

Heavenly Soldiers and Industrial Warriors: Paratroopers and Japan's Wartime Silk Industry

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Abstract: This essay explores new aspects of wartime Japan's industrial mobilization by analyzing how the country's struggling silk industry persistently exploited the emerging myth of Japan's paratroopers. With the outbreak of the Pacific War, Japan's silk manufacturers suffered from a ban on luxury goods and the collapse of the U.S. export market. After several spectacular Japanese airborne operations, the Dainippon Silk Foundation successfully campaigned for the large-scale production of parachutes. Silk now was a material for military consumption, and silk weaving companies became designated munitions factories that publicly compared the self-sacrifice of their young female workers with that of the death-defying paratroopers.

Keywords: Airborne Operations, Propaganda, Silk Manufacturers, Wartime Mobilization of Young Women.

A few months before the Pearl Harbor attack, the Japanese military added a novel type of airborne infantry to its war machine. Japan's new paratroop units, set up secretly and quickly sent into action, were to have a long-lasting impact on the country's home front and industry. To examine this remarkable phenomenon, I first explore the establishment

and deployment of Japan's paratroopers. Going beyond a mere account of military operations I then investigate the interactions among Japan's military men, media producers, and business leaders. I will show how these actors used the paratroopers' early exploits as powerful propaganda material and instrumentalized them to help keep Japan's silk industry in business.

The ups and downs of Japan's silk manufacturing during WWII have received scant attention.¹ The majority of previous studies on Japan's silk production have focused on its remarkable rise during the Meiji period (1868–1912), when Japan became the world's leading silk producer.² As the country's greatest earner of foreign capital, silk financed the lion's share of the Meiji state's ambitious armament program and thus played a crucial role in Japan's victory in the wars against China (1895) and Russia (1905).³ I offer a fresh view of the silk-warfare connection by reversing the line of inquiry to ask: what was the impact of the Pacific War on Japan's silk industry?

Connecting the history of Japan's military expansion with that of the country's economic mobilization, my investigation also adds new insights to earlier scholarship on the wartime state's botched efforts at "administrative guidance."⁴ Powerful business interests skillfully played the system of the New Economic Order to commence a mass production of parachutes that far exceeded actual military demand, resulting in a considerable waste of precious resources and manpower. Thus, I propose that Japan's silk industry is both a striking and instructive

example of Japan's inefficient wartime economic control.

The silk industry also deftly promoted its importance for the war effort by having its young factory workers join paratroopers as protagonists of Japan's wartime propaganda. Building on previous studies on Japan's "thought war" and on workers in the munitions industry, I will lay out how the "heavenly soldiers" of the airborne infantry and the "industrial warriors" of the silk factories became integral parts of the propaganda machine.⁵

A New Type of Combat

During the interwar period, all major powers experimented with a wide range of new technologies and doctrines that were to change the battlespace of the future.⁶ Using parachutes for airdropping soldiers over enemy territory was a promising way to deploy infantry units behind the frontline. These groups of highly mobile soldiers could carry out ground operations practically anywhere. They could also count on the element of surprise. The buildup of paratroops turned into a transnational endeavor. In 1935 the Soviet Union carried out a maneuver with a mass deployment of 6,000 paratroopers. One year later the commander of the Luftwaffe, Hermann Göring, established Germany's first paratroop battalion. In 1940 the U.S. Navy and Army established their first parachute units.

With the outbreak of WWII in Europe, Japanese efforts to set up an airborne infantry intensified. The successful deployment of German paratroopers during the May 1940 invasion of the Netherlands impressed Japanese observers and provided a strong incentive for the Japanese to rapidly build up their own parachute units. Japanese planners

also learned that the element of surprise was *the* decisive advantage of an airborne attack. Therefore, they agreed that the country's new paratroopers had to be trained in utmost secrecy. However, the Japanese Army and Navy kept to their long-standing tradition of interservice rivalry by deciding not to join forces but to proceed independently.

The army's new "Air Raiding Corps"

In fall 1940 Lieutenant Colonel Kawashima Keigo of the Hamamatsu Bomber Flight School received the order to train 70 officers as the Japanese Army's first parachute troopers. Yet, all that Kawashima could refer to were a book about the training of Soviet paratroopers and several photographs taken by an *Asahi Shinbun* correspondent that showed the training of U.S. paratroopers.⁷ The instruction of the future paratroopers began in an empty airship hangar. Their daily practice included gymnastic exercises that, according to one source, earned the group the nickname "Kawashima Circus."⁸ The training also included frequent visits to the Yomiuri amusement park in Tamagawa, Tokyo. The group joined civilian thrill seekers at the park's 70-meters-high parachute tower to familiarize themselves with "high-altitude" drops (see figure 1). To conform with the classified nature of their unit, all men had to exchange their military uniforms with that of university students and even received the order not to use any military language or vocabulary.⁹ Then, on February 20, 1941, the first five soldiers made successful jumps out of a flying aircraft.



