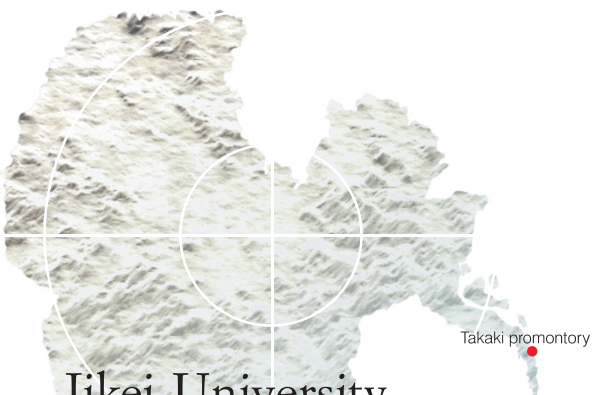
The Life of Kanehiro Takaki



Jikei University
Historical Collection

The Life of Kanehiro Takaki

Looking back through the history of Jikei one can note the tremendous influence of Kanehiro Takaki's sound thinking. It can be said that Jikei is the fruit of Kanehiro's philosophy.

Kanehiro's Childhood

Kanehiro was born on September 15, 1849, in the village of Mukasa in Miyazaki prefecture. Kanehiro's family were low-ranking samurai, who normally worked as carpenters for their lord. At the age of 13, Kanehiro left for Kagoshima to study medicine under Ryosaku Ishigami, who had studied Dutch medicine.

In the early 1860s Japan was in turmoil. The Meiji Restoration was soon to come. The people were frightened and uneasy after Commodore Perry's fleet ended 200 years of seclusion in 1854. The Satsuma clan was in a state of crisis after being involved in the Namamugi Incident (1862) and the British bombardment of Kagoshima (1863, known in Japan as the Anglo-Satsuma War).

In June 1868, Kanehiro joined the Satsuma forces as a surgeon in the Boshin Civil War. At the Battle of Aizu Wakamatsu, young Kanehiro was shocked that he and his fellow doctors from Satsuma could do little to treat wounded soldiers, as they had been taught only Chinese herbal medicine. In contrast, surgeons from other clans had been taught Dutch medicine. One day when Kanehiro was treating a wounded soldier on the battlefield, a surgeon from another clan asked, "Isn't there a doctor among the Satsuma soldiers?" He felt ashamed and could say nothing in return.

Kanehiro decided that he had to study Western medicine as soon as possible. Fortunately, the experiences on the battlefields of the Boshin Civil War led to the establishment of a medical school in Kagoshima where

Western medicine was taught. Kanehiro soon became a student of this school. William Willis, a British doctor who had had great success treating the wounded during the war, was appointed head of the school and hospital. Before then Willis had been unofficially appointed head of the medical school and hospital in Tokyo (which was the basis of the University of Tokyo School of Medicine), and it seemed that Japan was going to follow English medicine. The Meiji government instead selected German medicine as a model for Japanese medicine and appointed a German doctor as head of the school and hospital in Tokyo.

Kanehiro's future was decided when he became a pupil of Willis, who emphasized practical education in Western medicine. Kanehiro worked hard day and night as Willis's assistant. Willis was impressed by Kanehiro's character and abilities and often recommended that he go to England to study. Because Kanehiro had no direct contact with medical schools in England, he thought that joining the navy might provide better opportunities to study abroad. Fortunately, his former teacher, Ryosaku Ishigami, held an important position at the Imperial Naval Medical Department in Tokyo. Kanehiro was then given permission to join him there.

After two months in Tokyo, Kanehiro married Hisato Sewaki's elder daughter Tomi. The person who had introduced them was, of course, Ryosaku Ishigami. Sewaki was a student of Dutch and English medicine.

After coming to Tokyo, Kanehiro was assigned to care for patients with kakke disease, the endemic form of beriberi, at the Naval Hospital in Takanawa. He felt helpless because he could do little to save the lives of most patients. This feeling of helplessness also stimulated Kanehiro to go abroad to study.

In August 1873, the Naval Medical College was established. William Anderson was invited as a doctor and a teacher of the school and the hospital. Kanehiro and Saneyoshi Toyozumi translated Anderson's lectures

into Japanese. Anderson returned to England in 1880. Fifteen students had graduated from the Naval Medical College by that time; these 15 were to become Kanehiro's collaborators years later.

