

The Man with Five Faces



KOTARO HONDA: The Man with Five Faces

The Honda Memorial Foundation
Institute for Materials Research, Tohoku University



The Man with Five Faces

He was an INNOVATOR producing spectacular results.

He was an ORGANIZER of many researchers.

He was like a WILD CHILD with the innocence of a baby.

He was an ARTISAN possessing a wealth of academic experience and skills.

He was an INSTRUCTOR nurturing many of the next generation . . .

The great researcher Kotaro Honda was a man with five faces.

**Born in Aichi Prefecture's Nishimikawa area (Okazaki),
he studied physics at Tokyo Imperial University,
aspiring to enter the academic world.**

At Tohoku Imperial University, he came to be called the "God of Steel."

**Honda founded the Institute for Materials Research
and became a worldwide leader in metallurgy.**

Let's take a look at some anecdotes of his life.

Kotaro Honda

Born on March 24, 1870, in Hekikai District, Aichi Prefecture (now Okazaki City, Aichi Prefecture).

Leading Japanese physicist and metallurgist.

Launched Tohoku Imperial University's Institute for Materials Research
and later served as the university's president.

Died on February 12, 1954.

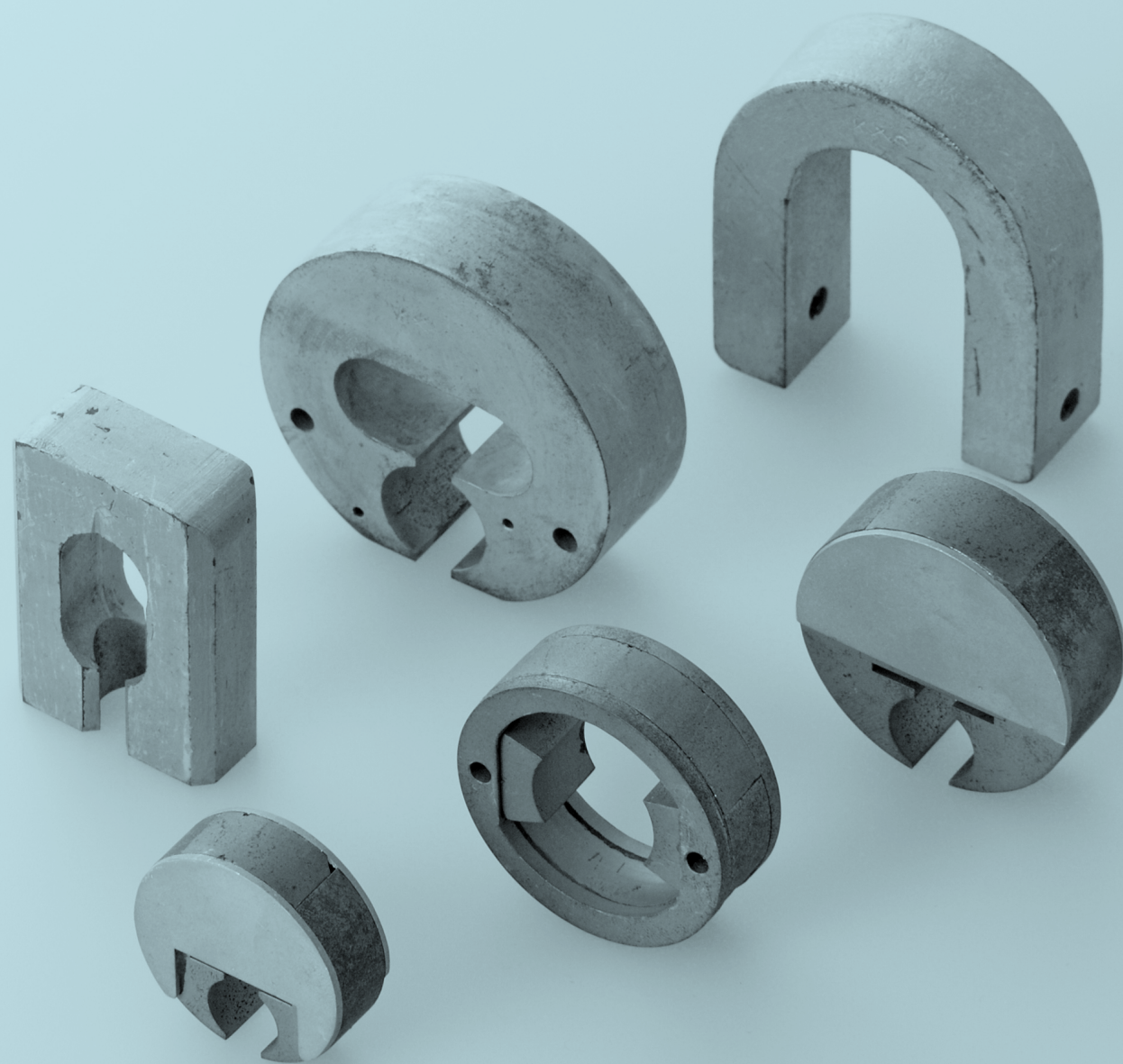
INNOVATOR

Bringing innovation to academia and industry

The KS Magnet Steel, New KS Magnet Steel, thermobalance . . .

Kotaro Honda not only produced a great amount of research, but he also connected his research with society.

Tracing his trajectory, we find a researcher who did not confine himself to academia.



KS Magnet Steel (back row), New KS Magnet Steel (front row)

His Analysis Method and Exhaustive Experiments

Detailed experimentation covering all possible patterns —the mark of an innovator

As his studies in Germany drew to a close, Kotaro Honda spent a year working under Henri Du Bois at the University of Berlin, measuring the magnetic susceptibility of forty-three different elements. Along with his detailed experimental style, his results, which showed the magnetic periodicity of these elements, greatly surprised researchers and made Honda's name known throughout the world. After returning to Japan, Honda assumed a post at Tohoku University. He and his disciples devoted themselves to creating detailed phase diagrams for various concentrations of special steels (carbon, tungsten, chromium, high-speed, magnet) based on carbon steel he had obtained in Germany. Extensive thermal and magnetic analysis experiments covering specific compositions and temperatures became the characteristic research method of the "Honda school" in the years to come. Honda and his disciples created numerous new metal materials and advanced Japan's steel industry using this method.

