

## Memorial of Zyunpei Harada 1898–1992

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Zyunpei Harada, emeritus professor of Hokkaido University, died on April 27, 1992. He was born in Yokohama on October 5, 1898, the first son of Yasuzo and Saku Harada. He attended the Fourth High School in Kanazawa and then enrolled in the Geological Institute at the University of Tokyo in 1921. Under the guidance of Professor Koto, the founder of petrology in Japan, he completed his thesis on the geology of Hachijo-jima of the Izu Seven Islands. Upon graduating in 1924, he was appointed assistant at the Geological Institute. In the following year, he became a professor at the Kumamoto Higher Technical School and at the Fifth High School, both in Kumamoto, western Japan. During his stay in Kumamoto, Harada devoted himself to petrological research and presented a paper, "Notes on Some Bombs from Volcano Hachijo-Fuji, Hachijo Island," for the commemoration volume dedicated to Professor Koto on his 70th birthday.

He was deeply interested in Joly's hypothesis on the relation between the radioactivity of rocks and crustal movements, described in his book, *The Surface History of the Earth*. Harada wished to introduce this new hypothesis to Japanese geologists, and so he wrote *The Cycles of the Earth's Crust after Joly's Hypothesis*. This book consisted mainly of a translation of Joly's work, supplemented by numerous data from several other sources.

In 1926 the bill for establishing the Faculty of Science of Hokkaido University had passed the parliament, and an organizing committee composed of several eminent professors was appointed. They picked out more than a dozen promising young scientists, most of whom were in their 30s, as candidates for the faculty and sent them to Europe or the United States to study for two to three years. Harada was chosen as one of them. He left Kumamoto in September 1928 and went first to London. He studied descriptive mineralogy, using the abundant mineral collections under Professor Spencer at the Natural Science Museum in London.

In April 1929 the professorial candidates studying in Europe assembled in Paris, where they had intensive discussions on the future of the new Faculty of Science. This meeting was called the Paris Conference. Among the group were two physicists, S. Kaya and U. Nakaya, well known for their contributions to magnetism and snow crystals, respectively, who became lifelong friends of Harada. Harada studied crystallography under Professor Niggli at the Eidgenossische Technische Hochschule, Zurich, during the summer semester of 1929.



Eventually, he proceeded to Hamburg, where he began an optical and chemical study on danburite from Obira, Japan, using the prism method developed by Professor Rose at the Mineralogisch-Petrographische Institut of Hamburg University. Indeed, it was Rose's stimulating guidance that inspired his keen interest in mineralogy. The result was his first mineralogical paper, "Beitrag zur Kenntnis der optischen und chemischen Eigenschaften des Danburits von Obira, Japan," which was published in *Zeitschrift für Kristallographie* in 1931.

After a three-year study in Europe, he came back to Japan via the United States in May 1931 and was appointed associate professor in the Department of Geology and Mineralogy, which had been established the previous year. In 1932 he was promoted to professor of mineralogy, the position which he held for 30 years, until his retirement in 1962, when I succeeded to the chair. In collaboration with J. Suzuki (petrology), T. Nagao (stratigraphy and paleontology), and K. Uwatoko (economic geology), Harada devoted himself to mineralogical re-

search and the education of the students in this new department. Following his study in Hamburg, his main interest became the B-bearing minerals, and he published a series of papers, "Studien über japanischen Bormineralien" from 1933 through 1939. He received his D.Sc. degree from the University of Tokyo with his thesis, "Study on the Boron-bearing Minerals of Japan" in 1939.

In the 1930s, little was known about the minerals in Hokkaido, and Harada made extensive studies on various minerals, both in the field as well as in the laboratory, with the help of many students. The results of this research were first published in *Minerals of Hokkaido* in 1935, in which 124 species were described. With the accumulation of data, the number of minerals increased to 390 in its revised and enlarged second edition, published in 1984.

From the 1940s to the 1950s, many small Mn mines were operating in Hokkaido. Consequently, Harada gradually shifted his interest to Mn ore deposits and Mn minerals. With his collaborators and students, he made extensive field surveys of these deposits and published *Manganese Ore Deposits in Hokkaido* (1949), in which he classified metasomatic, vein, bedded, and residual types of Mn deposits. He found that nearly all kinds of Mn minerals reported from Japan are also present in Hokkaido. Manganese carbonate minerals are especially abundant, and he described them in *On the Manganese Carbonate Ore Deposits in Hokkaido* (1955). These works not only gave much scientific information but also offered guidance for the exploitation of Mn ore. Harada and his collaborators showed that some Mn ore deposits were formed by the activity of bacteria. A new mineral, todorokite, was found at the Todoroki Au mine by his collaborator T. Yoshimura.

During and after the World War II, Harada made many efforts to exploit mineral resources. He held the post of director of the Hokkaido branch of the Geological Survey of Japan from 1947 to 1948. He served as councilor of the Japanese Association of Mineralogists, Petrologists, and Economic Geologists and of the Geological Society of Japan. He was a longtime Fellow of the Mineralogical Society of America.

In the late 1940s, many mineralogists in Japan wished to have a mineralogical society that was independent from the Geological Society of Japan. Harada took the initiative, and, when the Mineralogical Society of Japan was founded in 1952, he became its first president. In his presidential address, "On the Imperfections of Crystals," delivered at the inaugural meeting of the Society, he pointed out that the study of the imperfections of crystals would be an important trend in mineralogy in the future. In the following years, many papers related to this issue were presented in Society meetings.

His book *Introduction to Mineralogy* covers wide fields of mineralogy in spite of its small size and has been used widely as a handy textbook by undergraduate students.

In addition to his scientific contributions, Harada also had administrative ability. He served Hokkaido Univer-

sity as councilor from 1946 to 1949 and from 1953 to 1955 and also as dean of the Faculty of Science during the period 1958-1962. During his four-year term, the Department of Polymer Sciences was established, and a new building for the Department of Geophysics was built. An outdoor sportsman, he enjoyed skiing and mountain climbing with students. He was president of the Alpine Club of Hokkaido University for 14 years.

Upon his retirement in 1962, he became professor emeritus of Hokkaido University. He was honored by the Governor of Hokkaido with the Hokkaido Science and Technology Prize for his meritorious contributions. T. Watanabe, his former colleague at Hokkaido University, named a newly discovered mineral, from the Noda-Tamagawa Mn mine, haradaite in his honor.

Subsequently, he was appointed the first principal of the Asahikawa National College of Technology, which was established in Asahikawa in 1962. Here again, with his administrative ability, he firmly established the basis of the college curriculum and educated many active engineers. He even composed a song for the college, with music by one of his former students; it has been sung ever since. After completing an eight-year term, he retired from the college in 1970 and was named professor emeritus.

Thereafter he moved to his home in Kawasaki, south of Tokyo, where he spent peaceful days with his wife, completely free from all official duties. Because of his cheerful character and humor, he was loved by his colleagues, his students, and all who were in touch with him. In his later years, he was respected as the most senior mineralogist in Japan. Many former students got together once or twice a year for the "Gathering around Professor Harada," which he enjoyed very much. However, his health was gradually declining, and he died quietly at the age of 93. Indeed, he lived life to the fullest.

He is deeply missed by his wife, Hanako Harada, and his two daughters, Hisako Yamanari and Junko Doi.

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