Kanehiro's Stay in England

Anderson was deeply impressed by Kanehiro's abilities and enthusiasm as a young doctor and encouraged him to study at his alma mater St. Thomas's Hospital Medical School. Kanehiro left Yokohama on June 18, 1875, and reached London on July 16.

Kanehiro recalled Willis's words stressing the importance of anatomy and read through his anatomy textbook four times.

Kanehiro began to study Western medicine at St. Thomas's Hospital Medical School (Figure 1). The medical education, especially bedside training, given at St. Thomas's was much more substantial than he had anticipated. The education stressed patient-centered medicine. In contrast, at German university hospitals, research-centered medicine was enforced under the strong influence of Alexander Humboldt, and patients were used as "materials" for study.

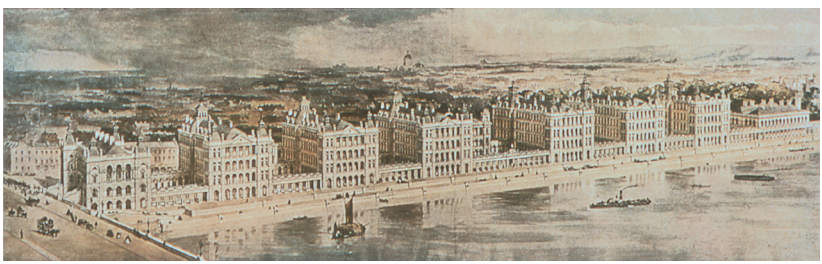


Fig.1. St.Thomas's Hospital as it stood on the bank of the River Thames in 1875.

Among his many subjects at St. Thomas's, Kanehiro was especially impressed by the lectures given by John Simon on epidemiology and by E.A. Parkes on hygiene. Simon investigated disease from an epidemiological and environmental standpoint, while Parkes studied the role of nutrients in maintaining health. What Kanehiro learned from these lectures was applied to his study of beriberi after his return to Japan.

English medicine of the late 19th century emphasized epidemiology and health, and Kanehiro was influenced by this trend. Developments during this time included Edward Jenner's vaccination to prevent smallpox, James Lind's use of fruit juice to prevent scurvy, and John Snow's improvements in the water supply to prevent cholera. All these methods were well known to the general public in England.

After studying for 5 years at St. Thomas's, Kanehiro received his diploma in May 1880 . He was an honor student and received many awards, including the Cheselden (silver) Medal for the outstanding student of surgery and anatomy. Also at St. Thomas's Hospital were the Nightingale Training School and the Nightingale Ward. They were both built by the Nightingale Fund from donations collected throughout England. When Kanehiro was at St. Thomas's, Florence Nightingale was already 55 years old and bedridden. Nevertheless, Kanehiro was greatly influenced by her patient-centered philosophy.

When Kanehiro was in London, the living conditions of the rich and the poor differed greatly. To lessen these differences, the royal family opened the doors of St. Thomas's hospital to the poor and provided free medical care. The funds were provided by the royal family. In a spirit of mutual aid, the rich also donated money to help the poor. Thus, Kanehiro came to understand the social background supporting medicine in England.

Establishment of a Charity Hospital

Kanehiro returned to Japan in November 1880 and was appointed head of the Naval Hospital. He had two objectives he wished to realize. The first was to establish a hospital and medical school like St. Thomas's, and the second was to study beriberi, which he had planned to study before going to England.

After studying at St. Thomas's, Kanehiro recognized how poor medical conditions in Japan were compared with those in England. Although the University of Tokyo had invited German doctors to teach since 1871, the patients there were considered objects of study, and doctors were considered inaccessible authorities who kept their distance from the general public. Doctors at other large hospitals assumed a similar authoritative "German" attitude towards their patients. Furthermore, most general practitioners used only herbal medications, which were far from being scientific.

Under these conditions, Kanehiro felt strongly that patient-centered English medicine must be introduced quickly throughout Japan. When Kanehiro was still thinking of when and where to start, a doctor named Toan Matsuyama knocked on his door. After learning Dutch medicine, Matsuyama had helped English and American military surgeons to examine and treat patients with syphilis and to give vaccinations. In 1873 Matsuyama became dean of Yukichi Fukuzawa's Keio Gijuku Medical School. At that time the Meiji government was debating whether Japanese medicine should follow the English model or the German model. Because Fukuzawa favored the English model, he invited Matsuyama, who had studied English and American medicine, to become dean of the Keio Medical School. Bunkai Tozuka, the Surgeon General of the Imperial Navy, had introduced Matsuyama to Kanehiro. Tozuka also valued patient-centered medicine.