KS Magnet Steel

Developing the world's strongest magnet

In 1916, Honda and his disciple, Hiromu Takagi, developed the world's strongest magnet at the request of the military. It was named the KS Magnet Steel, after Kichizaemon Sumitomo (head of the Sumitomo conglomerate), who donated research funds. This magnetic steel was an alloy made by blending iron, cobalt, tungsten, chromium, carbon, and other elements to create the most magnetic force. The coercive force (the magnet's strength) was three times that of existing permanent magnets. Honda ordered Takagi to create a special steel that blended elements with iron, and he created test pieces through trial and error, combining various elements in various proportions. At Honda's suggestion, Takagi wore a firefighter's uniform; the work of melting in a small room was tough and required enduring extreme heat. Substances reached more than 1,000 degrees Celsius. The painstakingly completed KS Magnet Steel was put on the market by Sumitomo Metal Industries. However, the military, which had originally placed the request, could not use it because the magnetic force was too strong. The KS Magnet Steel reigned as the world's strongest magnet for the next fifteen years, but in 1931, Tokushichi Mishima's research group at Tokyo Imperial University developed the MK Magnet Steel, which had twice the coercive force. Honda and his crew were astonished, and only two years later, Honda, Hakaru Masumoto, and Yuki Shirakawa, developed the New KS Magnet Steel, which surpassed the MK Magnet Steel.

Thermobalance

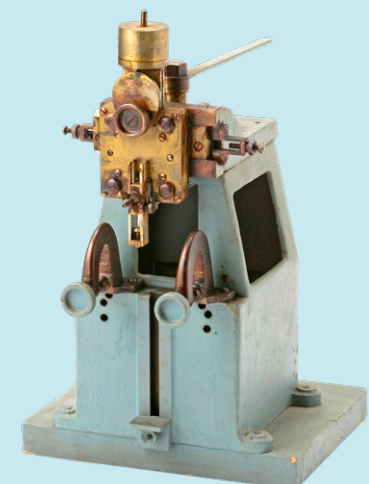
A research device created by Honda

Together with his research comrades and disciples, Honda built many original research devices. The most striking of these was the thermobalance. When a substance is heated, its mass (weight) changes. The Honda thermobalance was invented to measure this temperature-induced change in mass. One places a specimen (a substance to be weighed) on one side of the balance and a weight with a known heaviness on the other. When the side with the specimen is heated in a furnace, the tilt of the balance changes as time passes due to the weight change. Honda used this thermobalance to present graphs of the temperature-induced changes in mass of manganese sulfate, calcium sulfate, calcium carbonate, and chromium oxide. Thermobalances were subsequently manufactured and sold by a company in Sendai, sparking strong interest in academic and industrial circles worldwide. Various improvements have also been made since then.

Sharpness Tester

Developing a machine to measure blade sharpness

One day, Honda was asked by a blacksmith from Wakayama to compare the advantages of a blade manufacturing method he had invented with the manufacturing method handed down in Sakai, an area near Osaka known for blacksmithing. Honda's attentive response led them to develop a relationship, and he eventually came up with a sharpness tester for blades. It was the world's first device that measures the sharpness of a blade numerically based on the number of sheets of paper that are cut (on the pull stroke). This method is still widely used today.



Honda's sharpness tester

ORGANIZER

Connecting people, organizing them, and nurturing a center of magnet manufacturing

Kotaro Honda’s charisma attracted many.

In fact, he brought together people who adored him and created a research organization that would play a key role in the future of materials science. Honda must have taken it upon himself to serve as a hub connecting various people.

Creating the Institute for Materials Research

Taking the lead in materials science, creating a global center

In 1915, Kotaro Honda proposed to Tokiyuki Hojo, the second president of Tohoku Imperial University, the creation of a second division of the Provisional Institute of Physical and Chemical Research that would be dedicated to research on iron, steel, and other similar topics. Inspired by Honda’s enthusiasm, President Hojo approached the Ministry of Education, and then the Sumitomo conglomerate to provide still needed money, resulting in its establishment in 1916. In that year, Honda and his disciples introduced to the world their great invention: the KS Magnet Steel. It quickly raised Honda’s reputation in academia, government, and industry. Later, with Honda having the university’s third president, Ryojiro Fukuhara, lobby the Ministry of Education, the institute’s second department became the Iron and Steel Research Institute in 1919. After this, Tohoku Imperial University’s Iron and Steel Research Institute would lead in the study of iron, steel, and physical metallurgy. In addition to researchers from universities across the country, many young engineers from large steel, shipbuilding, and machinery companies, as well as numerous research students from the military, were sent to the institute. At the time, it was said that getting into the institute’s laboratories was harder than opening a shop in Tokyo’s upscale shopping area of Ginza. In 1922, the Iron and Steel Research Institute was renamed the Institute for Materials Research (IMR, or Kinken in Japanese) and became an independent research institute attached to Tohoku Imperial University. Thus began its illustrious history that has continued to the present.



Albert Einstein and Department of Physics faculty
(From left: Kotaro Honda, Albert Einstein, Keiichi Aichi, Shirota Kusakabe)

IMR and the Department of Metallurgical Engineering

Research and education

Honda also worked quite hard to help establish the Department of Metallurgical Engineering in Tohoku Imperial University’s Faculty of Engineering in 1923. Initially, the Ministry of Education planned to establish the “Department of Metallurgy,” but Honda insisted that the department name be “Department of Metallurgical Engineering.” In the end, the latter name was approved. He must have wanted to firmly establish the field of metallurgical engineering, with the department shouldering education and IMR conducting research.

