

A Lost Mathematician, Takeo Nakasawa

The Forgotten Father of Matroid Theory

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*Dedicated to Mie Nakasawa, who is a sister-in-law
of Takeo Nakasawa. Fortunately she is still alive,
and Takeo Nakasawa is still alive in her memory.*

Preface

Takeo Nakasawa was a very unfortunate mathematician. He was born in Kochi prefecture of Japan in 1913, and he died of dystrophia at the age of 33 in Khabarovsk in the Soviet Union in 1946. He was forced to live his youth in Japan in an era of a fanatical government, which entered upon the Fifteen Years War (1931–1945) without any clear purpose or any efficient leadership. His discovery of matroid theory, made independently of the work of American mathematician Hassler Whitney, remained unnoticed or forgotten for a long time. As far as I know, it was Joseph P. S. Kung who discovered Nakasawa in his thorough investigation on the history of matroid theory in the 1980s. Nakasawa wrote four papers, the first three of which were concerned with what is now called matroid theory. The remaining paper was concerned with general topology. All four papers were written in German in the 1930s, and they were published in the same university bulletin, namely, the bulletin of the Tokyo University of Arts and Sciences, from which Nakasawa graduated in 1935 and where he stayed as an assistant until August 1938. His four papers were published during 1935–1938. His career as a mathematician ended in 1938 or so. He left Japan for Manchuria to seek a new life in a new frontier. In Manchuria he worked as a bureaucrat and married a Japanese woman in July 1939. He had three children there. At the end of the Second World War, the Soviet Union invaded Manchuria and took away many Japanese soldiers to such harsh places as Siberia, where they were forced to perform hard labor in camps without sufficient food or shelter. Nakasawa was one of these unfortunate Japanese soldiers to suffer such a brutal death in Siberia.

In summer 2006 Akira Saito, a professor of the Department of Computer Science and System Analysis of Nihon University, asked members of the Institute of Mathematics of our university, via Professor Akito Tsuboi of our institute, how to write “Takeo Nakasawa” in Chinese characters. This was the

first time I ever heard the name. By consulting Zentralblatt Math, I could easily identify his four papers, all of which were published in the bulletin of the Tokyo University of Arts and Sciences (which became the Tokyo University of Education after the Second World War). In the 1970s our university, called University of Tsukuba, replaced the Tokyo University of Education. For this historical reason, these three universities have the same association of alumni, and the central library of our university has a special corner for materials related to the above association of alumni. Therefore it was not difficult for me to find that Nakasawa was an assistant of the Tokyo University of Arts and Sciences when his four papers were published, and that Nakasawa had died by 1953. Then a question arose in my mind of when and how Nakasawa died and why at such a relatively young age. Although a complete answer to the question could not be determined, I could easily find how to write Takeo Nakasawa in Chinese characters, and I conveyed the result to Professor Saito.

Hiroyuki Tachikawa, who is presently an emeritus professor of our university and was once a student of Kiiti Morita, came to our university two days a week after his retirement. Kiiti Morita is famous for Morita equivalence and Morita duality. I consulted with Tachikawa about this question, and he was so kind as to get in touch with Tokunosuke Yoshida, who was once a lecturer of Tokyo high school for teachers and had connections with some people surrounding Nakasawa. According to Yoshida, Nakasawa presumably went to Manchuria after he was dismissed from the Tokyo University of Arts and Sciences. Then an idea came to my mind that if he went to Manchuria in the 1930s and had stayed there until the end of the Second World War, it was very probable that he was detained in Siberia or some other places in the Soviet Union by the invading Soviet forces and was forced to labor there. I know well that many Japanese soldiers had the same or similar experiences. Then another idea came to my mind that Nakasawa might have died in the Soviet Union, because I know well that many former Japanese soldiers detained in Siberia or other places in the Soviet Union at the end of the Second World War had died there for unbalanced nutrition or some other diseases. In December 2006 I asked Yasukuni Shrine, where the war dead of modern Japan was apotheosized, about Takeo Nakasawa. Yasukuni Shrine was kind enough to investigate its records, and it got seven hits on the name “Takeo Nakasawa”. Only one of the seven Takeo Nakasawas had the same birthday as the one I was looking for. To confirm my discovery, I asked Yasukuni Shrine where Takeo Nakasawa was born. A spokesperson there replied “Kochi prefecture (of Japan)”, which gave me confidence that I had really found the mathematician I had been seeking.