Unfortunately, the medical school at Keio had closed for financial

reasons by the time Kanehiro returned to Japan in 1880. Although things did not go as planned at Keio, Matsuyama and Kanehiro had the opportunity to meet and to exchange ideas about teaching and promoting patient-centered medicine in Japan. The two started by organizing a medical group named "*Sei-I-Kwai*" in January 1881. Kanehiro was elected president, and Toan Matsuyama, Soetsu Kumagawa, and two others were elected secretaries. The number of members was only 36 at the start but soon increased to 100. Most members were naval surgeons who knew Kanehiro or were acquainted with Matsuyama through their interest in English-American medicine. Kanehiro and the members of *Sei-I-Kwai* met several times from the beginning of 1891 to decide where to establish a charity hospital. Yushi Kyoritsu Tokyo Charity Hospital, the first charity hospital in Japan, finally opened at Tenko-in temple in July 1882. In September 1883 the hospital moved into an unused former Tokyo prefectural hospital in Shiba Atago. The hospital's name indicated that the hospital was supported by voluntary contributions.

"Who should take care of the poor and the sick? Yes, the healthy and the rich are obligated to do so." These are the words of Kanehiro. The doctors who saw outpatients included Kanehiro, Matsuyama, and Kumagawa.

The people who collected donations were doctors and businessmen, but as was then customary, a ladies' charity society, organized mainly by peeresses and wives of politicians, took over the collection of funds to maintain the hospital. An important fund-raising function was the Rokumei-kan Charity Bazaar, which was held twice starting in 1885 and collected a total of 15,000 yen (or the equivalent of approximately 150 million yen today) (Figure 2). This money was used to build a small school for nurses, the first in Japan.

With the increases in the number of patients and the expenses of maintaining the hospital, new sources of revenue soon became necessary. Kanehiro believed that Her Majesty the Empress might serve as president

Fig.2. Rokumei-kan Charity Bazaar.

of this charity enterprise, as members of the royal family had in England. Kanehiro's dream came true, and the name of the hospital was changed to Tokyo Jikei-Iin. In April 1887 the building and facilities of the hospital were renovated with a donation from the Empress.

The Nightingale Ward was also built at this time (Figure 3). It was a large one-room ward that could be seen at a single glance. The nurses station and the head nurse's room were placed so that the nurses and patients could see each other. Nightingale's ideal of a patient centered-ward had been realized. In 1897 Kanehiro set up a household altar and a Buddhist altar in the hospital so that anyone could pray regardless of their religious beliefs. He invited priests from Zojoji temple to preach daily. Kanehiro believed that both the body and the soul of the sick should be cared for. This care was appreciated by many patients, who sent letters of thanks to the hospital.

A few years later the finances of the hospital could not meet the needs of the ever-increasing number of patients. However, during a visit to the United States, Kanehiro had been inspired by the great contributions

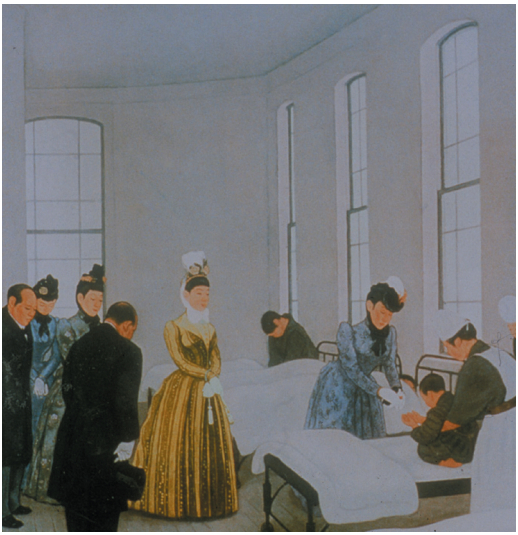


Fig.3. The Empress visits the patients in the Nightingale Ward of Jikei-Iin.

made by the Rockefeller Foundation. Kanehiro asked the Mitsui and Mitsubishi companies (*zaibatsu*) to form a financial group to help maintain the hospital. His request led to the establishment of the Shadan Hojin Tokyo Jikei-kwai financial group in July 1907.

The hospital was renamed the Tokyo Jikei-Kwai Hospital. According to its charter, the hospital's objective was to treat the poor, a mission that has not changed since its early days.