Attending to IMR as University President

IMR matters still required Honda’s approval

In 1931, Honda became the sixth president of Tohoku Imperial University. In this position, Honda would agree with the opinions of deans on most matters concerning their departments. However, at IMR, things were no different than when he was director. While leaving administrative matters to its then-director Torajiro Ishihara, when it came to research, he would walk around to each IMR research lab every day, checking on how things were going. In addition, important IMR-related matters, such as facility expansion and human resources, could not be decided by the director alone. It was always necessary to ask for Honda’s opinion. On approval forms, the IMR administrative office even added a space for Honda’s seal above the director’s seal.

Honda-Style Negotiations

Advancing the university organization through tough negotiating

When he was president of Tohoku Imperial University, Honda would acquire funding to further develop the university from the Ministry of Education by hard negotiating. Normally, university presidents negotiate budgets with ministers, vice-ministers, and bureau chiefs, but in Honda’s case, he went to ask for help from even section chiefs and section managers. He would sit down in a small chair next to a section chief and go on and on, explaining how important a plan was for the university and how much it would benefit society and the country. On multiple occasions, with Honda, the world-renowned “God of Steel” and president of an imperial university, assuming a humble stance, the Ministry of Education finally caved in and restored a scrapped budget. This great organizer was also a competent negotiator.

WILD CHILD

The unpolished and amusing side of the “God of Steel”

While Kotaro Honda was called the “God of Steel” and rose to the position of Tohoku Imperial University president, there are many anecdotes that illustrate his character as an innocent, unpolished “wild child.” Those around Honda surely adored this human side.

Runny-Nose Kotaro

A large and lumbering child

While Honda graduated from Tokyo Imperial University and became president of Tohoku Imperial University, he was not a member of the elite from the start. As a child, Honda was a “lumbering kid” with a runny nose all year round. Although large and sturdy, he was not brilliant and was sometimes ridiculed by those around him. However, after graduating from higher elementary school, he moved to Tokyo, relying on his older brother, who was a student at the city’s imperial university, and enrolled in the University Preparatory School, where he plunged into a period of intense study. His unpolished nature was transformed into tenacity in learning, and he then would walk the path to becoming a diligent, outstanding researcher.

Kotaro Honda Fashion

A blend of Japan and the West, with an umbrella and a dog

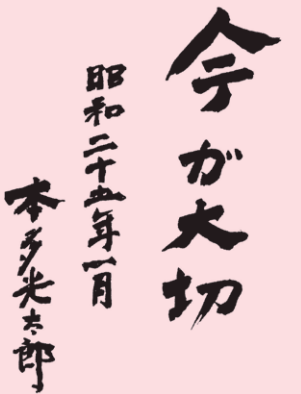
After becoming a professor at Tohoku Imperial University, Honda lived in Komegafukuro, not far from the Katahira campus, and walked to the university every day. His commuting attire was always the same: a blend of Japanese and Western styles that combined a plain black kimono and hakama skirt, shoes, and a bowler hat. Even on sunny days, he always carried an umbrella, and when Honda walked, his dog always followed. This dog always came with Honda on his laboratory patrols. The umbrella and dog were also part of Kotaro Honda fashion.



Writing Mistakes

Calligraphy with incorrect characters

As Honda became more famous, he was asked to write calligraphy more and more, and sometimes would make mistakes when writing Chinese characters. Even the phrase Honda liked best (that means “cherish the present” as shown on the right) often had incorrect strokes. These pieces of calligraphy are today still found in the Honda Memorial Hall.



The Imperial Rescript on Education

Invariably reading it incorrectly, and receiving thunderous cheers

President Honda frequently misread the Imperial Rescript on Education during ceremonies. Even when he read it through without making a mistake, he would forget to read the part indicating that the emperor had signed it, or he would misstate its date. Students and professors looked forward to this, wondering what he would get wrong today. When he did make a mistake, they would offer great cheers. While it was an era when it was unacceptable for a university president to misread the rescript, one professor remarked that not having him practice it made ceremonies more interesting. This is an anecdote that shows the magnanimity of Tohoku Imperial University.

Lots of Retracting When Playing Go

Often angering a long-time opponent

Honda began to play the board game Go actively around the time he became president of Tohoku Imperial University. His favorite opponent was Professor Tadahiko Kubota of the Faculty of Science’s Department of Mathematics. They often played at Kubota’s house. With Honda, it involved a lot of retracting—so much so that Kubota would often become angry and say, “I’m not playing with you anymore.” However, after just a few days, Honda would visit Professor Kubota, and they would enjoy playing Go as if nothing had happened. This “retracting” in Go was also part of Honda’s charm.



Honda playing Go with a friend (Kuniichi Tawara) at Atami Onsen

SAYINGS

Words of the “God of Steel,” sharing with us a life of honesty and diligent research

Although he was of few words, as Kotaro Honda had more opportunities to write calligraphy after becoming president of Tohoku Imperial University, he left behind a number of phrases that capture the man himself.

Hope should always be grand.

The perfection of character begins with self-awareness.

Forge iron while it's hot.

Iron is the king of all metals indeed.