A fortunate discovery was that Nakasawa’s sister in law was still alive. Her name is Mie Nakasawa. Even if Nakasawa were alive, he would at the time of my investigation have been 94 years old. This meant that it would not be easy to find someone who knew him personally. This is particularly so for a person who died almost unnoticed in the Soviet Union at the age of 33 in 1946.

Thanks to M. Nakasawa, I learned that Nakasawa had married in Manchuria and had three children. Thanks to her generous permission, I was able to look at a copy of Takeo Nakasawa's family register. Although M. Nakasawa was only 7 years old or so when Takeo Nakasawa left for Manchuria, and although she had not met him since then, she was of much help in my preparation of this book. In particular, she had finally found Takeo Nakasawa's photos, which we once believed to have been lost under the utter confusion of the Second World War. I am very happy to be able to include these photos in the book. There are more than ten photos, ranging from his childhood to one in 1944 (two years before his death), in which he stood with his first son and his first daughter.

If Nakasawa's four papers in German were available only in the bulletin of the Tokyo University of Arts and Sciences, they would remain almost unnoticed forever. It is never easy to access the publications of an extinct university, and German is not so popular as it once was in mathematics. This is the reason why I have decided to translate his four German papers into English and to publish them in a book form. The translation was not a simple matter. Since I am not familiar with German, I asked Professor Kuroda, who is an expert in German, to cooperate with me in translation as the coauthor. Professor Kuroda kindly accepted my offer. Frankly speaking, Nakasawa's German was not necessarily sophisticated, and so my English translation is not verbatim. I tried to make Nakasawa's works as accessible as possible to our contemporary mathematicians, not to mathematicians in the 1930s. Nakasawa's notation was considerably antic. By way of example, he wrote $A \leftarrow \rightarrow B$ in place of $A \leftrightarrow B$ (two propositions A and B are equivalent) and $*a_2, \dots a_n$ in place of $\hat{a}_1, a_2, \dots a_n$ (the sequence obtained from the sequence $a_1, a_2, \dots a_n$ by elimination of the first element a_1). In this sense I am not only the translator but the strict referee of his papers. Since Professor Kuroda was not familiar with mathematics, I asked him to translate Nakasawa's four German papers into English without taking notice of mathematical expressions or mathematical jargon at all. Professor Kuroda was so efficient as to give me the English translation of Nakasawa's four papers, one a month for four consecutive months. My work began upon these first English drafts. Strictly speaking, the fourth paper of Nakasawa, which was concerned with general topology, was dealt with principally by Professor Kazuhiro Kawamura of our institute, who is so reserved as to decline to post his name as a coauthor. Nevertheless, I gladly acknowledge that Kawamura's contribution to this book was essential and crucial.

The 1930s, when Nakasawa did his own research on linear dependence and general topology, were an age of storm and stress (*Sturm und Drang*) both in the world and in Japan. In Germany, the Weimar Constitution was replaced by the Nazi party in 1933, which caused a great exodus of European intellectuals into the U.S. In the early days of the 1930s, Japan occupied the whole of Manchuria to establish its puppet state called Manchukuo, while the military became a powerful political power and Japan became more and more

fanatical at home. To understand Nakasawa's life, the reader should understand this situation, in particular, why Japan was led to the Fifteen Years War (1931–1945) internationally at a time when it was a terribly fanatical state domestically. Since European and American readers are not necessarily familiar with Japanese history, I have tried to tell this story in the first four chapters. Those chapters are presented without references, which does not mean that I would like to claim originality there. On the contrary, I have exploited the common knowledge of history, and I have consulted many Japanese books written by true historians. It would be absurd to believe that a mathematician could present original results in history, and I make no such claim. The fifth chapter is devoted to a brief review of the mathematical landscape surrounding Nakasawa in the 1930s. To understand someone in the past, it is necessary to understand him or her historically, i.e., in the historical context where the person at issue was destined to live.