Figure 1: The jump tower at Yomiuri's amusement park in Tamagawa, Tokyo. (Courtesy of Japan Aeronautic Association)

After this initial success, pressure on Lieutenant Colonel Kawashima to build up a sufficiently large paratrooper unit increased, especially after news about the mass deployment of 10,000 German paratroopers during the invasion of Crete arrived in Japan in May 1941.¹⁰ In the same month the army moved its parachute training division from Hamamatsu all the way to Baicheng in central Manchuria. The army officials expected that large-scale training could be carried out more secretly there than in Japan. Yet, in August 1941 the parachute training division moved back to Japan, and by the end of the year the army's first *Kūchū Teishinbutai* (Airborne Corps) was ready for combat.¹¹ It consisted of two regiments with 760 men each and one flying brigade of 50 transport aircraft.¹²

The word *teishin* as part of the newly established unit's name has an important symbolic connotation. It can be translated into "dashing ahead of the others" and suggests an aggressive and elitist esprit de corps that was to become a defining feature of Japan's paratroopers. Such elitism was further fueled by the army's doctrine not to copy the German strategy of massive paratrooper deployment, but to train only a limited number of crack soldiers for surprise attacks. Another distinct sign of the paratroopers' special status was their uniform badge that featured the golden kite (*kinshi*). This fabled bird is associated with the legendary origins of the nation. According to the eighth-century chronicle *Nihon Shoki*, the golden kite helped Japan's first emperor, Jimmu, defeat his enemies by blinding them with the dazzling light of its feathers.

The navy's new "Special Naval Landing Forces"

In November 1940, the Japanese Navy established its own paratroop research team of 26 officers under the leadership of Lieutenant Yamabe Masao. One month later high-ranking members of the Navy Ministry and the Navy Aviation Headquarters discussed how to equip and deploy the new airborne infantry. As a result, the navy's paratroopers were to use only light firearms in order to keep them highly mobile after landing. Furthermore, they were organized as small self-contained units that could carry out swift surprise attacks independently.¹³ Naval planners also began to set up several scenarios that included the capture of the Tarakan Island oil field (off the northeastern coast of Borneo) and an attack on Guam. In August 1941, the Naval General Staff ordered two parachute units with 750 parachutists each to be set up by the end of October. Even though Yamabe considered this a "totally unreasonable demand," by mid-

November each unit member had completed the required two or three training jumps.¹⁴ Now the Navy had two parachute units ready for deployment: the 1st and 3rd Yokosuka Tokubetsu Rikusentai (Special Naval Landing Forces).

Early successes

During the initial phase of the Pacific War, Japanese paratroopers staged two spectacular missions in the southwestern part of the Malay Archipelago. Their successful takeover of key installations secured Japanese air superiority and vital resources for further expansion. The first combat jump of navy paratroopers was part of the Japanese effort to occupy Celebes in preparation for an assault on Australia.¹⁵ The paratroopers were to capture the strategically important Langoan airfield close to the city of Manado (see figure 2). The takeover was to ensure that no enemy aircraft could attack Japan's advancing naval infantry. On January 11, 1942, 28 converted Mitsubishi G3M bombers dropped 334 soldiers of the 1st Yokosuka Special Naval Landing Forces over the airfield. To minimize their exposure to enemy fire and to avoid a dispersal over a wide area, the paratroopers jumped from an altitude of only 150 meters, which left them less than 30 seconds in the air before touchdown. Within five hours the troopers occupied the airfield. The next day, after a second drop, 74 additional paratroopers joined the first group to attack and occupy the town of Manado.



Figure 2: Airborne operations of the Japanese Navy (blue) and Army (red). (Map by author.)

The army's first large-scale deployment of paratroopers aimed directly at the rich oil resources of the Dutch East Indies.¹⁶ In September 1940 Japanese envoys commenced talks about oil imports with Dutch East Indies officials, who, even after the defeat of the Netherlands by Nazi Germany, still controlled the region.¹⁷ In January 1941 these negotiations failed. The situation escalated with the start of the U.S. oil embargo in August 1941 that left Japan with only a two-year oil stockpile.

Already in summer 1940 Japanese Army officials began to prepare a forcible takeover of Palembang oil fields in South Sumatra (see figure 2), whose output alone exceeded Japan's total oil consumption at that time.¹⁸ In addition, a nearby refinery was a high-value target as it produced much-needed high-octane aviation gasoline. A quick surprise attack would give the Dutch no time to destroy their industrial installations in order not to let them fall into the hands of the Japanese. First lieutenant Ōshiro Takashi, together with about 50 soldiers, meticulously prepared for the capture of the oil refinery. They familiarized themselves

with the devices of Nippon Oil Corporation's Tsurumi oil refinery near Yokohama, where they learned how to operate valves and shutoff devices and how to fight a fire once it had broken out in such a highly explosive environment.¹⁹

The army decided to drop two raiding groups that were to hold the Palembang airfield and two refineries until ground troops could arrive. On February 14, 1942, a fleet of 67 aircraft flew into the area and airdropped the paratroopers together with equipment and weapons stored in special containers. By the end of the day, the 240 soldiers of the first attack group had taken the airfield. The second group of 89 men occupied and secured the Shell Oil BPM refinery. Even though a time-delayed bomb destroyed parts of the facility, the refinery was operational again by early April 1942.²⁰ The Palembang takeover was of great strategic importance. In 1943, the combined crude oil output in the Japanese-occupied southern region reached nearly 50 million barrels. Of those, 14.5 million barrels were shipped to Japan, covering 44 per cent of the country's total oil consumption.²¹ Historians have noted that without this unexpectedly plentiful supply of oil, the Japanese could not have maintained their offensive expansion which highlights the significance of the paratroopers' exploit.²²