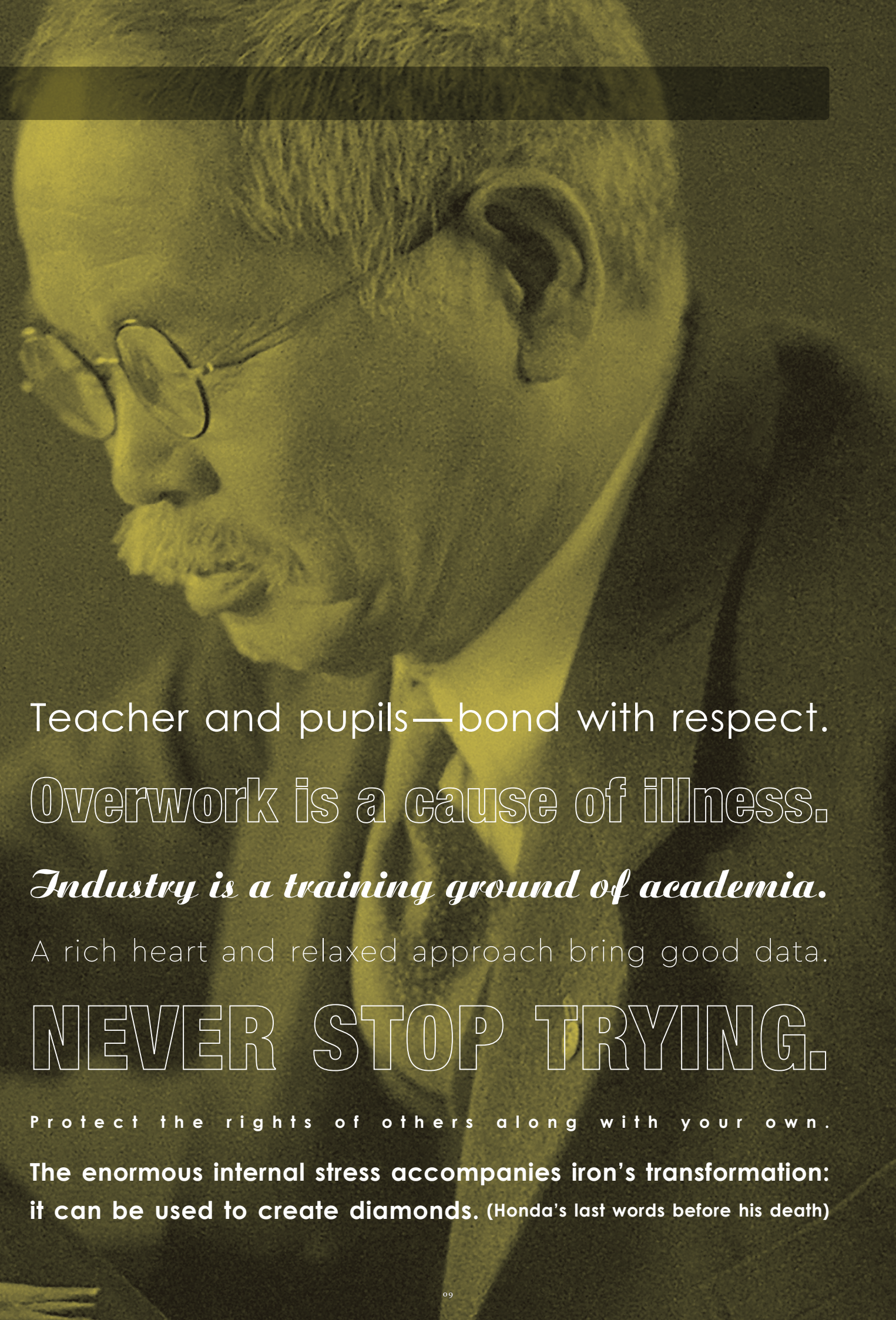
鐵 王 金 哉

*Good observation begins
with the right approach.*

Carefully read good books until their flavor becomes apparent.

CHERISH THE PRESENT.

Youth's hardship: experience it.



Teacher and pupils—bond with respect.

Overwork is a cause of illness.

Industry is a training ground of academia.

A rich heart and relaxed approach bring good data.

NEVER STOP TRYING.

Protect the rights of others along with your own.

The enormous internal stress accompanies iron's transformation:
it can be used to create diamonds. (Honda's last words before his death)

ARTISAN

Repeating experiments like an artisan, the path to excellence in research

Kotaro Honda was an “experiment fiend.” He devoted all his time to experiments.

He would repeat an experiment an enormous number of times to finally get the data he wanted.

Honda was a tenacious and highly artisanal researcher. Anecdotes remain that illustrate his thoroughness.

At Tokyo Imperial University — 1

A guard complains Honda’s experiments last until midnight

Kotaro Honda spent every day at Tokyo Imperial University devoting himself to experiments. By the time he would return home in the middle of the night, the university’s Akamon Gate was already closed, and every night he had to wake the sleeping guard to unlock it. The guard, fed up with this, went to ask Honda if he could just climb over the wall and leave. Honda apologized and said, “I’m sorry that it’s every night,” but quietly remarked, “I believe that humans are different from dogs and cats in that they enter and leave through the gate. I am sure I will do useful work for Japan, so please don’t let me climb over the fence like a thief.” The guard was convinced, and he and his fellow guards remarked that Honda would go on to do great things.

At Tokyo Imperial University — 2

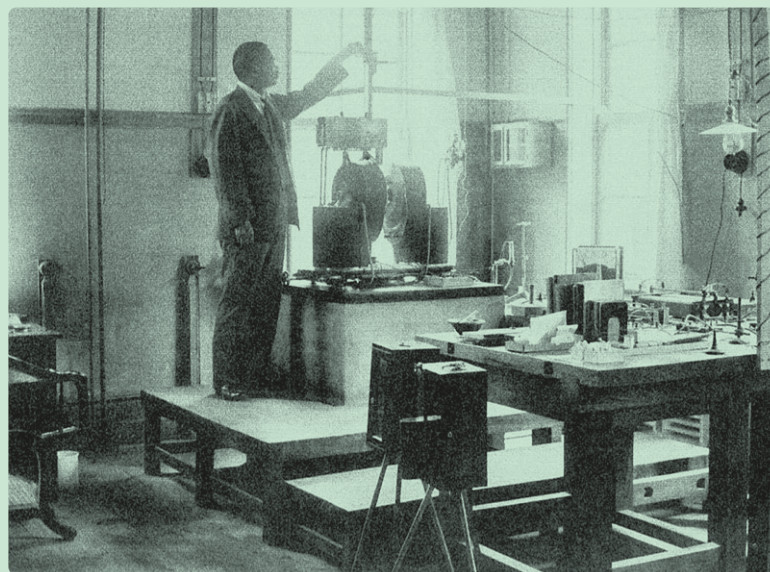
Going to the lab on New Year’s Day and running into Hantaro Nagaoka

Hantaro Nagaoka, under whom Honda studied at Tokyo Imperial University, recalls the following anecdote. On New Year’s Day, Nagaoka went to his workplace, the Department of Physics at Tokyo Imperial University, hoping to check an experiment idea that had occurred to him. He encountered Honda, draped with a red blanket and continuing his experiments. He couldn’t help but say, “Well, you’re energetic. It’s New Year’s Day.” Honda replied, “Hm? It’s New Year’s Day for you, too.” This research-loving teacher-student pair then broke out laughing.