Acknowledgements In preparing this book, I owe much to many people. First of all, I must express my deep thanks to Professor Akira Saito, who let me know that there was a great mathematician called Takeo Nakasawa. Without him, I would never have known even his name. I would like to express my sincere gratitude to Yasukuni Shrine, which has apotheosized Takeo Nakasawa among the war dead for decades. I am thankful to Professor Kikai, a professor in philosophy of our university, who introduced me to Professor Kuroda. I am deeply indebted to Tachikawa and Yoshida, who have turned my attention to Manchuria. I am also indebted to Professor Kawamura, who did most of the preparation of the complete English translation of Nakasawa's fourth paper based on Kuroda's tentative translation into English. I am very glad to acknowledge my indebtedness to M. Nakasawa, without whom it would have been impossible for me to trace the personal trail of Takeo Nakasawa. I am also glad to acknowledge my indebtedness to Hamada, who worked in the bureau of welfare in Kochi Prefecture, sent me Takeo Nakasawa's military record, and introduced me to M. Nakasawa. I owe much to Professor Günter M. Ziegler who, amidst his demanding responsibilities as president of the Mathematical Society of Germany, took the time to help make this conjectured book become a reality by recommending it to Birkhäuser. I owe much also to Thomas Hempfling and Karin Neidhart of Birkhäuser for their endeavors in publishing this book. Last but not least, I am deeply indebted for financial support to the Institute of Mathematics of the University of Tsukuba.

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The Life of Takeo Nakasawa

When I speak of Takeo Nakasawa, I cannot help but recall Sharaku Toshusai of the Edo period. He was an artist who specialized in ukiyo-e (Japanese woodblock prints). His artistic career was exceedingly short, only about ten months during the years 1794 to 1795. It appears to be unknown when he was born or when he died. The only certain fact is that he left approximately 150 ukiyo-e, modeled mainly on Kabuki actors. Among them, “Ebizo Ichikawa” is the masterpiece of masterpieces. It is modeled on the Kabuki actor Danjuro Ichikawa V after this name passed to the sixth in the succession. The name Ebizo Ichikawa is used by the fifth after the succession. Just as a good performance of a talented actor or actress inspires the audience, this ukiyo-e undoubtedly inspired its contemporaries. It is clear that Sharaku Toshusai opened up a new field of ukiyo-e by drawing the physical features of actors with stark exaggeration and by omitting the subject’s softer aspects in order to more vividly describe the human personality. He is documented in *Ukiyo-e Ruiko* [Considerations on Currents of Ukiyo-e], which is a book published for the first time in 1800. Appearance in this book led to high acclaim for him, since of the many artists represented, only 37 were ukiyo-e artists. However, it seems that we will never know anything more about the man, but only about his works: It has been said by some that Sharaku Toshusai is the same person as the Noh-actor Jurobei Saito in Awa, Shikoku, but this is now considered to be doubtful at best.

Mathematician Takeo Nakasawa is reminiscent of artist Sharaku Toshusai in that his time of activity was also extremely short. His life, if not to the extent of Sharaku Toshusai’s, is nevertheless veiled in mystery. His work did not attract attention when he was alive and, after he finished his mathematical work he was swiftly forgotten, receiving high recognition only a long time after he died.

Now let us look at his profile. He was born on 5 February, 1913, in Kochi Prefecture, which lies in the Shikoku island of Japan. In the following year the First World War broke out; in the previous year the Meiji Emperor had passed away, and the renowned army general and war hero Maresuke Nogi and his wife died the death of martyrs. Thus an era of Japanese history had ended.

It can be said that Nakasawa's life started at that time with many vicissitudes. His family genealogy might well confuse the reader. He was born not as Takeo Nakasawa but as Takeo Sogabe and became Takeo Nakasawa only at the age of 11 on 18 March 1924, when he was adopted as a son by Morinao Nakasawa and his wife Shigeki Nakasawa. Takeo Nakasawa's real father was Tomoshiro Sogabe. His real mother Morie Sogabe was an elder sister of Morinao Nakasawa. She was born as Morie Nakasawa, and became Morie Sogabe after her marriage with Tomoshiro Sogabe. Morinao Nakasawa and Shigeki Nakasawa had three children before they adopted Takeo, after all of their three children had died. Morinao Nakasawa and Shigeki Nakasawa had two daughters after they had adopted Takeo, but one of them died of dysentery at the age of 5. Fortunately, the other daughter survives and was kind enough to share with me much information about Takeo Nakasawa.

