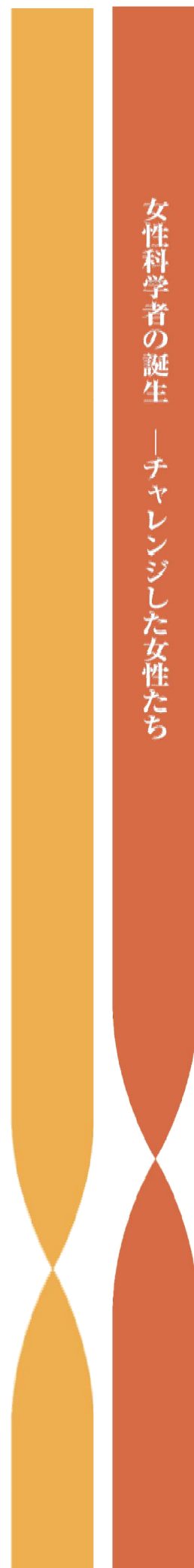


The Birth of Women Scientists - women who met the challenges -

Special Exhibition at Women's Archives Center
6 October – 13 December 2009

National Women's Education Center, Japan
(NWECC)

女性科学者の誕生
— チャレンジした女性たち



About the Exhibition

Welcome to “The Birth of Women Scientists”, the second special exhibition by the Women’s Archives Center at National Women’s Education Center (NVEC).

This is the second exhibition of “Women who met the challenges” series, followed by “Dawn of Higher Education for Japanese Women : Lives of Women Founders” last year.

Gender equality in the field of research in Japan is a policy area much progress is needed. The percentage of female researchers is only 13% in FY 2008, much lower than other countries such as France (27.7%), U.S. (34.3%) and Lithuania (49.3%)*. As regards female researchers in the field of science, the number is much smaller, and various kinds of projects have been implemented to improve the situation.

This exhibition introduces five pioneering women scientists who studied at institutions of higher education and went on to challenge careers as a scientist in the early twentieth century, when the situation surrounding women scientists was much severer than today. By tracing their lives, the people supported them and the circumstances surrounding science education at that time, it is hoped to give us an idea to confront the present issues.

* “White paper on gender equality 2009 : outline” (Cabinet Office, 2009)

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The Birth of Women Scientists and Higher Education for Japanese Women

There was no higher education institution for women in Japan before 1900 except a government- established teachers college, Women's Higher Normal School (later Tokyo Women's Higher Normal School, now Ochanomizu University). Several schools were founded in the early twentieth century, but they were relatively small in size and only a few of them put the focus on science education. A science course at Women's Higher Normal School and science education at Department of Home Economics at Japan Women's University (college system) were examples of these few. Japan Women's University was established by NARUSE Jinzo in 1900 with three departments, Japanese, English and Home Economics. Based on NARUSE's experience in the U.S., a curriculum at Department of Home Economic put the focus on science education. Therefore, it is no surprising to find that five female pioneers in the field of science introduced in this exhibition had studied either Women's Higher Normal School or Japan Women's University.

Five female scientists in this exhibition, namely TANGE Ume, YASUI Kono, KURODA Chika, TSUJIMURA Michiyo and SUZUKI Hideru, chose science as their career and studied at higher education institutions in Japan and abroad when providing higher education to women was overwhelmingly considered as premature or useless. They stepped into the world of science as women pioneers and made a career in the field of science research supported by their progressive parents and tutors.

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TANGE Ume (1873-1955)

- First Japanese woman admitted to an Imperial University
- Recipient of doctoral degrees from Japanese and American universities

TANGE Ume was born in Kagoshima in 1873. After graduating from Kagoshima Prefectural Normal School (teachers college for primary schools), she had worked as a teacher for ten years.

In 1901, when she was 28 years old, Japan Women's University was established in Tokyo by NARUSE Jinzo. Having studied in the U.S. and visited universities including women's universities, he realized the necessity of education for women and made considerable effort to establish a higher education institution for women. Taking an advice from MAEDA Masana, her relative and a friend of NARUSE, she decided to study at the Department of Home Economics. Her elderly sister Hana also entered the university and studied at the Department of Japanese.

The curriculum at the Department of Home Economics focused on science education based on NARUSE's experience in the U.S. There were foremost researchers who agreed with his philosophy and cooperated with his university: NAGAI Nagayoshi, a leading pharmacologist and a professor at Tokyo Imperial University, was one of them and taught chemistry at NARUSE's university. TANGE learned from NAGAI and after graduation she worked as an laboratory assistant at Japan Women's University. In 1912, TANGE took a certificate examination for secondary schools teachers by the advice of NAGAI and passed for the first time as woman. This certificate led her to the next career.