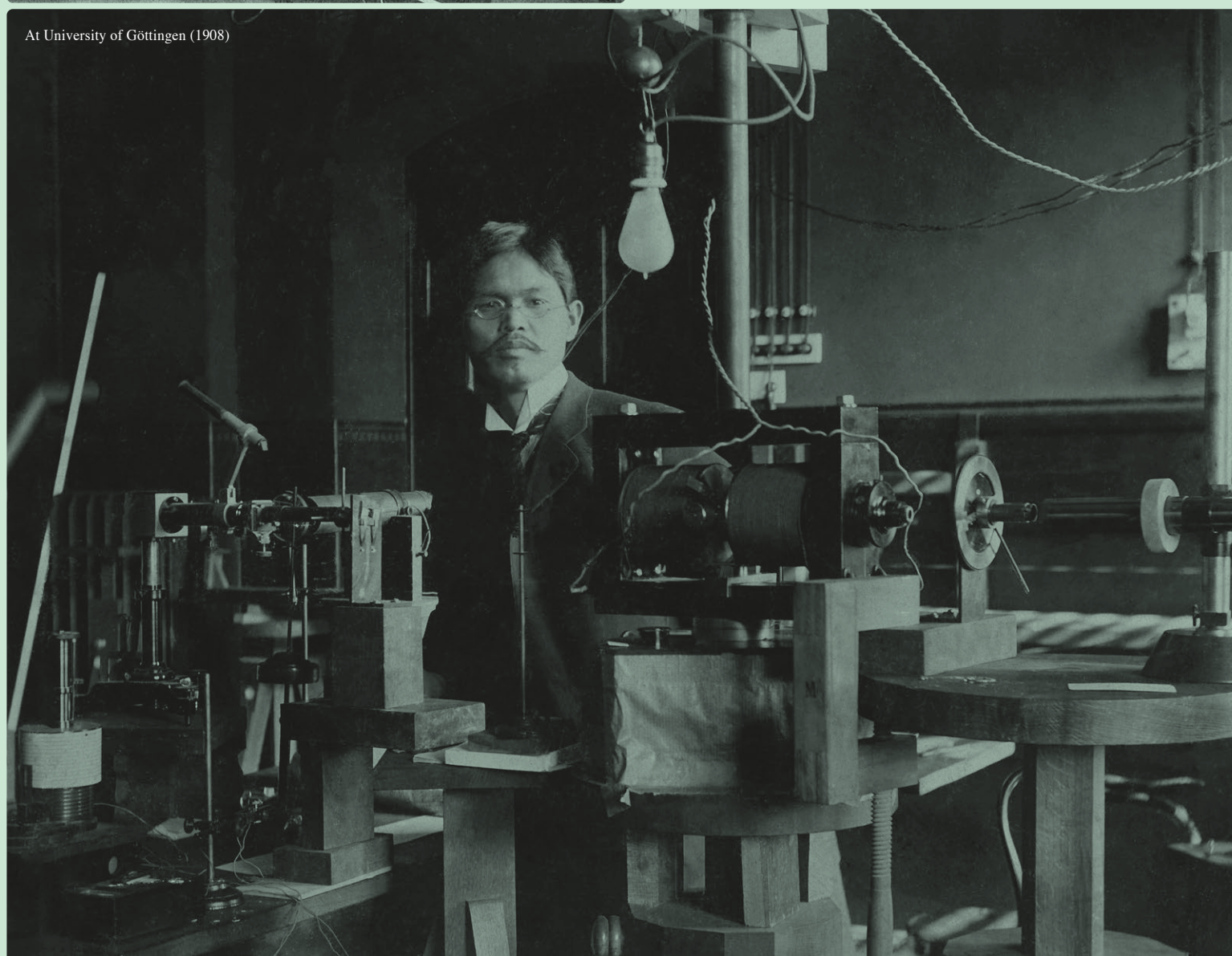
At Tokyo Imperial University — 3

Honda’s amazing experiments that surprised Torahiko Terada

In his later years, Torahiko Terada (a student junior to Honda who became a physicist and the model for the character Kangetsu in Soseki Natsume’s *I Am a Cat*) recounted Honda’s greatness in a memoir written by Ukichiro Nakatani (a physicist famous for his research on snow crystals). Honda persistently repeated measurement experiments “that seemed entirely impossible considering even just the precision of the machine or the nature of the equipment alone,” and then would finally succeed. Seeing Honda like this, Terada says he came to the realization that “if you are convinced that you can do something and do it patiently many times, you can finally do even things that seem almost impossible.” Honda’s tenacity made the impossible possible.



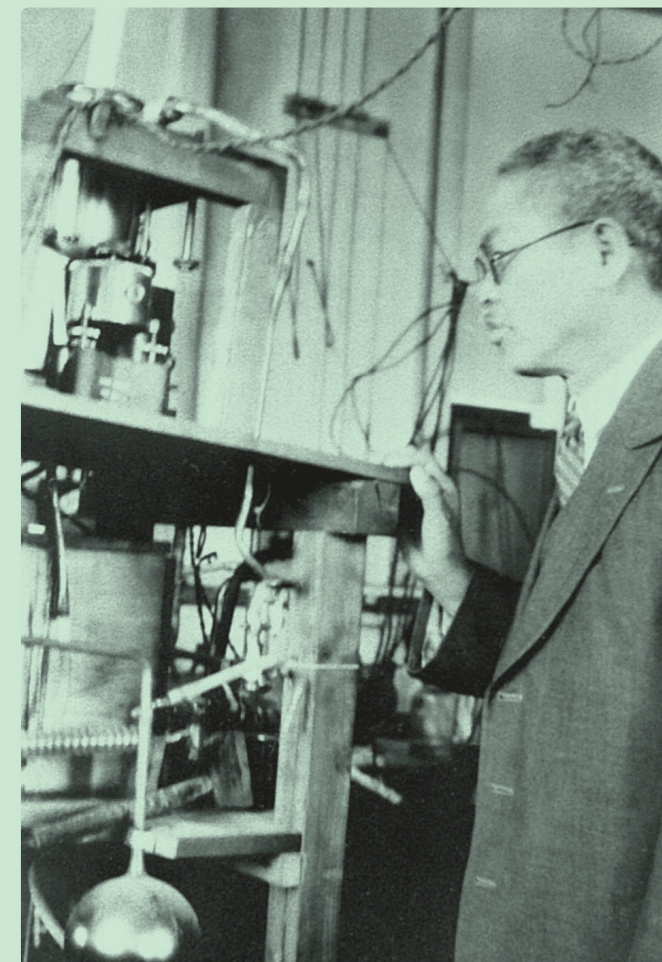
At University of Göttingen (1908)