In 1935 (the tenth year of the Showa period), he graduated from the department of mathematics, Tokyo University of Arts and Sciences, which is the predecessor of Tokyo University of Education to be succeeded by University of Tsukuba in the 1970s. His supervisor was Koshiro Nakamura, born in 1901 and 12 years senior to Nakasawa. In passing, Kiichi Morita, a Japanese mathematician very famous for the concepts of Morita equivalence and Morita duality, was born on February 11, 1915 (the fourth year of the Taisho period) and so was two years junior to Nakasawa. Morita also studied at Tokyo University of Arts and Sciences. Shortly after his graduation, Nakasawa was hired as an assistant at that University where he stayed until being discharged on 22 August, 1938. With the first three of his four papers written in German, all of which were published in the proceedings of the Tokyo University of Arts and Sciences during the period 1935–1938, he shares with Hassler Whitney in the U.S the distinction of co-founder of the theory of matroids.

While we will not explore the details of Nakasawa's mathematical work in this chapter, it should be noted in particular that those papers were published when he was in his early 20s. He was undoubtedly an early maturing genius: He wrote superb papers in his twenties. It is likely that when asked for their papers written in their twenties, many mathematicians, even those who are called experts in their fields, will break out into a cold sweat. At the age of 45, Teiji Takagi, very famous in number theory, published his epoch-making paper on class field theory, which made his name everlasting. At the age of 43, Kiichi Morita, an algebraist as well as a topologist, released what is now called Morita theory. In the mid-1960s, Minoru Tomita, very famous in the theory of operator algebras, wrote a paper on the prototype of the theory

to be called later the Tomita-Takesaki theory. As he was born in 1924, this paper was written when he was over the age of 40. In fact, this paper was not published, because it was beyond the referee's understanding.

Finally we note that it was not easy in the 1930s and 1940s for Japanese mathematicians to have their ideas acknowledged by European or American mathematical circles. I will give a well-known example. The Japanese mathematician Kiyoshi Ito arrived at the idea of stochastic differential equations in 1942, when he wrote a paper in Japanese and published it in a Japanese journal. The theory of stochastic differential equations was undoubtedly so important as to have yielded Black-Scholes equations in financial engineering in the 1970s as a by-product. Nevertheless, Ito published his idea on stochastic differential equations in English in 1951. Imagine what would have happened if Ito had died in the 1940s.

Let us return to the profile of Nakasawa. He seems to have gone to Manchuria to look for a new start after he was discharged from his job on August 22, 1938. I have no clear idea of what he did in the following period. In July 2006, however, I found out that he is listed as deceased on the 1953 membership list of Meikei-kai, the alumni association of Tokyo University of Arts and Science, Tokyo University of Education, and the University of Tsukuba. In December 2006, by chance, it occurred to me that I might ask the Yasukuni Shrine, a national shrine for the spirits of the war dead of modern Japan, if he is enshrined there. I found seven Takeo Nakasawa's on the list, but after restricting them by birthdays, found the unique one. There is little doubt that he is really the Takeo Nakasawa who I have been looking for, since not only the birthday but the registered prefecture coincided with those of the desired one. On June 20, 1946 (Showa 21), the announcement of his death was sent to the Yasukuni Shrine by the Ministry of Health and Welfare. According to this report, he died of disease during the war at a hospital in Khabarovsk in Russia. Based on this fact, we can conjecture his probable story as being a familiar one for Japanese soldiers who met the end of the war in Manchuria: Maybe he was conscripted there and then seized as a captive by the USSR Forces which advanced southward at a furious pace just before the end of the war. Presumably he was subjected to slave labor in various places in Siberia, without sufficient food and shelter. At last his body screamed out in agony and he was brought to the hospital in Khabarovsk, but it was too late. He died at age 33. Here I will tentatively finish my personal odyssey on the trail of Takeo Nakasawa. It started at the resource center of the University of Tsukuba Library and ended at the Yasukuni Shrine, leaving me in a deep depression, not knowing what forces of nature or man to blame for Nakasawa's tragedy.

