Arts degree in Chemistry at U of T in 1899.

(1875-1964)

her doctorate in the same year and was the first woman to receive a Ph.D. in chemistry from U of T (See box). She shared the honor of being the first woman to receive the Ph.D. degree from U of T with Emma Baker (philosophy).

During the time of her graduate studies, it was proposed that a degree program be created to create a degree in household science, which ostensibly was to prepare young women for careers as housewives. It was not an idea that was universally greeted with enthusiasm and Clara Benson, among other women graduates of University College, opposed it. However, upon completion of her degree, with only limited job opportunities available in chemistry (despite her Ph.D. degree), she accepted a position as demonstrator in food science in the Lillian Massey School of Domestic Science. Thus, she left Chemistry and joined the Department of Physiology (Physiological Chemistry), as required for the post, and became a protégé of Macallum. A. B. Macallum was an important figure in science and medicine, having founded, at the U of T, the first department of Biochemistry in Canada in 1906 and is often referred to as the “Father of the Medical School at Toronto.”. He also had an active role in the founding of the JBC and ASBC. He was a member of the original editorial group (26 in all) of the JBC (and the only Canadian), and thus among the group approached by J. J. Abel regarding the formation of the ASBC, and was one of four charter members of the

Society from Canada. He was elected several times to the Council or Nominating Committee and in 1912-13, he served two terms as the 6th President.

The shift to Macallum’s Department was an opportune change for Clara Benson and she subsequently enjoyed a productive working relationship with him for many years. This continued even after he left Toronto in 1916, as part of the war effort, to head the Advisory Committee for Scientific and Industrial Research, which became the National Research Council of Canada, and then to chair the new Department of Biochemistry at McGill University in 1920. When food science was transferred to the medical building, Clara Benson became a lecturer in physiological chemistry (1905-06), thus becoming the first woman to achieve a rank above demonstrator at U of T. In 1906, the faculty of household science was established and she became associate professor along with Annie Laird. They were the first two women professors at U of T. She achieved the rank of full professor in 1926 and retired (as professor emeritus) in 1945.



Clara in academic procession with Annie Laird, the first two associate professors at U of T (~1907). Photo courtesy U of T.

It was, of course, her transfer to Macallum’s department that honed her her interest in biochemistry and, undoubtedly at his urging, lead to her also becoming a charter member of the Society. However, her training in physical chemistry also served her in good stead. Her interests in ion chemistry were similar to some of Macallum’s and they published an article together in the JBC in 1906 entitled “On the Concentration of Dilute Renal Excretions” (6, 87-104 (1906)). It was the only article Macallum published in the JBC, as he apparently preferred to send most of his work to the transactions of the

A voice from the past

U of T re-enacts 100-year-old thesis defense

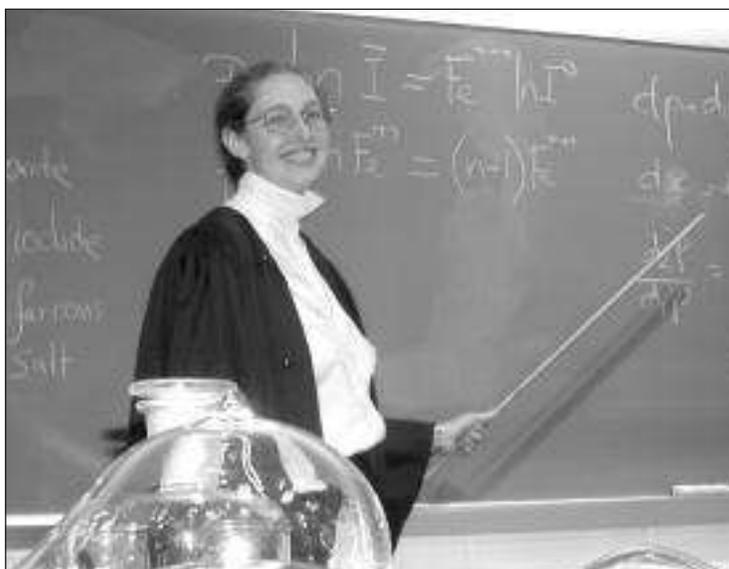
by Nicolle Wahl

June 9, 2003 — The words of Clara Benson, one of the first women awarded a Ph.D. at U of T, captivated an audience during a re-enactment of her thesis defense at chemistry's spring reunion May 30.

The re-enactment was part of a day of special lectures and displays to mark the 100th anniversary of the landmark event by looking back over the history of women in science.

Christine Braban, a graduate student in chemistry, admitted to an attack of nerves before she strode into the auditorium posing as Benson, whose thesis was entitled, "The Rates of the Reactions in Solutions Containing Ferrous Sulphate, Potassium Iodide and Chronic Acid."