The Words of Hantaro Nagaoka

In this world, it’s not whether you’re brilliant

Hantaro Nagaoka, Honda’s teacher, said the following in a speech at the twenty-fifth-anniversary celebration of Honda’s tenure as a professor at Tohoku Imperial University: “I honestly didn’t think Honda was that smart of a student. Therefore, I never imagined that he would become someone who would do such great work. I must say that this tireless and constant effort has made Honda what he is today. Looking at Dr. Honda, we can see that in this world, it’s not whether you’re brilliant, but that the bigger question is whether one can work hard or not” (from Teijiro Ishikawa’s *Honda Kōtarō-den*).



University of Göttingen Days

The famous words of the boarding house lady: “That man is too busy with experiments to die”

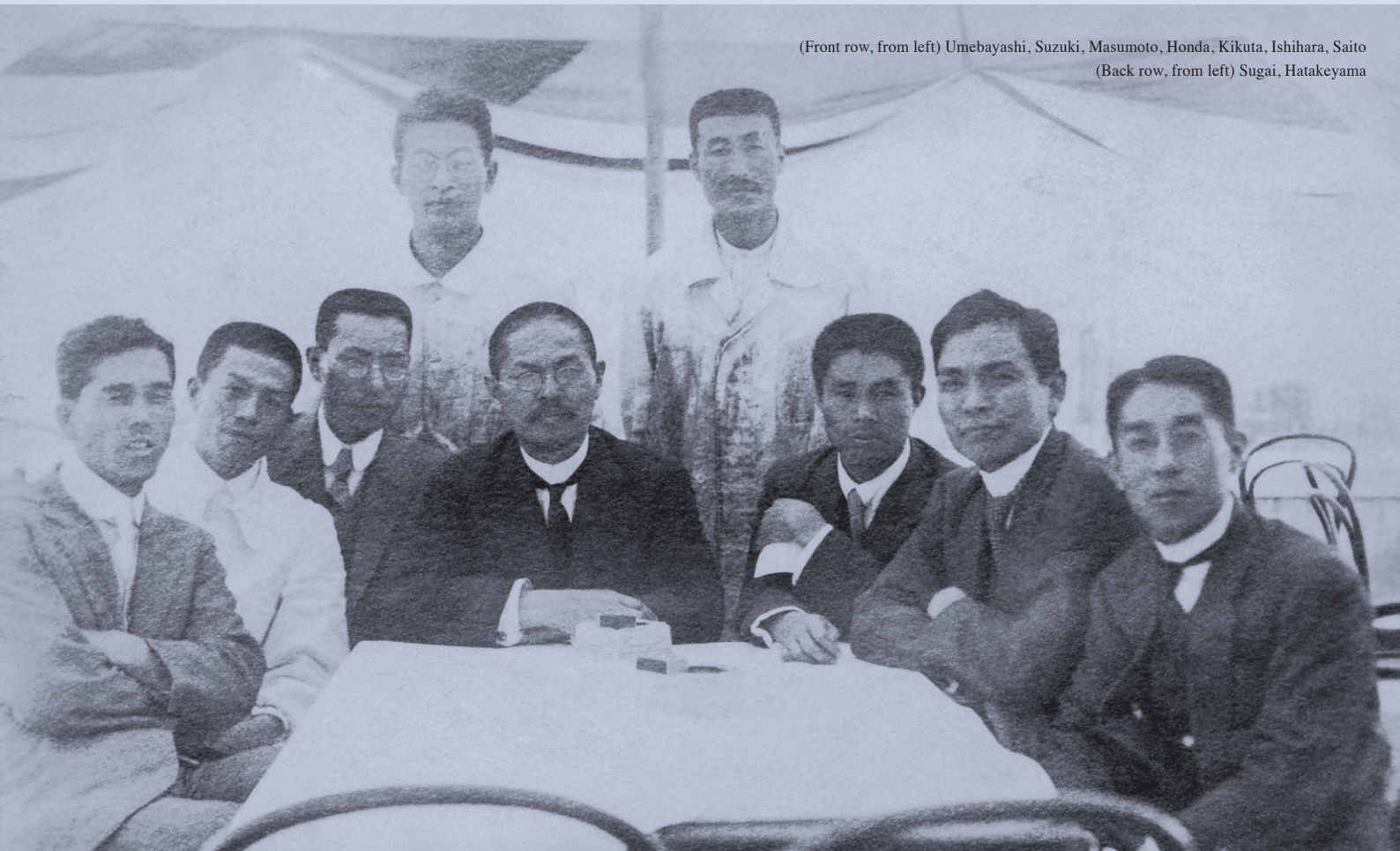
In 1907, Honda went to study at the University of Göttingen in Germany. One day, Ryoji Nakazawa, a fellow international student living in Berlin, heard a rumor that a Japanese resident of Göttingen had died. Thinking, “This is serious; it might be Honda,” he went there. Arriving at Honda’s boarding house in Göttingen, he asked the lady there if it was true that Honda had died. She was surprised and responded, “That man seems to not have time to die—he’s too busy with experiments.” When Nakazawa further inquired about Honda’s current situation, the lady replied while laughing: “He eats a lot more than the average German. He’s so busy with experiments that he doesn’t come back until 9:00 p.m.” Nakazawa was relieved to hear this. He left a message on his business card and leisurely returned to Berlin.