To further support the probability of this conjectured story, you should know that Manchuria when Takeo Nakasawa went there was not just the name of a region but a formally independent state called Manchukuo. In March 1932, Manchukuo was established with the last Emperor of the Qing Dynasty (one of the former names of China) as its head. The emperor at

that time in China, by the name of Puyi, reigned as sovereign of Manchukuo. However, the new state was actually built as a puppet state, indeed a colony, of Imperial Japan. This colonization was effected by the Japanese Forces on its own volition without any negotiation with the Japanese government. At that time, the Japanese army seemed to have been terribly afraid of the tremendous progress of the First Five-Year Plan of the USSR and to have wanted to secure the occupation of Manchuria and Nei Mongol (Inner Mongolia) because of the anti-Japanese movement in China by Zhang Xueliang and his advocates.

The Manchurian incident, which prefaced the foundation of Manchukuo, started in September 1931, which was also the beginning of Japan's notorious 15-years war. The motion picture "The Last Emperor" starred Ryuichi Sakamoto, who played the role of Masahiko Amakasu, the emperor in the dark in Manchuria in contrast to Puyi as the emperor in daytime in Manchuria, and its soundtracks were also produced by him. The movie clarifies the story of Manchukuo, though it was dramatized with the usual exaggeration and transmutations of Hollywood productions. The Japanese government sent many Japanese citizens to Manchukuo as teams of immigrants. Because Japan at that time was economically destitute as a result of the world-wide depression, this immigration was intended partly to reduce the population inside Japan, but it was also partly intended to secure Manchukuo as a food supply station for Japan. In 1936, Kooki Hirota's cabinet put forward a plan to immigrate 5 million Japanese to Manchuria in 20 years from 1936 to 1956 by announcing the, so-called, Promoting Program for Reclaiming of Manchuria and Nei Mongolia Immigration. What a grandiose program it was! In fact, following this program, 200,000 people were sent to Manchuria or Nei Mongolia as farmers. There is no doubt that Takeo Nakasawa went willingly to Manchuria against such a background. The young Japanese as farmers in Manchukuo were called "warriors of sickles", an alias that provides unmistakable evidence of this exodus being a national policy. This immigration had actually been stopped as a formal program when Japan entered a period during which it lost command of the air and the sea on the Huang Hai (Yellow Sea) and the Sea of Japan, and Manchukuo had been brought to inevitable collapse. However, this possibility must not have crossed the mind of young Nakasawa, who apparently had been to Manchukuo in the late 1930s, in his mid 20s: Not a few people, as Nakasawa must have, dreamed of Manchukuo as a new frontier at that time.

Manchukuo consisted of the three eastern provinces Liaoning, Jilin, and Heilongjiang, in addition to Rehe and Nei Mongolia. It had five ethnic groups: the Hans, Manchus, Mongolians, Koreans, and Japanese. Its slogan was "Five ethnics in harmony." This phrase would certainly have won the grand prize in a "buzzword contest" if it had been presented in contemporary Japan. This slogan, as well as the name *Oodoo raku do* [the righteous realm of peace and prosperity; Arcadia], was invented by a dentist named Kaisaku Ozawa. Many readers have not heard this name, but the fact that he is the father of

the world-famous conductor Seiji Ozawa will certainly ring a bell. The name *Seiji* is written as 征爾 in Kanji characters, and these characters were taken after Seishiro Itagaki and Kanji Ishiwara, who were the actual executors of the Manchurian Incident. If the origin is traced in this way, it should be no surprise that I felt something making waves in my mind when I first saw the name.