Paratroopers in Japan's Wartime Propaganda

Within days after their initial deployments, Japan's paratroopers saw their role change radically. Secret shadow warriors turned into media stars that were thrust into the limelight. To better understand this process, it helps to consider that close control of the mass media was a defining feature of Japan's wartime propaganda efforts. The *Naikaku Jōhō Kyoku*

(Cabinet Information Bureau), established in December 1940, supervised and censored the country's press, radio, and movie industry.²³ Interestingly, the bureau's tight control led to an unprecedented interaction of all types of media. Newsreels, magazines, and movies—together with singers, painters, and book illustrators—eagerly absorbed, digested, and publicized encouraging reports of the successes in the Dutch East Indies. Such news met with a receptive public, which was desperate for a boost to morale, especially when Japanese troops on the Chinese mainland seemed to be stuck in a quagmire.

Soon Japanese moviegoers could immerse themselves in the action over the South Pacific. In early February 1942, the newsreel Nippon News featured a report under the title "Celebes surprise tactics – our paratroopers' splendid baptism of fire."²⁴ The producers skillfully strove for maximum impact, combining striking pictures with dramatic music and an exuberant voice-over. Spectators were kept on the edges of their seats, watching paratroopers descending on the combat zone to the powerful sound of Wagner's "Ride of the Valkyries."²⁵ The narrator's enthusiastic voice and colorful language added to the drama. Emphasizing that the paratroopers' "immortal military achievements will go down in military history," he reported how the Japanese transport aircraft with their "magnificent silver wings" carry the "warriors of the sky" (*sora no senshi*) all the way to the enemy's bases in Celebes. The moment they approached the drop area, their "pure white parachutes" (*junpaku no rakkasan*) opened like big flowers in the cerulean sky, and, one after another, the paratroopers descended from heaven. The audience then could follow the brave warriors landing, picking up their weapons, and mopping up the nearby enemy.

The media machinery rapidly gathered momentum when Japan's leading wartime magazine entered the fray. The Cabinet

Information Bureau's own journal, *Shashin Shūhō* (Weekly Photographic Report), celebrated the "first paratroop units of the Imperial Army and Navy" on February 25, 1942, just ten days after the successful Palembang takeover. The journal featured an article about the victories at Celebes and Sumatra that was illustrated with dramatic pictures of the deployment of Japan's airborne soldiers. Echoing the words of the newsreel commentator, one caption praised the "pure white parachutes" popping up in the sky "like large-flowered white chrysanthemums." A follow-up article guided readers step-by-step through the paratroopers' rigorous training: from initial ground exercises up to the first actual jump out of an aircraft. The author emphasized the spiritual and aesthetic qualities of the parachute to which the young recruits entrusted their lives and whose immense relief of seeing a fully opened parachute above them was mixed with an "intense sense of its beauty."

The strategic significance of the paratroopers' early exploits was also brought home to the Japanese public. A newsreel on the Palembang takeover informed audiences that American and British companies had made an enormous investment in the nearby oil field resulting in a yield of 2.8 million tons of oil every year.²⁶ Japanese soldiers were shown patrolling in front of a smoking industrial complex, and the commentator explains the importance of the surprise attack: the Japanese paratroopers had successfully thwarted the enemy's scorched-earth tactics and secured the most important facilities of the oil refinery. These great military gains would boost the construction of a new East Asia while the problems of the United States and Britain were mounting. The newsreel scene then changed to the Timor operation that the Navy Paratroops launched in late February 1942. Japanese bombers were shown in formation flight, showering their huge bombs on the enemy's military facilities. Then countless little white dots could be seen from

high above. From a bird's eye view the audience experienced the strong visual, if not symbolic, contrast between the pure white of the attackers descending from the sky and the black fumes associated with those attacked on the ground. The background voice explained that in view of the black smoke of the burning city, the attack forces opened their parachutes "like large white flowers in the sky." Even though the airborne assault turned out to be ineffective, the report concluded that, with their successful surprise attack, the navy paratroopers had won another impressive victory over the American, British, and Dutch enemies.

The first war song in praise of the paratroopers appeared in April 1942, when the Japanese record company Victor launched its "Divine Soldiers of the Sky" (*sora no shinpei*).²⁷ Accompanied by a military band, the song text took the colorful imagery to a new level. It contrasts the "bluer than indigo" sky with the parachutes' pattern of "one hundred thousand pure white roses" that opened in almost no time. The song went on to praise the men of the surprise attack corps who descended from the sky and sacrificed their red blood without regret while relentlessly attacking the enemy. The song's title was carefully chosen. The origins of the expression *shinpei* reach back at least to the Heian period.²⁸ Remarkably, it can translate as not only "soldiers dispatched by the gods" but also "soldiers with divine protection" or even "divine troops."