Wearing a high-collared antique lace shirt, a long black skirt, formal academic robes and with her hair pulled into a severe bun, "Benson" faced a sombre pair: 1903 chair of chemistry, Professor William Lang (played by chemistry professor James Donaldson) and her thesis supervisor Professor William Lash Miller (acted by department chair Stuart Whittington). Both wore



Picture of U of T student Christine Braban as Clara Benson

black academic robes with red and white hoods and severe expressions.

Braban played her part at a lectern on a chemistry bench, surrounded by replicas of laboratory glassware from Benson's time, occasionally gesturing to a blackboard littered with an alphabet soup of chemical equations.

"Most of the text of the re-enactment was actually taken from her thesis. I was trying to use her words," said Braban, adding that she understood most of Benson's thesis from her preparation for the re-enactment. But writing out the equations was a bit of a challenge, she explained. "Some of the nota-

tion was archaic. It was interesting that in only a hundred years, the notation has changed so much."

Braban worked on the re-enactment with a group of women including chemistry students Nana-Owusua Alecia Kwamena and Srimoyee Ray Chaudhuri, alumna Betty Leventhal, and senior development officer Sue McClelland as well as Bonnie Shepherd, administrative assistant

for alumni affairs at the Faculty of Physical Education and Health.

During their research, Braban and her colleagues got a glimpse of Benson's character. "She was a personality and she had her own opinions. Clara Benson wasn't just this woman who did a bit of chemistry a hundred years ago," said Braban. "Obviously she was a pretty strong woman, just to be there doing what she was doing. That's what we were trying to get through on the day and in the displays — to show her as she might have been."

Reprinted with permission from the University of Toronto.

Royal Societies of both Canada and Great Britain (he was a member of both). These interests were also useful in subsequent food research and she Clara Benson played a key role in the Canadian war (WW I) effort by successfully demonstrating that analytical techniques developed for food tests could be applied to munitions preparations. It is also clear that she was a highly respected and revered teacher during her long association with the food science department. Her retirement in 1945 was accompanied by the unveiling of a Karsh portrait, which was hung in the Household Sciences Building, a particular honor, and by the creation of a fellowship in her name by the alumae of the Household Science School in 1950. Many years later, the Canadian Society of Chemistry, of which she was a fellow, created the Clara Benson Award to honor a woman chemist in Canada each year.

Clara Benson is also well known at the University of Toronto for the active role she played in developing women's athletics at that institution. She was co-chair of the committee that oversaw these activities and was named President of the Women's Athletic Association in 1921, a post she and held that post until her retirement. Through her sustained efforts, greatly improved facilities were finally made available. The Women's Athletic facility at U of T today, opened in 1959, is named in her honor. She was also active in the YWCA and was an avid stamp collector. One of her most extensive activities was overseas travel (at a time when there was no significant air travel). She went to Europe, Africa, South America

and Asia on several occasions, logging visits to dozens of countries in the process, and was a frequent visitor to the USA, attending many scientific meetings there.

Following her retirement, she returned to New Hope where she lived out the rest of life, passing away there in March of 1964 at the age of 89. She was in fact one of the last surviving members of the ASBC "charter group" and in 1956, along with three others, she attended the 50th anniversary dinner held in Atlantic City, as an honored guest of the Society. Typically, she refused any reimbursement for her expenses noting in a letter to the Secretary that she had "planned to come anyway."

Although in terms of productivity, her her research accomplishments were modest, she clearly exerted a far more significant impact on science by the role model she provided for young women at Toronto (and surely beyond) in the first half of the 20th century. It is difficult today to appreciate how much ahead of her time she really was in just attending the university and then in majoring in the physical sciences at a time when this was essentially the province of men. By way of illustration, she was denied access, as a lady, to the Annual Dinner of the Canadian Institute of Chemistry, a year after she was elected a fellow in 1919 (a slight that was presumably corrected in future years). She was also listed in the 1920s in American Men in Science, undoubtedly one of the few women to be so recognized at the time, judging by the title. In remarks attributed to her later in her career, she implies that her career choices probably made marriage a more difficult



Clara at retirement, 1945. Image courtesy U of T.

option (referring to the reluctance of men to marry educated women in her younger days). As with her contemporary lab mate and friend, Maud Menten, she remained single her entire life. If there was to be only one woman among the founders of the Society, it seems unlikely that one could have chosen a better individual than Clara Cynthia Benson for that honor. ☺

The author gratefully acknowledges the assistance of Harold Averill and his colleagues of the University of Toronto Archives & Records Management and Edward Shorter of the U of T Faculty of Medicine for their assistance. Many thanks also to long term friend and colleague, Stanley Fenton of the U of T Dept of Nephrology, and his son Bruce, for their invaluable help in 'navigating' the U of T and sorting through archival material.

*Ralph A. Bradshaw
University of California Irvine*