Let us get back to the point. As I mentioned previously, the five ethnic groups had lived in Manchukuo. It is said that quite a few Russians (about sixty thousand) lived there, especially in Harbin or along the Chinese Eastern Railway. Taking this fact into consideration, Kaisaku Ozawa should have said “Six Ethnic in Harmony”. Since Japan won the First Sino-Japanese War in the end of the nineteenth century, Manchuria had been the place where Japan and Russia (at that time, the Romanov Dynasty) had fought over the territory and influence on it. After the Tripartite Intervention (France, Germany and Russia), the Qing granted the right of construction to Russia, and the Chinese Eastern Railway was fully opened to traffic in 1901. Due to this circumstance, many Russians originally lived along the railway, and more Russians came there as refugees because of the Russian Revolution in March 1917. Although the slogan “Five ethnic in harmony” was nothing but a slogan, it is indeed undeniable that Manchukuo was the crossroads where different cultures met.

It is generally said that Japanese people who were born in Manchukuo and grew up there got plenty of culture shock when they came back to the homeland after the end of the war. Li Xianglan (Yoshiko Yamaguchi, under her real name) is symbolic of the multicultural characteristic of Manchukuo. She was a native Japanese who had a good command of both Japanese and Chinese. She came to public notice as a Chinese actress from the Manchurian Motion Picture Association in 1938, her Japanese origin being veiled in secrecy. She was intended as a symbol of sham harmony between Japan and China. In the progress of the Fifteen Years’ War, both the mainland of Japan and the Manchukuo partook of the dreadful experiences of wartime. It was, however, a quintessential “blue rose” to place Manchukuo under the control of mainland Japan. It was surprising to see at that time pictures of a woman in Manchukuo modeling a refined set of bathing suits. It seems to me that people in the mainland of Japan at that time would not even have imagined such pictures. I have no doubt that Harbin in Manchukuo was an international city at that time.

What we are interested in, however, is what Takeo Nakasawa did in the Manchukuo described above. After he gave up the world of mathematics (for reasons we do not know), he passed the examination for elite bureaucrats. There is evidence that he first worked at the State Council in Hsinking (or Xinjing), the capital of Manchukuo. In passing we note that Nobusuke Kishi, who is the maternal grandfather of the former Prime Minister Shinzo Abe, was on the State Council at that time. Nakasawa married a lady from Kyushu in 1939 (Showa 14). According to the 1940 membership list of Meikei-kai,

his working place was the Department of General Affairs, the Heiho Public Institution of Secretariats. I must admit to not understanding his personal address: the list says “Koa Juku, Kokuga Town, Kokuga [the private school for Asia development, Heiho Town, Heiho].” Nowadays, Koa Juku reminds me of the groups of people who drive trucks on Sundays with martial songs at full blast and yell out irrational slogans from the extreme right. I do not understand why such a word appears on his personal address. It would be much appreciated if someone could enlighten me on this matter.

To return to our historical discourse, since the Battle of Midway in June 1942, the tactical situation for the Japanese Forces was deteriorating day by day, and it was far beyond consideration for the Japanese government to manage immigration to Manchuria. From around the latter half of the year 1943, the Kanto Army had to commit a major part of its military forces, and a significant number of weapons, to the Southern battle line. Moreover, in April 1945, the USSR notified Japan that it would not renew the Soviet-Japanese Neutrality Pact, which would expire after a year. This was based on the so-called Yalta Agreement, which was sealed among the US, the Great Britain and the USSR in February 1945, in the Crimean Peninsula. After receiving this notification, the Kanto Army decided to give up three-quarters of Manchukuo and to wage a war of attrition for the remaining part if and when the USSR invaded it. However, these facts were not revealed to Japanese settlers in Manchukuo and even today a significant number of people might believe that the USSR suddenly assailed Manchukuo by unilaterally abrogating the Soviet-Japanese Neutrality Pact; but this is a vulgar view of the matter.

The fact is that the Japanese government at that time disowned the Japanese settlers in Manchukuo. The origin of the detention of Japanese soldiers in Siberian labor camps and the problem of the war-displaced children, which has not completely been solved, lies here. After the USSR notified Japan that they would not renew the pact, there were a few months up to their actual invasion of Manchukuo, and it seems that the Japanese government or the imperial army had enough time to relocate the people there to safe areas. However, it was almost impossible at that time to expect the Supreme Council of War-Leadership in Japan to do such a thing, because the possibility of defeat in the war loomed large, and the council was too occupied mentally and physically to think of anything beyond daily routines.