In 1913, TANGE was admitted to College of Science, Tohoku Imperial University along with KURODA Chika and MAKITA Raku: they were the first-ever female students admitted to an Imperial University. Their admittance realized due to the expansion of entrance qualifications to the College, adding graduates of Higher Normal Schools and those who had passed certificate examinations for secondary schools teachers: KURODA and MAKITA were graduated from Women's Higher Normal School, and TANGE qualified the examination. Before this expansion, the admittance to Imperial Universities were limited to graduates from Higher Schools, in other words only men were admitted to Imperial Universities.

TANGE studied chemistry at the College and received a Bachelor of Science at the time of graduation. She continued her research on organic chemistry and biochemistry at a postgraduate course and worked as a research assistant at the College when she finished the course. In 1921, she was appointed a contract researcher by the Ministry of Education and Ministry of Home Affairs, she went to the U.S. to study nutritional chemistry. During her stay in the U.S. for eight years, she studied at several universities and received a Ph.D. from John Hopkins University in 1927.

After returning to Japan, she became a professor at Japan Women's College. She was a role model for the next generation and SUZUKI Hideru was one of her students. She also worked as a part-time researcher at RIKEN, a research institution to conduct comprehensive research in science and technology, and conducted research on Vitamin B₂ from perspectives of nutrition and pathology. In 1940, she submitted an article on Vitamin B₂ to Tokyo Imperial University and received a doctoral degree on agriculture.

YASUI Kono (1880-1971)

➤ First Japanese female recipient of a doctoral degree

YASUI Kono was born in Kagawa in 1880. Her interest in science began when she was a student at a Prefectural Normal School (teachers college for primary schools). In 1898, she entered to Women's Higher Normal School in Tokyo to study science. As it was a mandatory for Normal School graduates to work as a teacher, she taught science at a Girls' High School for several years. While teaching at a school, she wrote a textbook in physics for Girls' High School, however the Ministry of Education did not authorized it saying that it was impossible for women to write a textbook in physics.

In 1905, she went back to Women's Higher Normal School as a student in biology at a postgraduate course. During the first year at postgraduate, she wrote an article titled "Observations on the Weber's Organ of the Carps" and it was appeared on *Doubutsugaku zasshi* (Zoological magazine) : this was the first science article written by female scientist in Japan. Several years later, another article on salvinia appeared on the British journal "Annals of botany" became the first science article by a Japanese woman scientist posted on a foreign journal.

After graduated at postgraduate, she became an assistant professor at Women's Higher Normal School and continued her research on biology. Her tutor MIYAKE Kiichi, a professor at Tokyo Imperial University, recommended her to study abroad, however it took long time to get permission from the Government: it was said that the Government was reluctant to give the permission because they thought that there was little chance for women to success in the field of science. In 1913, she finally got the permission to conduct research on "science and domestic work" under the tacit condition that she should stay single and continue her research for the rest of her life.

YASUI went to the U.S. in 1914 as the first female government-sponsored student in the field of science and had studied at University of Chicago and Harvard University for two years. In 1927, after returning to Japan, she submitted her doctoral thesis to Tokyo Imperial University and received a doctoral degree for the first time as woman.

In 1929, while teaching at Women's Higher Normal School and Tokyo Imperial University, she joined a project to launch a journal "Cytologia : international journal of cytology". She involved in editing, printing and accounting, and became a chief editor in 1953.

KURODA Chika (1884-1968)

- First Japanese woman admitted to an Imperial University
- First female recipient of a Bachelor of Science

KURODA Chika was born in Saga in 1884. Her father had a progressive idea on girl's education and let the most of his seven children receive university education including daughters. KURODA went to a Prefectural Normal School (teachers college for primary schools) and became a teacher at the age of seventeen. However her desire to study was strong and she decided to go Women's Higher Normal School in Tokyo, the highest educational institution admitted women at that time. She chose science as her major after wavering between science and literature because she thought that study on science needed laboratory facilities, which were not individually available, while knowledge on literature could acquire through self-education. She became a teacher and taught at a Normal School in Fukui for a short period of time, however her tutor at Women's Higher Normal School recommended her to continue her study and she became a postgraduate student at Women's Higher Normal School. After graduated at postgraduate, she was appointed as an assistant professor at Women's Higher Normal School and helped NAGAI Nagayoshi, a pharmacologist and professor at Tokyo Imperial University teaching also at Women's Higher Normal School.

In 1913, College of Science at Tohoku Imperial University changed its entrance qualifications and decided to admit female students for the first time in the history of Imperial University [see TANGE Ume for detail]. Taking advice from NAGAI, KURODA took an entrance examination and passed together with TANGE Ume and MAKITA Raku. KURODA majored in organic chemistry and received a Bachelor of Science for the first time as woman when she graduated in 1916. She continued her research at university under the supervision of Professor MASHIMA Toshiyuki and became a professor at Tokyo Women's Higher Normal School in 1918. In the same year, she gave a presentation on pigment at the Tokyo Chemical Society. As it was the first presentation by female at the Society, it gathered a large audience and was reported in the media.