Establishment of the Medical School

Kanehiro also planned to start a medical school. At the general meeting of the *Sei-I-Kwai* in April 1881, he proposed that a medical school be founded. Kanehiro wanted to educate young doctors to have humanity and to understand the suffering of patients. Teaching the fundamentals and techniques of medicine, as in other schools, was only a part of Kanehiro's teaching. He laid special emphasis on cultivating the "soul" of medicine.

Fortunately, Toan Matsuyama, who had joined Kanehiro's group after Keio's medical school closed, had similar ideas about the teaching of medicine.

In May 1881 the Sei-I-Kwai Medical Training School opened in a one-room flat of the Tokyo Medical Company (Igaku Kaisha) at Yariya-cho, Kyobashi-ku. (Matsuyama had a connection with this company)

The teaching staff included Kanehiro, Matsuyama, and several young naval surgeons, who had been trained by William Anderson at the Naval Medical College.

The course of instruction given at this training school was so strict that after the first year only 20 of 100 students remained.

The Sei-I-Kwai Medical School moved to the Naval Imu-Kyoku-Gakusha located at Shiba Sannai Tenjin-bashi in November 1882. This move was necessitated by Kanehiro's becoming head of the Naval Medical College after Anderson returned to England. The students then trained with naval cadets. Clinical training took place at Yushi Kyoritsu Tokyo Hospital. Because instructors at the Naval Academy were paid by the Imperial Navy, the Sei-I-Kwai Medical School was able to save a considerable sum of money.

Because it was unnatural for a private medical school to be functioning on the grounds of a government school, the Sei-I-Kwai Medical Training School moved again, to a site near the Yushi Kyoritsu Tokyo Hospital (Tokyo Jikei Hospital) in Atago (January 1890) (Figure 4). The school was renamed Tokyo Charity Hospital Medical School. Thus, Kanehiro succeeded in establishing a medical school similar to St. Thomas's. The school was built with materials salvaged from the old naval hospital building, which was being reconstructed.

In 1903 this training school was upgraded to a *senmon gakko* (a medical school not requiring a premedical course). The graduates were permitted to go into practice after graduation without taking the national

Fig.4. The Tokyo Charity Hospital Medical School as it stood in 1890. Kanehiro stands in front of the main entrance.

examinations for physicians. At this time Kanehiro carried out reforms of the educational program. The first reform was to make oral examinations part of the admissions process. Although an oral examination was held, it was short and ended in a simple interview. Kanehiro asked the students why they wanted to become physicians and whether they were interested in religion. It is said that he rejected applicants who had no objective in becoming a physician or were not interested in religion. Kanehiro probably wanted to learn about the students' ethical views. The other reform was to provide a course (*Meitoku-Kai*) on moral culture. He invited a religious figure or a distinguished person to give a lecture every month. The topics of the lectures ranged from ethics to religion to world affairs. The main objective of these lectures was to heighten the students' level of culture and to impart a nobility of character leading to affection for the weak. Many new physicians with a humanistic soul graduated from this school and were often compared to those graduating from the University of Tokyo, where only study and learning were stressed. The lectures of *Meitoku-Kai* were beneficial for both Kanehiro and his students. His everyday life was filled with gratitude to God and Buddha.

Kanehiro's Study of Beriberi

Kakke, or the endemic form of beriberi, is a disease that causes polyneuritis, cardiac pathology, and edema and occurred most frequently in areas where polished rice was the staple food, including Japan, China, the Philippines, India, and Southeast Asia. The number of cases had increased rapidly in Japan with the introduction of polished rice. The incidence was especially high in young soldiers and students. One reason why Kanehiro went abroad to study was to be able to prevent and treat beriberi in the future. When Kanehiro returned to Japan, several theories about the cause of beriberi had been proposed. One theory was the infection theory proposed by the University of Tokyo and the Japanese Imperial Army. To find clues for the prevention and treatment of beriberi, Kanehiro started by carrying out simple basic studies. He first investigated the relation between possible causal factors (such as temperature, clothing, food, and living conditions) and the incidence of beriberi. He noted a relation between the quality of the food eaten by sailors and the development of beriberi.

During the long voyage of a naval training vessel he noted that the incidence of beriberi fell when the ship was in port but increased when the ship returned to sea. There seemed to be some relation between beriberi and the intake of Western food or Asian food.

The voyage of *Ryujo*, a training vessel of the Imperial Navy, provided evidence for a relation between food and beriberi. On the first leg of its voyage to New Zealand, Peru, and Hawaii, *Ryujo*, carried a crew of 376, of whom 169 had beriberi and 25 died. However, after the crew's diet was changed at Hawaii, there were no new cases of beriberi.