On the other hand, in Europe, the USSR Forces had surrounded Berlin, and took control of it in April 1945, the date when the USSR notified Japan of non-renewal of the pact. Desperate at the certainty of the fall of Berlin, Hitler killed himself. In May 1945, Germany finally surrendered unconditionally, as Italy had already done in September 1943. Because of these developments, the USSR had no more reason to bottle up its huge army in the European battle line, so transferred it to the Far East of the Eurasian continent in a surreptitious fashion. After the transfer was complete, the USSR attacked Manchukuo. An old saying is that a lion makes an all-out effort to

catch only one rabbit, and this apparently was true of the USSR attack against Manchukuo. The USSR greatly over-prepared for the attack, since the power of the USSR Forces which were already in the Far East was surely enough to destroy the terribly weakened Manchukuo. Perhaps the bitter experience of the Russo-Japanese War some decades ago haunted the thoughts and dreams of the generals of the USSR Forces.

Takeo Nakasawa was drafted into the army on May 7, 1945 as a second-class soldier, a rank that implies he was a first-time draftee. This was, generally speaking, the rank at which a novice in the army started his military career. The Kanto Army had succeeded in gathering a military unit of 780,000 soldiers. This military unit was quite large in number in, but the reality of its strength was not so reassuring: The Kanto Army inducted any and all men who could be of any possible use to make up for the shortage of soldiers. In the words of one of the cadre of the Kanto Army, "even a dead man is better than nothing." However, no air unit or tank regiment existed, and not all soldiers had even a basic rifle. On the other side, the USSR Forces had more than 5,000 aircraft, more than 5,000 tanks and about 1,750,000 soldiers. According to military experts, this was equivalent to 20 times the size of the Kanto Army.

When this huge Army of the Soviet furiously came from all three directions in the north of Manchukuo at the signal of the time tone of 0 o'clock of August 9, 1945, the abandoned Japanese settlers could do nothing but shriek in agony. Prior to the invasion of the USSR Forces, a rumor was spread in Manchukuo that vicious criminals had been released from USSR prisons and were providing the first line of invasion. When the USSR Forces actually came, the rumor appeared true to the people in Manchukuo and they were terrified. Pillages, assaults, rapes . . . all the horrors of war were heaped upon them. It is said that only 100,000 people escaped to the mainland of Japan safely among an estimated 300,000 settlers in Manchukuo. The 600,000 abandoned soldiers were detained in Siberia, forced to work in severe conditions without enough food, and ten percent of them, 60,000, lost their lives. The detention of soldiers started at the end of the summer or at the beginning of the autumn, and the winter in Siberia of minus 40 degrees Celsius divided those who had enough physical strength from those who did not. Many people who lost their lives in Siberia died in the first winter or not long after.

Takeo Nakasawa probably fell mortally ill and died before the next winter came. According to the notification from the Ministry of Health and Welfare, he died of malnutrition. From the formal viewpoint of the USSR at that time, malnutrition was not a disease, and it did not prevent him from being forced to labor. He had three children but they died of disease during the forced march returning to the mainland of Japan from Manchuria. Only his beloved wife survived to come home but a little while later, for reasons unknown, she lost contact with Nakasawa's family.

There is a museum called *Mugon Kan* (Museum of Silent Artists) in Ueda city, Nagano prefecture. You can go there by car in 30 minutes from Ueda-Sugadaira Interchange on the Joshinetsu expressway. With a backdrop of Mt. Asama, its building reminds us of monasteries in medieval Europe. It shows more than 300 works. When I came into the building, I felt the strange sense of tension which overwhelmingly filled the museum. The works presented in this museum were drawn by young art students who died in the Asia-Pacific War. Some drew their own portraits, and others drew their wives or girl friends. Some drew their families, and others drew landscapes. One of these pictures is reminiscent of boys and girls in the contemporary style of that time, who were called modern boys and modern girls. The artist of this picture had changed his paintbrush into a rifle and set it in a wartime background. How ironic this was! These young artists did not have enough time to make their talent in art effloresce, because they were born in an outrageous and irrational time. There are some unfinished drawings. A story is told of one young art student who was drawing the naked body of his girl friend. He promised her to finish it when he came back alive from the battlefield. Even the background of the picture was not finished. The girl friend wept inconsolably and the artist was unable to utter even a single further word. They spent their last moments together in silence, feeling the intensity of each other's grief. Against a background of numerous Japanese rising sun flags the soldiers were waved off to the battlefield. The young artist died at age 27 at Luzon in the Philippines. The picture remained unfinished.

