



*S. Matoba*

## Sachio Matoba

1899–1987

By Merton C. Flemings

Sachio Matoba, pioneer in physical chemistry of steelmaking, died on September 28, 1987, shortly before announcement of his election as a foreign associate of the National Academy of Engineering.

He was internationally known as early as 1927 to 1935 for his work on the physical chemistry of reactions of importance in iron and steelmaking, especially the equilibrium between carbon and oxygen in liquid iron with CO/CO<sub>2</sub> gas mixtures, based on his original papers in Japanese. He was a leader in research on iron and steelmaking systems and in promoting through papers, lectures, and education of students the understanding and use of physical chemistry as applied in the steel industry. He led in developing participation by Japanese technical people from industry and academia in international committees, conferences, and exchange programs. He was a leader in the 1940s and 1950s in establishing a strong technical base for the developing steel industry in Japan.

Professor Matoba was born in Tokyo on March 23, 1899, the first son of Professor Naka Matoba of the University of Tokyo. He graduated from Kyushu Imperial University in 1924, when Professor Kuniichi Tawara and Kotaro Honda were planning to start the new department of metallurgy at Tohoku Imperial University. Professor Tawara invited Professor Matoba to Tohoku as a lecturer. He took up his duties there, first in the area of physical

metallurgy, and then, after two years, in his first love of chemical thermal dynamics. He married Yasuko Nakahara in 1926, and in their lifelong marriage they had two children who have distinguished themselves personally and professionally, Naoya and Koko.

He was a faculty member at Tohoku University from 1924 to 1962 and served as dean of the faculty of engineering from 1959 to 1962. He was a member of the National Science Council from 1960 to 1963. In 1962 he joined Fuji Iron and Steel Company as vice-president and director of the Central Research Laboratory, and later became executive vice-president. When Fuji Iron and Steel Company became a part of the newly formed Nippon Steel Company, he served the new organization as executive adviser and later as adviser until his passing in 1987.

Professor Matoba's leadership in Japanese engineering and scientific organizations was an inspiration to Japanese scientists. He was a strong proponent of emphasis on quality, which has been so successful in the Japanese manufacturing segment and has raised quality to unmatched levels of achievement in that country.

He was widely recognized for his accomplishments and contributions to the iron and steel industry. He received the Tawara Prize of the Iron and Steel Institute of Japan (ISIJ) in 1963; the Honorable Prize, ISIJ, 1965; Honda Memorial Gold Medal, 1966; Nishiyama Medal, ISIJ, 1968; Gold Medal of Japan Institute of Metals; and Tawara Gold Medal, ISIJ, 1980. He held honorary memberships in the American Iron and Steel Institute, 1970; the German Iron and Steel Institute (VDEH), 1970; Iron and Steel Institute of Japan, 1973; and Korean Institute of Metals, 1983.

Professor Matoba's works on physical chemistry of ironmaking, steelmaking, and ore beneficiation played major roles in awakening Japanese metallurgists to the importance of physical chemistry in metallurgy. His equilibrium studies and chemical kinetic studies showed operational metallurgists how to improve their operations. In other important work at that time, he studied sintering and reduction behavior of many kinds of iron ores, sinters, and pellets. These studies were critical to the Japanese steel industry, because prior to 1950 it was necessary

for them to use low-grade iron ore and high ash coal. During his long research career, he also contributed much to improve chemical analysis of steel, iron ore, and slag, and especially determination of gaseous elements in liquid steel.

Later, as dean of the faculty of engineering, he made a most significant contribution to Tohoku University through his leadership role in establishing the new campus of the Faculty of Engineering on the hill Aobayama. Professor Matoba understood that for future development of the Faculty of Engineering, more space was required, space that could be found at Aobayama, and so he took the initiative, over much faculty resistance, to initiate the move. The government supported the move, and the new campus was established much earlier than expected, leading directly to the current great strength of the engineering school of Tohoku University.

Later, Professor Matoba's leadership was critical to the decisions of the Iron and Steel Institute of Japan and to the Japan Institute of Metals to publish their transactions in English. This was just one of the ways in which Professor Matoba contributed greatly to turn Japanese metallurgists' eyes outward to the rest of the world. In another example, he invited Professor and Mrs. John B. Chipman to Japan in 1965 when he was vice-president, Fuji Steel Company. Professor Chipman at that time was a leading U.S. academician in the field of steelmaking. Matoba did not monopolize Professor Chipman's time simply for Fuji Steel, but arranged for him to visit most of the leading universities and leading steel companies from Hokkaido to Kyushu.

Professor Matoba was a man who made everyone, independent of age, occupation, social status, or race, feel friendly and warm-hearted. He was fair and impartial, with compassion for all, but keeping to himself his good works, making way or room for others even if honors were given to them instead of to him, and heartfully celebrating his friends' or students' honors. Nonetheless, he was strict in training students and staff in his laboratory. It was rare for him to directly order his students, but rather he was patient until his students themselves overcame their difficulties based on his suggestions. He was strict with himself and deeply introspective.

Professor Matoba was a great reader, interested in books on religion, literary works, essays, and travel. He was interested in classical music and loved sports, especially walking with his family and mountain climbing. He climbed most of the high mountains in Japan and was a head of Tohoku Academic Alpine Club while he worked at Tohoku University.

Professor Matoba would surely consider as one of his greatest honors the establishment of the Matoba-Kawatabi Seminar. The seminar was planned and initiated in 1974, following the style of the Gordon Conferences. The Seminar is unique in Japan, held in August each year at the Kawatabi Seminar House, about one hundred kilometers north of Sendai. It is open to graduate students and to others from the steel industry, although limited in attendance because of the capacity of the house. Professor Matoba would begin the seminar each year with a profound and significant lecture. It should be added that, respecting Professor Matoba's modesty, the seminar was not officially designated as the Matoba Seminar until his passing.

Professor Matoba will be long remembered by his friends and colleagues in Japan, the United States, and throughout the world for his accomplishments, wisdom, and foresight and for his leadership in academia and industry in applying scientific principles to the technology of iron and steel production.