Kanehiro hypothesized that beriberi could be prevented and treated by decreasing the carbohydrate content and increasing the protein content of the crew's food and set out to prove it. He planned to introduce a new menu including Western-style food for the voyage of another training ves-

sel, *Tsukuba*, which was to take the same route as *Ryujo* (Figure 5). However, receiving permission for his experiment was not so simple.

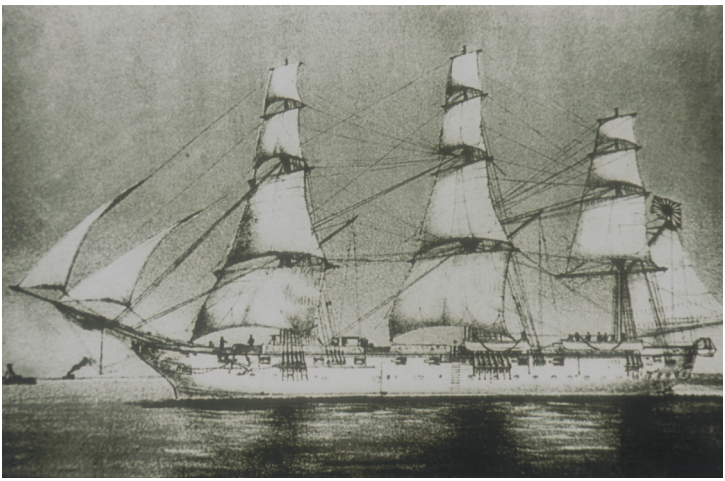


Fig.5. *Tsukuba*, a training vessel of the Imperial Navy, on its way to New Zealand, Peru, and Hawaii.

He had to persuade many of his superiors and to explain to Emperor Meiji the urgency of solving the beriberi problem. Kanehiro told Emperor Meiji: "Many of our sailors are suffering and dying from kakke. It is most urgent to prevent this condition. We must investigate the cause of this disease, and if we should succeed in preventing this condition it would be a great honor for the Japanese people and for those working in the field of medicine. If the cause of this condition is discovered by someone outside of Japan it would be dishonorable. We must solve this problem as soon as possible. Kakke is assumed to be caused by imbalanced nutrition. The food given to the naval force contains abundant carbohydrate and little protein. This nutritional imbalance must be adjusted as soon as possible. Decisive measures are needed. We await your decision, your Imperial Majesty."

Kanehiro soon received permission to carry out his nutritional exper-

iment on *Tsukuba*. *Tsukuba* left Japan for a long cruise in February 1884. As time passed, Kanehiro felt a sense of pressure and became uneasy: "What if the experiment fails? What will happen to the sailors eating the food I have recommended? I would have lied to the Emperor."

However, in September 1884, good news was received by telegraph: "not one patient; set your mind at ease." He thanked God for the success. He remembered the telegram that had been sent from *Ryujo*: "many patients, voyage impossible, send money." Thus, Kanehiro's nutritional deficit theory had been proven.

In 1885, the Navy followed Kanehiro's suggestion that sailors be given Western-style food (mainly whole-wheat bread). As assumed, this change in diet was extremely effective for preventing beriberi. Until that time 30% to 40% of the sailors had suffered from beriberi. Although thiamine, the vitamin essential for preventing beriberi, was not identified in rice bran until 1911, Kanehiro had already proven 30 years earlier that beriberi is caused by a nutritional deficit. This foresight is similar to John Snow's hypothesis that the cause of cholera could be found in drinking water.

However, in Japan at that time, most researchers and the Army supported the theory proposed by the University of Tokyo that beriberi was caused by infection. For this reason, Kanehiro's papers were often rejected for publication by medical journals in Japan, with the result that he was given little chance to report his work on beriberi. The controversy between the dietary and infection theories continued during the Sino-Japanese War (1894-1895), when 41,000 soldiers contracted beriberi and 4000 died, and the Russo-Japanese War (1904-1905), when 250,000 contracted beriberi and 27,000 died.

In 1906, Kanehiro was invited by his alma mater, St. Thomas's Hospital Medical School, to give a lecture on beriberi among Japanese sailors. It took 3 days for Kanehiro to explain the details of his study on beriberi.

This study was later published in *The Lancet** and deeply impressed other researchers in the fields of medicine and dietetics.

The originality of the conception and the corroborative evidence shown by Kanehiro were praised by Western scientists. The UK Antarctic Place-names Committee has named several places in Antarctica for outstanding figures in the field of vitaminology. These include Takaki Promontory, Eijkman Point, Funk Glacier, Hopkins Glacier, and McCollum Peak (Figure 6).

