Origins of the Shimadzu Spirit

The Founder's Spirit

In March, 1875, Genzo Shimadzu began manufacturing scientific instruments in a small house just 6.4 meters wide in the Kiyamachi-Nijo district of central Kyoto. He had just founded Shimadzu Corporation, at the age of 36.

Scientific Instrument Pioneer

Genzo Shimadzu began his business based on a strong conviction that Japan, a country with few natural resources, should work towards becoming a leader in science. He wanted to contribute to Japan by spreading scientific knowledge. To that end, he was determined to try his luck at manufacturing the kind of educational scientific instruments that had earlier stimulated his own inquisitive mind. In the beginning, of course, there were no orders pouring in and simply keeping the business alive was extremely difficult. As Japanese culture became increasingly enlightened, however, strong calls were made for the dissemination of scientific knowledge. According to a description of Japan's educational system that was distributed in 1872, considerable time was to be allotted to natural science subjects, and teachers were to "combine their teaching with practical experiments." In reality, however, most classes simply involved memorizing what the teacher said. As a result, at the time he launched his business, Genzo Shimadzu's work consisted mainly of visiting the Kyoto Prefectural Physics and Chemistry Research Institute to repair imported instruments and to manufacture apparatus for use in experiments.

Kyoto Prefectural Physics and Chemistry Research Institute

In August 1877, Japan's 1st National Industrial Promotion Fair was held in Tokyo to encourage industrial development. Genzo exhibited a cylindrical medical instrument, called a bougie, that was made of tin and was used to dilate a tubular passage of the body, such as the esophagus. He received a certificate of honorable mention, which enhanced the standing of his products and improved his prospects at a time when he was desperately struggling to stay in business.

A Successful Manned Balloon Flight

In the early summer of 1877, a department head in the Kyoto Educational Affairs Office named Sennosuke Harada brought the idea of launching a hydrogen balloon to Genzo. Genzo was asked to manufacture the balloon as part of a project to heighten people's interest in scientific education. In addition to having no knowledge of balloon manufacture, he was only given a few months to complete it. Genzo didn't know where to start, but knowing that it would promote scientific knowledge, he was determined to succeed and accepted the job.

After a period of trial and error, he finally created a balloon with a special silk fabric that was coated with rubber that had been melted in oil. He then filled the balloon with hydrogen that he generated from a reaction of metal scraps and sulfuric acid. On December 6, at a festival called Shokonsai, the balloon rose from a plaza inside Kyoto's Sento Imperial Palace. The general admission for this big event was the equivalent of a few pennies, and the palace grounds were packed with 50,000 spectators.

The manned balloon rose about 36 meters off the ground and was a huge success. Genzo's entrepreneurial spirit, which was fueled by the idea of contributing to society by disseminating scientific knowledge, together with the balloon, rose to new heights.

Disseminating Scientific Knowledge

Evacuation apparatus

The family business finally became busier in 1881 and Genzo expanded his factory. At the 2nd National Industrial Promotion Fair in April of that year, he exhibited a variety of products, including a still apparatus, a ventilator, a Magdenburg hemisphere, a test tube for falling body experiments, and an Atwood's machine. Fortunately the still apparatus received second prize and in the following year, 1882, business had developed sufficiently to publish a product catalog, called the "Science Equipment Catalog List," with a total of 110 products for use in the field of physics. This catalog, considered to be the first scientific instrument catalog in Japan, contained all of the instruments required at the time for scientific education in Japan's elementary and middle schools. In addition to physics instruments that covered five subjects (physical properties and dynamic and still solid objects, water and the atmosphere, sound, heat and light, and magnetism and electricity), there were also a number of molds, chemical apparatus, medical instruments, and various pumps and metal casting products. This amply demonstrates the diverse range of products that Genzo was able to manufacture.

Genzo Shimadzu's abilities as a scientific instrument manufacturer and his extensive knowledge and technical skills came to be highly regarded. He was even invited to teach in the metalworking department of the Kyoto Prefectural Normal School.

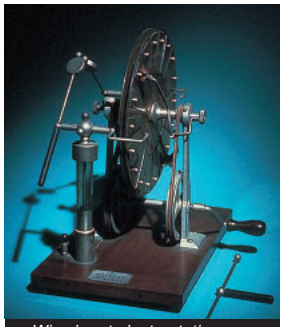
The Torch Is Passed to Genzo Shimadzu Jr.

When Genzo Shimadzu passed away suddenly from a stroke on December 8, 1894 at the age of 55, the business that he founded 20 years earlier in his tiny house had grown to cover his entire neighborhood.

His eldest son, Umejiro, who took the name of Genzo Shimadzu Jr., followed in his father's footsteps and became owner of the company at the age of 26. In addition to taking over as head of the family, Genzo Jr. inherited his father's enthusiasm for manufacturing scientific instruments and worked together with his younger brothers Genkichi and Tsunesaburo to develop the family business into a true corporation. He also ventured into a number of new fields, creating the basic framework for today's Shimadzu Group. In many respects, his talents exceeded even those of his father.