Soon the armed forces composed their own versions. The "Song of the Army's Paratroopers" (*rikugun rakkasanbutai no uta*) added the stock image of cherry blossoms: "our descent will be like that of the immaculately white blossoms that fall from countless cherry branches and are filled with the wind." The "Song of the Navy's Paratroopers" (*kaigun rakkasanbutai no uta*) chose the image of white peonies scattered in the bright blue sky. To be sure, aside from indulging in such flowery

aesthetics, the songs also celebrated the martial prowess of the airborne troops: “While we entrust our body to the parachute, we look out for the enemy’s position below. We surprise him like a strong gale and smash his defense in an instant.”²⁹

Within a few months Japan’s movie industry took up the paratroopers’ cause as well. In September 1942, the film company Nipponeigasha released its *Sora no Shinpei*, a 55-minute documentary on the training of the army’s paratroopers. The movie was supported and supervised by the Army Aviation Headquarters and clearly belongs to the genre of *kokusaku* (national policy) films that fully complied with the government’s wartime ideology.³⁰ The film followed a group of young soldiers through all stages of their training, starting from initial gymnastics, parachute packing, leaps from a mock-up aircraft and a jump tower up to their first deployment out of a flying aircraft. The movie and its eponymous theme song became widely popular. It was even screened in the occupied territories with the local audience reportedly waving their hands and stamping their feet to greet “the saviors” descending from the sky.³¹

The feats of Japan’s airborne infantry also inspired Japanese painters, who rendered the now already well-established imagery on large-scale canvas. Tsuruta Gorō (1890–1969) submitted his *Heavenly Soldiers Descending on Palembang* (see figure 3) to the First Greater East Asia War Art Exhibition, which was held at the Tokyo Metropolitan Art Museum from December 3 to December 27, 1942.³² The monumental oil painting covered five square meters and showed in the foreground three paratroopers who have just landed and shed their parachutes. They are fighting an imaginary enemy on the left with pistols and hand grenades. The larger upper part of the picture is dedicated to a huge number of airborne troops still descending, with their white parachutes against the backdrop of a

blue sky with scattered clouds. The battle scene draws much of its dynamic tension from the contrast between the apparently slow vertical movement of the parachutists who are still in the air and the forceful horizontal thrust of those already fighting on the ground.



Figure 3: Photographs like this might have inspired Tsuruta Gorō when he painted his *Divine Soldiers Descending on Palembang* in 1942. (Courtesy of Japan Aeronautic Association). Click [here](#) to see how the artist added color and action.

Even more dramatic images appeared in several illustrated children’s books. The picture book *Sora no chūtai* (The squadron of the sky) was published in 1943 (see figure 4). In its preface an army official openly declared that the book’s purpose was to “whip up aviation ideology among [Japan’s] young citizens.”³³ One chapter was devoted to the pursuits of a group of paratroopers who are dropped deep inside the enemy’s territory to take over an airfield. Colorful illustrations showed the brave warriors jumping head-first out of their transport aircraft, which are defying intense fire from anti-aircraft guns. Then their parachutes opened, and the blue sky was filled with “big

white flowers.” After touchdown, the “brave warriors” picked up their airdropped machine guns and flamethrowers and, supported by fighter aircraft and dive bombers, started their assault. Soon the enemy soldiers surrendered, and the paratroopers waved their Rising Sun flags with cheers of “banzai.”



Figure 4: These two pages from *Sora no chūtai* show the Japanese airborne troops plunging into battle while their transport aircraft defy the enemy's artillery.

Another 1943 book, *Shōkokumin no tameno rakkasan monogatari* (A story about parachutes for young citizens), instructed its young readers how the parachute even transcended its material aspects to embody the “holy spirit of Japan.” Therefore, the text continued, Japanese paratroopers paid deep respect to their parachutes. Before each jump they worshiped their parachutes with respectful bows and silent prayers. Even after touchdown, in the heat of battle and with parachutes scattered all over the terrain, great care was taken not to step on any of them.³⁴

A Godsend to Japan's Silk Industry

While the media engaged in such idealistic glorification of the airborne soldier and his silk parachute, Japan's silk industry was bound to reap great material benefits from the paratroopers' exploits. To better understand this game-changing process, we have to consider that silk manufacturing in Japan had expanded rapidly during the Meiji era but experienced an equally dramatic decline in the Taisho and early Showa periods.³⁵ Starting in the 1920s, Rayon, made from cheap regenerated cellulose, began to drive silk out of the world textile market.³⁶ Soon after the start of the war with China, Japanese silk manufacturers received another major blow. In March 1938, the Japanese Diet passed the National Mobilization Law, which drastically limited the production of so-called “nonessential” (*fuyō fukyū*) civilian goods that included most of Japan's silk products. The situation worsened in 1940 when the government promoted the slogan “Luxury Is the Enemy” and issued a new ordinance that strictly controlled the production and sale of luxury goods. Under these conditions, Japanese silk makers placed all their hopes on continuing U.S. demand for their products. Yet, on July 25, 1941, in response to Japan's invasion of southern Indochina, the U.S. government froze Japanese assets in America, leading to the effective collapse of the U.S. export market.