Years later, Kanehiro was asked by a young naval surgeon: "What would you have done if beriberi had occurred among the sailors on *Tsukuba*?" Kanehiro answered, "I would have immediately committed *harakiri*, begging pardon for the great mistake." Therefore, his life was at stake during the *Tsukuba* experiment.

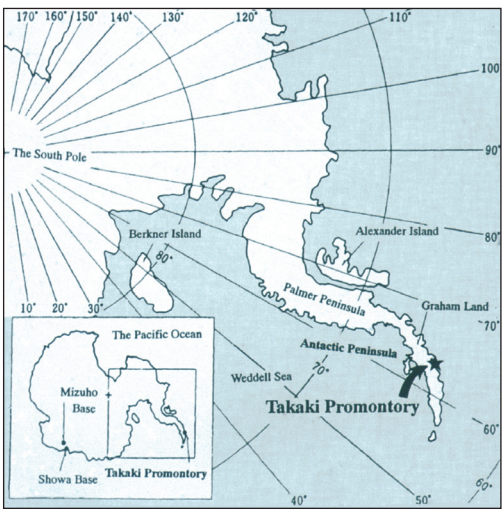


Fig.6. Map of Antarctica with Takaki Promontory.

* " Three Lectures on the Preservation of Health Amongst the Personnel of the Japanese Navy and Army." *The Lancet*, May 19, 1906, pp.1369-1374; May 26, 1906, pp.1451-1455; June 2, 1906, pp.1520-1523.

Late in Life (Closing Years)

Kanehiro was already 64 years old when the Meiji era ended in 1912. He had already won or received all the fame and glory possible (including Surgeon-General of the Navy, Fellow of the Royal College of Surgeons, member of the House of Peers, and baron).

However, in 1919 when he had just reached the age of 70, his third son Shunzo died at the age of 36. Shunzo had been educated in United States and was working for the Mitsui Company in New York. Shunzo became depressed and was being treated when he was involved in an automobile accident. Soon after this misfortune, his second son, Kenji, who was a professor of internal medicine at Jikei, died at age 38, 2 weeks after contracting typhoid fever complicated by perforating peritonitis. Shunzo and Kenji were Kanehiro's best students. The three most important lessons he gave them were "Do not tell a lie;" "Be honest;" and "Respect God and Buddha." They had always believed and respected their father. When they were primary school and middle-school students, most of their time was spent playing sports, traveling, and meditating. When they reached the age for higher education, Kanehiro believed that going abroad would be better for them. Kenji was sent to London to study medicine at St. Thomas's Hospital Medical School. Kenzo went to study at the University of Pennsylvania in the United States. After graduating from the School of Business, he went to work for the Mitsui Company in New York. Kenji, after graduating from St. Thomas's Hospital Medical School, visited Germany and the United States before returning to Japan. He later became a professor at Jikei.

Kanehiro was devastated by the deaths of his beloved sons. Through the years he had accomplished much for his country. He had personally earned all the glory and fame in Japan as a teacher of patient-centered medicine and a pioneer and leader in the field of preventive medicine. However, through the years he had lost many of his loved ones. His eldest

daughter Sachiko died at age 5 when Kanehiro was studying at St. Thomas's, and his fourth son Toshiro died at age 2. His second daughter Hiroko died at the age of 30. However, Hiroko had married Shigeji Higuchi (professor of obstetrics and gynecology) 4 years earlier, giving birth to Kazushige, who later became president of Jikei University.

He now had only one surviving son, Yoshiro, the eldest son, who had also graduated from St. Thomas's Hospital Medical School and later became president of the Jikei University School of Medicine.

Kanehiro had lost the will to live and frequently became depressed. He also suffered from rheumatoid arthritis. He did not want to meet anyone. Every day he would remain seated on a cane chair with a blank look. The only person he met was Bonji Kawamo, a Shinto priest. When Kawamo visited Kanehiro at home, Kanehiro left his bed, came out to the garden, and grabbed Kawamo's hands and said, "I'm finished." The light had gone out of his eyes.

Kanehiro improved slightly for a few days and when he met Kawamo again, Kanehiro said, "God is the light penetrating the universe. I must follow this light and again serve my country." On April 12, 1920, Kanehiro suffered a mild stroke and died the following day. He was 72 years old.

[English version by Eisei Ishikawa and Masao Okazaki]

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