Genzo Jr. had previously displayed a hint of this talent in 1884, when he was only 16 years old and still named Umejiro. At the time, an important teaching tool for science education was a small desktop friction generator that was used to demonstrate power generation. The Holtz friction generator was commonly used for this, however, in 1883, England's James Wimshurst had successfully produced an induction electrostatic generator that performed better. Umejiro, who read about this in a book, sat down and built a Wimshurst machine on his own, using a diagram as a model. This electrostatic generator amazed people by discharging sparks up to 20 centimeters in length. Records show that the following year, when the generator was exhibited at the Kyoto Exhibition, the minister of education, Arinori Mori, was astonished by Umejiro's talent. He found it difficult to believe that such a machine could be built by a 16 year old and strongly encouraged Umejiro to continue his studies. The machine was nicknamed "Shimadzu Electricity" and was subsequently used in science classes for many years to perform static electricity experiments.

In 1887, at the age of 19, Umejiro took over for his father by teaching in the metalworking department of the Kyoto Prefectural Normal School. He continued to teach science for over five years while also tending to company business. In May of 1895, the year after he assumed leadership of the company, he established a department for scientific specimens, such as anatomical models of humans, and animal, plant, and mineral specimens. The specimens department opened up totally new areas of business for the company. In response to orders from schools and other organizations it produced a variety of specimens and models, including human skeletons and the taxidermy of rare birds and animals .



Wimshurst electrostatic generator made by Genzo Jr.

The Successful Radiograph

During this same period, Shimadzu enjoyed another groundbreaking event: early success in X-ray photography.

On November 8, 1895, Professor Roentgen of the University of Wurzburg in Germany discovered what he called X-rays, which were introduced as "a new type of radiation" in the university's academic journal on physics and medicine. Early in the following year, research on X-rays began in Japan. One of these researchers was Professor Hanichi Muraoka of the Daisan Senior High School in Kyoto (predecessor of Kyoto

University). However, because of the difficulty of conducting these experiments with only the school's equipment, Professor Muraoka asked for Shimadzu's help, which had sufficient power supply facilities. The experiments were conducted by Professor Muraoka and his assistant Sosuke Kasuya, together with Genzo Jr. and his brother Genkichi.

The early stages of these experiments were fraught with failure. Then one day, Genzo used a Wimshurst electrostatic generator equipped with an improved 1-meter-diameter glass rotor plate and hung the vacuum tube from the ceiling. He placed a photographic plate in its frame, then put a wooden box containing a silver coin on top of the photographic plate and turned on the generator. About 30 minutes later, a faint X-ray image appeared on the plate. The group had successfully taken a radiograph. That was on October 10, 1896, just 11 months after Professor Roentgen's X-ray discovery.

Through this research, Genzo gained considerable knowledge and skills in the manufacture of X-ray machines and began to make improvements to the induction coil. In 1897, he produced and started marketing an X-ray machine for educational use. The sale of an X-ray machine that could be used to perform actual experiments was an epoch-making event for the academic community.

Japan's First Medical X-ray Machine Developed

When large-capacity electrical current became available in cities in the early 1900s, practical X-ray machine use became prossible and machines for medical use imported from Europe and the U.S. began to reach Japan. X-ray machines were gaining acceptance at some of Japan's advanced hospitals and Shimadzu immediately began R&D on medical X-ray machines.

In September 1909, Shimadzu completed a large-scale, direct-current X-ray machine with a Wehnelt interrupter induction coil. The power source consisted of a storage battery that was charged by generating DC current with a motor generator operated by a benzine motor. Delivered to the Chiba Kokufudai Eisei Hospital, this was the first medical X-ray machine produced in Japan.

In 1911, Shimadzu delivered an induction-coil X-ray machine to Ohtsu Hospital, which was operated by the Japan Red Cross. This machine used a rectifier to convert alternating current to direct current, which served as the power supply. This was the first domestically produced, large-scale medical X-ray machine using alternating current. Since that time, Shimadzu has advanced steadily in its efforts as a pioneer of medical X-ray machines in Japan.

Genzo Shimadzu Jr. continued his activities as industrialist and inventor until his death at the age of 82 on October 3, 1951, eventually registering patents for 178 inventions in twelve countries.

Medical X-ray machine delivered to Ohtsu Hospital

Genzo Shimadzu Honored as a Great Inventor

In addition to medical X-ray machines, Genzo Shimadzu was particularly enthusiastic about his storage battery inventions. A typical example is a device that he developed to produce reactive lead powder, the main material used in storage batteries. A stable supply of good-quality, low-cost lead powder is essential for producing storage batteries, and Genzo took up the development of this new production method himself. After considerable trial and error, he devised a method of placing lead pellets in a drum, rotating it to produce powder and then removing the powder together with the air, thus cheaply producing large quantities of lead powder. Also, the lead suboxide that resulted from this method reacts easily with oxygen, making it an ideal storage battery material in terms of both properties and cost. This method later found applications in other fields as well, including the production of glass for optical uses and a variety of coating materials. Patents were granted for the method both in Japan and overseas.

In recognition of his achievements, in 1930 Genzo Shimadzu was designated one of the top ten inventors in Japan, an honor bestowed on him at a dinner party given by the emperor on December 11 of the same year.

Genzo Shimadzu (Front row, far left)