While Japan's silk industry seemed bound to slump, a promising new strategy emerged: the revival of the country's silk production by increasing domestic industrial and military demand.³⁷ The Dainippon Silk Foundation, founded in 1892 to promote Japan's silk industry, became a major force to implement this idea. In March 1940, the foundation inaugurated its new Silk Science Research Institute as a response to increasing competition by artificial fibers. After the U.S. embargo, pressure increased on the research

institute to ensure the survival of the country's silk industry with the development of a novel type of strong silk that would open an entirely new market of industrial and military goods. The institute was confident that "adequate processing" could make a silk thread strong and tough enough for fishing nets, electric insulation, and even cogwheels. The institute's ambitious program included genetic research on silkworms to combine the advantages of Japanese, Chinese, and European silk. Such an improved silk would also lend itself to a vast array of military applications. Researchers stated that it would be possible to develop silk for military use that would be 16 to 20 times stronger than the standard silk strand. The institute's specialists also hailed experiments that proved that silk would become increasingly valuable for military supplies, such as strong and thin artillery powder charge bags and—above all—parachutes.

The silk parachutes of the Japanese paratroopers had already proven the advantages of conventional silk. With its light weight, high elasticity, and great tensile strength, it was the ideal material for parachutes.³⁸ A silk parachute is easy to pack and fits into a small container. It can also withstand the strong mechanical forces during opening. Yet, the Silk Science Research Institute's researchers argued that a parachute made from their advanced silk would have an even much greater impact resistance and would be unrivaled by any other parachute the world. In an article published in December 1942, Suzuki Shirō, one of the institute's scientists, assured that the continuing study of silk fiber would lead to a wide range of further improvements. In his view the American embargo was a blessing in disguise that would boost the further development of Japanese silk. Suzuki concluded: "We will win the fiber war!"³⁹ Such an empathic battle cry forcefully expresses how Suzuki and his colleagues were anticipating the revival of Japan's silk industry under wartime conditions.

A "New Economic Order" and Japan's wartime silk production

As the scientists fought their fiber war in the laboratories, Japan's paratroop units fought their first battles in Southeast Asia. Their spectacular successes and immense visibility in the media came as a godsend to Japan's battered silk industry and generated invaluable support for the lobbying of the Dainippon Silk Foundation. After the victorious Manado and Palembang operations, both the Japanese Army and the Navy decided on large-scale mass production of parachutes.⁴⁰ Yet, when the military passed the order to Japan's silk weaving industry and cord makers to increase their output, they soon learned that Japan's silk production capacity had declined dramatically. As a consequence of Japan's wartime exigencies, a large number of mulberry fields had been turned into farmland for food production, and most silk manufacturers, suffered from a severe labor shortage after their workers had been assigned to munitions factories or conscripted for military service. Aware of this production bottleneck, the military appealed to both the Ministry of Agriculture and the Ministry of Commerce to boost silk production for parachutes.

The government's direct involvement in Japan's wartime silk industry was part of Japan's transition toward a controlled wartime economy that became known as the "New Economic Order." The *Sanshigyō Tōseigaisha* (Sericulture Control Company) was set up in May 1941. As a stock company it was capitalized at ¥80 million, with half of the stock held by the government and the rest by various branches of the sericulture industry.⁴¹ The company took full control of all aspects of silk production and sales in Japan: it established a system of fixed prices and quality control, distributed silkworm eggs and silkworms, and

bought cocoons from farmers and sold them to silk-reeling manufactures. It also purchased the raw silk from the silk-reelers for resale to weaving manufacturers and textile makers.⁴²

Soon the government's sway over Japan's silk production tightened further. The *Jūyō Sangyō Dantai Rei* (Important Industrial Corporations Ordinance) was promulgated in August 1941. It allowed the government to establish so-called *Tōseikai* (Control Associations) for Japan's key industries. These influential government-controlled cartels were authorized to allocate resources, set up production quotas, and determine prices. In October 1942, the Ministry of Commerce and Industry ordered the establishment of four Control Associations in the fiber industries. One of them was the *Jinken Kinu Tōseikai* (Rayon and Silk Control Association) headed by Kumura Seita, the president of the Rayon fibers manufacturer Teikoku Jinken.⁴³ Kumura's appointment was in line with an implicit agreement that the heads of all Control Associations had to be civilian businessmen. As historians of Japan's wartime economy have pointed out, such an arrangement had important consequences. Throughout their existence the Control Associations could dodge the military's full control and more often than not followed their member companies' interests rather than the exigencies of the war economy.⁴⁴

Backed by a powerful institution and revitalized by soaring military demand, Japan's silk industry transformed from an ailing producer of luxury goods into an apparently indispensable part of Japan's war machine. A revision of the "Raw Silk Inspection Rules" (*kiitokensakisoku*) set up a new standard for "aviation silk" (*kōkūyōkiito*) that had to be significantly stronger than ordinary raw silk. Building on the efforts of the Silk Science Research Institute, the silkworms used for the production of this type of silk were new hybrids derived from different silkworm varieties. By 1944 the quality of parachute silk had

considerably improved. As an incentive to boost production, the Control Association fixed the price of aviation raw silk higher than that of ordinary raw silk and—with silk production now being part of Japan's munitions industry—also facilitated access to sufficient raw material.