INSTRUCTOR

The Honda school and academic guidance

Honda nurtured many outstanding researchers. The “Honda school,” so to speak. They were found at not only Tohoku Imperial University, but also at other universities and in business circles, and had a great impact on academia and society.

Honda also actively provided academic guidance to industry and helped establish several companies.



(Front row, from left) Umebayashi, Suzuki, Masumoto, Honda, Kikuta, Ishihara, Saito
(Back row, from left) Sugai, Hatakeyama

The Early Honda School

His first and favorite disciples, Take Sone and Hiromu Takagi

After Kotaro Honda began working as a professor at Tohoku Imperial University, the Honda school included Take Sone and Hiromu Takagi. When Sone was a student at the First Higher School, he and Honda, who was at Tokyo Imperial University, conducted an experiment together on the seiches of Lake Chuzenji. This led to him becoming Honda’s first assistant after the latter became a professor at Tohoku Imperial University. Hiromu Takagi went from the Seventh Higher School to the Faculty of Science at Tokyo Imperial University and then to the graduate school of Tohoku Imperial University. Later, he became a research aide at the Provisional Institute of Physical and Chemical Research, where he worked with Honda on a major invention: the KS Magnet Steel.

The Honda School at the Beginning of Its Heyday

The Second Division of the Provisional Institute of Physical and Chemical Research’s lineup

Honda’s heyday as a researcher is said to have lasted for about twenty years from 1916, when the Second Division of the Provisional Institute of Physical and Chemical Research was established. The members of the Second Division around the time of its founding became the prototype for the Honda school of later years. Honda was the head of research. Research aides were Hiromu Takagi, Torajiro Ishihara, Takeo Shimizu, and Takejiro Murakami (later the second director of IMR), and research assistants were Seibei Konno, Tario Kikuta, Tamizo Koyama, Shichiro Yachimori, Naoki Watari, Take Sone, and Daisuke Takayanagi. Kuniichi Tawara worked as a contract worker. The strongest team in metallurgy was in the process of being built.

The IMR Honda School

The Honda school’s achievements amaze the academic world

Around when Tohoku Imperial University’s Iron and Steel Research Institute turned into the Institute for Materials Research, Honda and his students produced many remarkable research results. Take Sone’s measurement of the magnetic coefficients of gases; Honda and Junzo Okubo’s ideas on ferromagnetism; Honda and Seiji Kaya’s precise magnetic measurements of single crystals of iron, nickel, and cobalt; Hakaru Masumoto and Tatsuji Yamamoto’s work on Sendust, a high permeability powder alloy; Honda, Tadashi Masuko, and Tamotsu Nishina’s work on super permalloy; Honda, Masumoto, and Yuki Shirakawa’s work on magnetostriction alloy “Alfer” for ultrasound generation; and Masumoto’s work on super invar. These accomplishments had a major impact on the field of metallurgy.

People from the Honda School at Tokyo Institute of Technology

Honda school graduates gather in Ooakayama Campus

Many of the researchers who were under the tutelage of Honda took up positions at the Tokyo Institute of Technology. Starting with Takeshi Takei, who was brought in as an assistant professor when the Tokyo Higher Technical School rose in status to become that university in 1929, many graduates of the Honda school gathered there, including Yoshinosuke Yamada, Masuo Kawakami, Kinji Yokoyama, and Masazo Okamoto. At that time, there were a great number of people from Tohoku Imperial University, including Hidetsugu Yagi, the inventor of the Yagi/Uda antenna who served as dean of the Faculty of Engineering at Tohoku Imperial University, dean of the Faculty of Science at Osaka Imperial University, and later as president of Tokyo Institute of Technology. They created the “Tohoku Association.”

Academic Guidance and Founding Companies

Helping establish companies that apply academic research, and providing technical guidance to companies in Osaka

Honda not only trained researchers in academia but also was involved with companies. He provided technical guidance and helped found them. As the name of Sendai’s IMR became well known throughout Japan, metallurgy companies began to request technical guidance. From around 1926, Honda did so for companies in Osaka. These included Kimura Koka Kojo, Izumi Riki Seisakusho, and Asaka Industrial. This led to him becoming the first director of the Osaka Prefectural Institute for Materials Research in 1932, which was attached to the Osaka Prefectural Industrial Promotional Hall. He has also helped establish many companies in Sendai, as if putting into practice his saying,

“Industry is a training ground of academia.” At Honda’s suggestion, Toyo Knife was established in 1925 to promote the domestic production of industrial knives, and in 1937, Tohoku Steel was founded as well. Furthermore, Tohoku Kinzoku Kogyo was created in 1938 to commercialize magnetic materials such as Honda’s KS Magnet Steel and Masumoto’s Sendust. In 1933, Honda helped found Tohoku Kogei Seisakusho to make commercial crafts using the KS Magnet Steel. The founders and engineers of these companies under Honda’s tutelage can be said to be part of the Honda school.



(Left photo) The signboard on the right reads,
“Tohoku Kogei Seisakusho: Manufacturer and Distributor of Products made with the KS Magnet Steel, invented by Tohoku Imperial University President Kotaro Honda.”



Kotaro Honda in History

Takahito Hatsuyama

Physics greatly advanced in the nineteenth century. One of the major factors that facilitated its development was industrial technology. The mass production of steel, in particular, changed the mechanisms of society. Not only was it produced to be widely used in society, but the need emerged for detailed research on the properties of the iron and steel being used. A person who responded to this need was Kotaro Honda.

Universities are now seen as places of research. However, in some regards, at the beginning of the twentieth century, Tokyo and Kyoto’s imperial universities did not adopt that view. Tohoku Imperial University’s College of Science, which was established in this context in 1911, emphasized research as the role of the university, and up-and-coming people with research talent were appointed as its professors. One such person was Kotaro Honda.