When she was 37 years old, she was ordered to go to the U.K. and conduct research on science "concerning domestic work". Shortly after returning from abroad, she started her research on pigment of safflower and she received a Doctor of Science from Tohoku Imperial University in 1929. Another research on pigment of onion during and after the World War II brought her the acquisition of patent in 1953 and Keltin, a drug for prevention and treatment of high blood pressure using her patented method, was went on the market later.

In addition to her research, she also had worked for the advancement of status of women scientists in Japan. She became a honorary chairperson of the Society of Japanese Women Scientists in 1960, a society established in 1958 to encourage mutual support and friendship among Japanese women scientists, and her name is still found in the name of scholarship or prize for female students in the field of science.

TSUJIMURA Michiyo (1888-1969)

➤ First female recipient of a Doctor of Agriculture

TSUJIMURA Michiyo was born in Saitama in 1888. Her father was a head teacher at a primary school and she along with her three sisters was brought up based on his educational policy that women as well as men should be independent. Her mother had a great deal of curiosity about gardening and tried to grow tomatoes, which was uncommon in Japan at that time.

She entered Tokyo Women's Higher Normal School in 1905 and chose science as her major. She decided to study science contrary to the expectation of friends of hers, because she thought that acquiring organized knowledge required facilities to study, while literature that could learn by oneself, and women in the modern society should acquire organized knowledge. At the School, she was taught by YASUI Kono and began to be interested in science research. She retained her interest in the research during her seven years as a teacher after graduation.

In 1920, when she was 32 years old, she started her research at Hokkaido Imperial University as an unpaid assistant because she was not allowed to admit to the University. There was no Imperial University admitting female students other than Tohoku Imperial University in 1913. She had conducted her research at Hokkaido for two years and later moved into the Tokyo Imperial University and researched on protein.

The Great Kanto Earthquake in 1923 destroyed her laboratory facilities at Tokyo Imperial University and she had to find another place to continue her research. She found her place at RIKEN, a research institution to conduct comprehensive research in science and technology. Her supervisor at RIKEN was SUZUKI Umetoro, a well-known agricultural chemist who discovered Vitamin B1, and she and MIURA Masataro conducted a joint research on green tea. Their finding of Vitamin C in green tea had contributed to increase the amount of export of green tea to the U.S.

She continued her research on green tea to find its components and finally wrote an article "On the chemical components of green tea". The article was submitted to Tokyo Imperial University and she received a Doctor of Agriculture in 1932 for the first time as woman. Later in 1956, she was awarded a Japan Prize of Agricultural Science by the Association of Japanese Agricultural Scientific Societies for her research on components of green tea.

When Ochanomizu University was established in 1949 as one of the two national women's university in Japan, TSUJIMURA was appointed as a professor along with YASUI Kono and KURODA Chika. She also taught and brought up the next generation of women scientists at Jissen Women's University after she retired from Ochanomizu University.

SUZUKI Hideru (1888-1944)

➤ First female recipient of a Doctor of Pharmacy

SUZUKI Hideru was born in Aichi in 1888. As her father could not have an opportunity to study and regretted it, he encouraged his eight children to get education. As a result, all of his children received university education. SUZUKI studied science at Japan Women's University and graduated in 1910, but remained at the University as a laboratory assistant of NAGAI Nagayoshi, a professor of chemistry. "There was no appropriate job at the time of graduation and I did not want to get married", she said later.

While she was busy as an assistant, she passed a certificate examination for secondary schools teachers and started to teach at a Girls' Higher School. Furthermore, she studied by herself and passed a examination for pharmacists. Having witnessed her effort, NAGAI and KONDO Heizaburou, a pharmacologist at Tokyo Imperial University, provided her an opportunity to study pharmaceutical sciences as a non-degree student at Tokyo Imperial University. She took this chance and started her research while she worked at Japan Women's University.

In 1932, she obtained a research fund from the Japan Society for the Promotion of Science and conducted her research on perillen. She submitted her thesis to Tokyo Imperial University and received a Doctor of Pharmacy in 1937 for the first time as woman.

Soon after her receiving the doctoral degree, however, her research environment worsened due to the World War II. She tried to continue her research taking every possible mean while putting her effort into foster the next generation of women scientists by encouraging her students to get opportunity to do research.

Like other four scientists in this exhibition, her career as scientist was supported by people surrounding her: TANGE Ume was one of them. TANGE was her tutor and senior colleague at Japan Women's University. SUZUKI deeply respected TANGE and took care of her when she was taken with illness in 1944. TANGE recovered and left a hospital in a short while, however SUZUKI herself succumbed to a sudden illness a few days later. She was 56 years old.



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Women's Archives Center
National Women's Education Center, Japan (NVEC)
728 Sugaya Ranzan-machi
SAITAMA, JAPAN
355 0292
URL:www.nwec.jp

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