Weaving the silk fabric

Wartime developments also allowed Japan's silk weaving industry not only to survive but to prosper. The weavers of Fukui prefecture are an illuminating example of this remarkable development.⁴⁵ Already in the 1880s the Fukui government promoted the production of *habutae*, a plain-weave silk fabric.⁴⁶ A favorable coastal climate, low wages, and efficient cooperative system further helped to establish Fukui's reputation as Japan's "textile kingdom." Mechanization of silk looms proceeded quickly, and by 1895 Fukui's silk weavers produced half of Japan's *habutae* silk fabric.⁴⁷ Advances in electrification and transport—in 1914 the Katsuyama Electric Power Company was established, and the Keifuku Railroad began operation—further spurred production.⁴⁸

Like many other branches in Japan's textile industry, Fukui's weavers suffered from wartime control measures. Let us recall that the 1938 National Mobilization Law devastated Japan's silk industry facing a severe shortage of labor, raw material, and machinery. The situation escalated with the start of the Pacific War, when the government enforced its program of metal collection that began with the requisition of charcoal braziers, iron kettles, cookpots, kitchen knives, farming tools, and even altar fittings and statues from Buddhist temples. By 1943 the weaving industry became a target of metal collection as well. As many as 40 per cent of weaving machines in Fukui prefecture were confiscated, and their iron parts were delivered to munitions factories.

Many companies faced the stark choice of changing or shutting down their businesses. To stem the decline of a whole industry, Fukui's prefectural government launched a campaign to increase the number of factories engaging in armaments production.

While many silk weavers converted their production to aircraft parts or communication equipment, some companies had fewer problems with continuing their original business. One of them was Matsubun, a major producer of *habutae* in Katsuyama in the northeastern region of Fukui. Already in 1925 it had established itself as the army's main supplier of parachute fabric. As it turned out, *habutae*, with its light weight and superior strength, was the ideal material for parachute production, earning the fabric the name of "parachute silk." Weaving silk for military parachutes became a successful survival strategy. In 1943 Matsubun, together with Kaytay and two other Katsuyama weaving companies, were appointed as factories under army supervision (*rikugunkantoku kōjō*). As one Kaytay official put it: "During wartime we produced *habutae* for parachutes as a munition industry in Katsuyama. That was how we could retain our machines, our personnel, and our technology."⁴⁹

Fujikura: A parachute maker takes off

One manufacturer reaped the greatest profits from the parachute boom. Fujikura, founded in 1901, initially engaged in the production of rubber and electric wire. In June 1913, the company began experimenting with silk and cotton fabric for balloons, airships, and aircraft.⁵⁰ Fujikura also engaged in the research and design of parachutes and presented its first rescue parachute for balloon and airship crews in 1919. In May 1928, the company secured orders from the Navy Ministry for the production of the Type 89 parachute. In 1934, after receiving another

navy order of 600 parachutes, large-scale production of parachutes began. In October 1939 Fujikura set up its new branch, Fujikura Aviation Industry, that successfully established a monopoly on parachute production in Japan.

Soon Fujikura's unique position paid off nicely. In summer 1940 a high-ranking army officer paid a confidential visit to the company's managers. He informed them about the army's plan to establish several paratrooper units and asked for Fujikura's cooperation in the project. One week later a navy officer visited the company as well and submitted a similar request.⁵¹ These visits were important. With the upcoming large-scale orders from both the army and the navy, Fujikura started preparation for mass production at three different sites. The Ebahara factory in the southwestern suburbs of Tokyo employed 2,000 workers and aimed for a monthly production capacity of 4,000 parachutes. Two more plants in central Tokyo at Nihonbashi and Honjo, with a combined workforce of 4,500 workers, could initially reach a monthly output of 5,000 parachutes.⁵² According to a former Fujikura employee, the company steadily increased its annual production from 4,500 parachutes in 1939 to a staggering 105,000 in 1945.⁵³ Another source corroborates these figures, stating that Fujikura produced a total of about 300,000 parachutes between 1939 and 1944.⁵⁴

Such a quantity is curious considering that the strength of Japan's paratroopers at any given time barely exceeded three thousand men, of which a significant part never engaged in a combat jump.⁵⁵ What is more, after 1942, the navy's paratroopers did not carry out any more combat jumps for the rest of the war. The army's paratroopers were redeployed only in December 1944 when they joined the Battle of Leyte. Why, then, could Fujikura continue to boost its production? It follows from the above that the company could build on the paratroopers' early victories and rely on successful propaganda. Both emphasized the

importance of parachutes for winning the war and induced the military to place large orders. Furthermore, appointed as an important section of Japan's munitions industry and supported by a powerful Control Association under civilian leadership, Japan's silk producers, reelers, weavers, and manufacturers gained new self-confidence and began to relish the prospect of substantial profits. As a result, all manufacturers involved in the parachute production chain could initiate and maintain their mass production regardless of actual military demand.