By the turn of the twentieth century, research institutes were being established one after another in Europe and North America. Research by small groups of people was no longer sufficient for industrial aims. In light of this situation, Honda created the Institute for Materials Research (IMR/Kinken), which was praised by Western researchers.

Even today, people continue to speak about Honda enthusiastically educating students and researchers at IMR. Because of the great achievements of Honda’s disciples, IMR also came to be known as the

“Honda school.” One of Tohoku University’s principles is “research first,” meaning that education should be based on cutting-edge research, and one of the sources of this principle was Honda’s stance regarding education. Honda’s enthusiasm for education can also be seen in his authoring of physics textbooks written in Japanese. (The fact that Honda made it possible to study physics in one’s native language was groundbreaking in itself.)

While in Japan it is extremely rare for the headquarters of a national academic society to be outside of Tokyo or the Kyoto-Osaka-Kobe region, that of the Japan Institute of Metals and Materials is still in Sendai. This happened because Honda and IMR were so influential in Japan’s metallurgical research. In the past, students who had aspirations to engage in metals research traveled to Sendai to be taught by Honda. The bronze statue of Honda in IMR continues to watch over the many young people who gather, following their predecessors’ footsteps.

Takahito Hatsuyama
Historian of science and part-time lecturer at Tohoku University.
Author of a monograph, published by Tohoku University Press, *History of Science of Iron: How Did Science Relate to Industry from the End of the 19th Century?* (*Tetsu no kagakushi: Kagaku to sangyō no ayumi*).

Kotaro Honda: Timeline	
March 24, 1870	Born in Yahagi Town, Hekikai District, Aichi Prefecture (now Okazaki City, Aichi Prefecture) as the third son of Hyozaburo Honda (agriculture)
July 10, 1897	Graduates from the Department of Physics at Tokyo Imperial University’s College of Science
February 22, 1911	Appointed professor at Tohoku Imperial University’s College of Science
April 1, 1916	The Second Division of the Provisional Institute of Physical and Chemical Research established at the university, and Honda becomes chief researcher
1916	Invents the KS Magnet Steel
May 22, 1919	Tohoku Imperial University’s Iron and Steel Research Institute established, and Honda becomes the first director
August 9, 1922	The Iron and Steel Research Institute is reorganized into the Institute for Materials Research, a research institute attached to the university
June 15, 1931	Becomes president of Tohoku Imperial University (until May 30, 1940)
1933	Invents the New KS Magnet Steel
February 14, 1937	Founds Japan Institute of Metals and Materials and becomes its first president
April 28, 1937	Received the first Order of Culture
July 31, 1940	Becomes Tohoku Imperial University professor emeritus
April 1, 1949	Appointed president of Tokyo University of Science
February 12, 1954	Passes away in Tokyo at the age of eighty-four Awarded Grand Cordon of the Order of the Rising Sun Buried at the temple Myogenji in the city of Okazaki
November 22, 1957	Honda Memorial Foundation established



Director	Tomoyuki Kakeshita (Chairperson, Honda Memorial Foundation) Takahiko Sasaki (Director, Institute for Materials Research, Tohoku University)
Adviser	Norio Kobayashi (Board Member, Honda Memorial Foundation; Professor Emeritus, Tohoku University) Takahiko Sasaki (Director, Institute for Materials Research, Tohoku University)
Coordinator	Misa Tomimatsu (Institute for Materials Research, Tohoku University)
Editor/Writer	Osamu Shimizu (ACADEMIC GROOVE MOVEMENT)
Designer	Masami Furuta (opportunity design Inc.)
Illustrator	MIKITAKAKO Illustration
Translators	Dylan Luers Toda Yuko Godart (Institute for Materials Research, Tohoku University)
(All affiliations and positions are current at the time of publication of the English edition.)	

The Honda Memorial Foundation	
The Honda Memorial Foundation was established to honor the academic virtues of the late Kotaro Honda, who gained worldwide fame as the founder of physical metallurgy in Japan.	
Overview of Major Activities	
Honda Memorial Prize (1959-) Awarded to individuals who have made outstanding contributions to the advancement of science and culture through research on science and engineering, particularly metals and related materials.	
Honda Frontier Award (2004-) Awarded to individuals who have made groundbreaking academic or technical discoveries/inventions through research on science and engineering, particularly metals and related materials.	
Honda Memorial Research Encouragement Award (1980-) Awarded to young researchers with a promising future who have produced excellent research results or inventions through research on science and engineering, particularly metals and related materials.	
Harada Research Encouragement Award (2004-) Awarded to young researchers from the Tohoku region who have made outstanding achievements and educational contributions through research/education on metals and related materials.	
Lectures of the Honda Memorial Chapter of the Japan Institute of Metals and Materials (1988-) The Japan Institute of Metals and Materials’ eight chapters hold lectures, and the foundation subsidizes a yearly Honda Memorial Chapter lecture.	
Inquiries	
Honda Memorial Foundation, Institute for Materials Research, Tohoku University 2-1-1 Katahira, Aoba-ku Sendai 980-8577, Japan	
Tel: +81-22-215-2868 E-mail: hondakinenkai0223@gmail.com http://hondakinenkai.or.jp/	
Production Honda Memorial Foundation Institute for Materials Research, Tohoku University	
Publication February 23, 2020 (150th anniversary of Dr. Kotaro Honda’s birth) March 31, 2024 (English edition)	
Sources <i>Honda Kōtarō-den</i> (A Biography of Kotaro Honda), Teijiro Ishikawa. (1964) <i>Honda Kōtarō: Materiaru saiensu no senkusha</i> (Kotaro Honda: Pioneer of Materials Science), ed. by Makoto Hirabayashi, superv. by Honda Memorial Foundation. (2004)	



The Honda Memorial Foundation

<http://hondakinenkai.or.jp/>

Institute for Materials Research, Tohoku University

<http://www.imr.tohoku.ac.jp/en/>