When I contemplate the life of Takeo Nakasawa, I recall the Old Testament of Job. Unlike his demeanor in the New Testament, the God of the Old Testament is fierce, and commits genocide when he is angry. The cities of Sodom and Gomorrah in Genesis were destroyed completely for incurring the displeasure of God. Especially in Job, God assigns ordeals to righteous Job one after another. Those who have faith in sublunary principles or in the law of Karma will not understand this. Milton, the seventeenth century British poet, stated that he did not want to believe in a god like this. Sima Qian, the author of the Records of the Grand Historian in ancient China, wondered whether there was any divine justice in the world. Here, it is the justice of God that is in question: Does God really have righteousness? Reading the Old Testament of Job faithfully, we will arrive at the predetermination of Calvin, but the road to this can be very hard. There are a lot of religionists in the world, but few reach the level of Calvin. Some religionists of newly-risen religions tend to teach sublunary principles by attributing a kind of mysterious power to that religion, and they themselves tend to make full use of the benefits to be derived. On the one hand, in the Old Testament, Job gave up asking questions of God, and happily left his fate to God's decisions. On the other hand, Takeo Nakasawa apparently died in the middle of trials by God. As he did not die on the battlefield but in a hospital, he might presumably have had some time to reflect upon and evaluate his life. Had he survived, I and the world might

have learned something of his thoughts. That is impossible. We must be content with knowing that he was promoted to first-class soldier on October 10, 1945, two months after the end of the war. When he died on June 20, 1946, he was elevated to the superior class and into the top rank of soldiers. In the normal case, a promotion like this would not have been admitted, but clearly Nakasawa was recognized by some people as exceptional.

I would like to finish this chapter by mentioning that Nakasawa was included in the Iwanami Dictionary of Mathematics, fourth edition published in March 2007. His work had not been mentioned at all up to the third edition. We finish this chapter by reporting this fact to the spirit of Nakasawa that is left to us even after he has gone.



Figure 1: *Top left:* 13 July 1922 – From the right: Takeo Nakasawa’s real brother (15 years old), his real sister (18 years old), and Takeo Nakasawa (9 years old) *Top right:* 25 January 1928 – Takeo Nakasawa was 14 years old. *Bottom left:* March 1929 – Takeo Nakasawa was 16 years old. *Bottom right:* Date: unknown – Takeo Nakasawa’s real sister. She got married and had one son and three daughters.



Figure 2: *Top left*: 6 July 1930 – Takeo Nakasawa was 17 years old. *Top right*: 26 June 1932 – Takeo Nakasawa was 19 years old. He entered the University of Arts and Sciences this year. *Bottom left*: 17 October 1932 *Bottom right*: 5 February 1936 – Takeo Nakasawa was an assistant of the University of Arts and Sciences. The photo was taken as the memory of his birthday.



Figure 3: *Top*: Date: unknown – The photo was received by Takeo Nakasawa's real sister in Japan on 4 August 1941. Takeo Nakasawa was with his wife and his first daughter in Manchuria. *Bottom*: 5 May 1936 – Takeo Nakasawa was in Nihonbashi with his real sister.



Figure 4: *Top*: 29 March 1942 – Takeo Nakasawa with his wife, his first daughter (a year and 8 months old) and his first son (4 months old) in Manchuria. *Bottom*: 8 January 1944 – Takeo Nakasawa’s last photo.



Figure 5: *Top*: 25 June 1939 – Takeo Nakasawa’s marriage. Since it was held in Dalian, Nakasawa’s parents and other relatives could not attend the ceremony. *Bottom*: 25 June 1939 – At the marriage.