To be sure, conspicuous waste of limited resources is a defining feature of any wartime economy. As is well known, each warring nation engaged in notoriously expensive armament projects that turned out to be of doubtful military use, such as the German heavy railway gun *Gustav*, the U.S. giant flying boat *Spruce Goose*, and the Japanese battleship *Yamato*. It might be argued that most of these costly developments failed because their feasibility and operational advantage were unpredictable. In contrast, Japan's wasteful mass production of parachutes was the result of poor coordination of supply and demand. Even though the Japanese Army and Navy stopped all paratroop operations after February 1942 for nearly three years, precisely during this period Japan's parachute makers boosted their production on an unprecedented scale. This suggests that the Rayon and Silk Control Association could successfully lobby for an increase in silk production. On the other hand, the resulting inefficiency and poor economic control were, of course, especially damaging to the Japanese economy, which was desperately struggling with dwindling labor and material resources.

Parachutes and the Mobilization of

Young Women

In many ways the paratroopers' saga is closely interwoven with that of the workers at Fujikura's factories. Both would come to share a common narrative of devoted volunteers, determined warriors, and, ultimately, patriotic self-sacrifice. Before Fujikura could establish itself as a major segment of Japan's wartime industry a serious problem had to be solved. The company's dramatic production increase required an equally massive workforce expansion—a major challenge at a time when military conscription caused a severe labor shortage. To compensate for the lack of male factory workers, Fujikura began to recruit girls and women as volunteer workers from all over Japan. Mass recruiting was successful, and soon these female volunteers made up about a half of the factory workers. After silk reeling and weaving parachute production also developed into a highly gendered workplace.⁵⁶

Fujikura's management aimed to further improve production capacity by boosting workers' morale. The book *Rakkasan o tsukuru kokoro* (The spirit of making parachutes) that the company published in 1943 celebrated the importance of the Fujikura workers and their products. In the preface Fujikura's president, Matsumoto Arata, noted: "Our brave paratroopers entrust their lives to Fujikura's parachutes. We are aware of this heavy responsibility and put our hearts and souls into every single stitch and rivet. At the same time, we are proud of our rewarding duty. . . . We are industrial warriors (*sangyō senshi*) entrusted with this decisive work."

The book featured several contributions from Fujikura's employees. Such primary sources must, of course, be handled with caution. They nevertheless suggest an attitude that goes beyond the purely material aspects of parachute production. One worker declared that "before the paratroopers carry out their

crucial missions, they put their parachutes on an altar and pray for victory. Likewise, with every stitch, we Fujikura workers instill our wishes for victory into each parachute.” A factory girl from Fujikura’s Honjo plant contributed a poem that draws a telling parallel between the young factory girls and the soldiers on the battle front:

We young maidens brace up our frail bodies for the country.

Today we will stitch the white silk again.

While we make parachutes our mind is pure,

strong, and calm just like the white silk.

When we are stitching with our sewing machines our mind

is just like that of a soldier carrying his gun to the battlefield.⁵⁷

These grandiose texts could be easily dismissed as a company’s effort to instill a higher purpose in their employees’ work. Yet, as a historical document the book reveals an important conflation of wartime Japan’s mobilization and indoctrination. An already well-established myth of the self-sacrificing heavenly warriors at the front now extended to the parachute weavers and seamstresses whose nimble fingers perform delicate but decisive work. Thus, the young parachute seamstresses found themselves caught up in the effort to win the war both as laborers in the munitions industry and as subjects of Japan’s wartime propaganda.

The rich symbolism of young women laboring to support their countrymen’s struggle on the warfront was not lost on Japan’s military and civilian opinion makers. The selfless devotion of factory girls became a recurring theme that the

media impressed upon Japan’s youth. Take, for instance, the previously mentioned 1943 book *Shōkokumin no tame no rakkasan monogatari* (A story about parachutes for young citizens) that was endorsed by the army’s aviation headquarters and the navy’s press section. The authors told the “young people of the Empire” about the young girls (*otometachi*) who were bearing a tremendous responsibility for all stages of parachute production, from raising silkworms to silk reeling and textile weaving and finally making parachutes. The text continues:

These young girls put their effort with all their heart into every single silk thread. . . . They devote all their life to parachute production and even hesitate to take time to eat. They work hard even though they bleed from their small fingers. Japan’s brave paratroopers cannot forget these young girls’ sincere devotion. Therefore, the Japanese paratroop is the strongest in the world.⁵⁸

Such praise for young female workers’ participation in the war effort, overdramatic as it may seem, was part of a national campaign to increase war production. Historians have pointed out that the Japanese state initially was reluctant to recruit women for labor service.⁵⁹ Yet, when the draft of men for military service took a heavy toll on the workforce, the government turned to the two largest sources still available for mobilization: students and unoccupied females. Already in November 1941 compulsory registration for women between 16 and 24 began.⁶⁰ Over the course of the Pacific War, pressure on women to join the labor force continuously increased. In 1943 the newly established *Joshi Kinrō Hōkoku Tai* (Women’s Patriotic Labor Corps) began to enlist unmarried women who were 14 to 25-years old.

By August 1944, the government's rhetoric and coercion intensified, and the myth of the paratroopers once more inspired the home front. The Women's Patriotic Labor Corps changed its name to the *Joshi Kinrō Teishintai* (Women's Labor Volunteer Corps). The expression *teishin* was a direct reference to the Army's *Kūchū Teishinbutai* (Airborne Corps) and its paratroopers, who had all volunteered for high-risk missions. Military language and organizational patterns kept on spreading in the civil sphere. Now women enlisted in Japan's munitions industry were designated as *sangyōsenshi*, industrial warriors. A new policy organized them like military commandos into small, tightly knit groups that were assigned to special production tasks.⁶¹ According to one source, 473,000 women had joined the Women's Labor Volunteer Corps by March 1945.⁶²

The militarization of the home front further escalated with the mobilization of ever-younger Japanese for participating in the "decisive battle." The "Student Labor Law," issued in August 1944, led to the mobilization of about two million students for work. Youth recruitment intensified in March 1945, when the cabinet approved the "Outline of education measures for the decisive battle."⁶³ The new policy allowed for a one-year closure of all schools above the elementary school level. Now Japanese middle schools and high schools were to carry out duties deemed "vital for winning the decisive battle," such as munitions production and air-raid defense. By July 1945, the number of mobilized students had increased to over 3.4 million: 1.5 million of them were young women, with nearly half of them engaged in war production.⁶⁴

Again, a look at Fukui prefecture's parachute weavers might help conceptualize the reality confronting those behind these numbers. By 1944 young female students between 12 and 16 years of age from Katsuyama city girls' high school, Katsuyama Seika girls' high school, Ōno

junior high school, and Ōno girls' high school were mobilized. They wove silk for parachutes in textile factories, while others produced aircraft parts at metal processing works (see figure 5). As members of the student corps they wore mandatory nametags and armbands. While commuting to their workplaces, they wore cloth air-raid hoods (*bōkūzokin*) that, in a sad irony, still identified them as non-military persons.

The discourse around female workers' self-sacrifice as industrial warriors reached a new dimension that gave rise to an even stronger myth to inspire the country's workforce. Following the Munitions Ministry's exhortations to turn "factories into battlefields," the young girls in Katsuyama, as in factories all over Japan, had to show their devotion by wearing *hachimaki* headbands with the characters *kamikaze* written on them (see figure 6), the name given to the pilots of the special attack units who sacrificed their lives during suicide attacks on the enemy.⁶⁵ Such an increasingly desperate militarization of student factory workers once more mirrored developments at the battlefield, where paratroopers were sent into the fray in a last-ditch effort to turn the tide of the war.



Figure 5: Recent high school graduates inspecting *habutae* silk fabric for parachutes. (Courtesy of Kaytay Texinno Inc.)



Figure 6: Young factory workers with *kamikaze* headbands. (Courtesy of Kaytay Texinno Inc.)

The Brief Return of the Heavenly Soldiers

After their deployment in early 1942, Japan's paratroopers were conspicuously absent from the battlefield for nearly two years. On a tactical level, it seemed to be increasingly difficult to bring the troops close enough to their target without exposing them to enemy fire.⁶⁸ To make things worse, Japanese paratroopers had lost their most valuable asset. After the large-scale airborne operations in the early phase of the war, military planners could no longer rely on the surprise factor. Furthermore, the summer 1942 losses at the Battle of Midway and during the Guadalcanal campaign halted Japanese expansion and forced the military into a defensive war. After this fundamental change in strategy, even the

early advocates of airborne assaults began to doubt the efficiency of deploying paratroopers for offensive surprise attacks.⁶⁹

Only after U.S. troops under General Douglas MacArthur landed on Leyte in October 1944 did plans to airdrop paratroopers into enemy-held territory reemerge. When the advancing U.S. forces began extending their air superiority over large parts of Leyte, the Japanese Army commanders decided to deploy their paratroopers once more. The 3rd and 4th raiding regiments received the order to recapture five airstrips in the American-occupied Leyte Valley in the northeast of the island (see figure 2). On December 6, a first wave of nearly five hundred paratroopers jumped out of their planes but landed far from their targets. U.S. anti-aircraft fire downed 19 transport aircraft, and most of the 20 aircraft that made it back to their airfield were heavily damaged. A second wave took off with four transporters and two heavy bombers. One of them crashed and the rest returned because of bad weather. On the following day, the army canceled the operation. A second attempt to drive back U.S. troops ended in disaster as well. Between December 8 and 14, more than 480 paratroopers were dropped over the Valencia airfield, about 15 kilometers north of the city of Ormoc. Yet, during the following week it became obvious that the Japanese troops could not stop the U.S. advance, and, while suffering heavy losses, the Japanese retreated.

Even though the Leyte airborne operation ended in failure, it still served the propaganda machine at home. The December 20, 1944, edition of *Shashin Shūhō* for the first time showed paratroopers preparing for their combat jump on its title page.⁷⁰ The text explained that the same "divine warriors" who had been fighting at Palembang now had been sent into the "decisive battle" over Leyte. The magazine exhorted readers to continue their fight on the home front. All Japanese were told

that they should follow the example of the paratroopers who risk life and limb and dash their bodies against the enemy. In an obvious reference to the kamikaze suicidal attacks (*taiatari kōgeki*), the word *taiatari* was printed in big letters over the title page. Even in the final stages of the war, the glorification of Japan's paratroopers continued. The Tokyo Metropolitan Art Museum opened its War Record Painting Exhibition (*sensō kiroku gaten*) on April 11, 1945.⁷¹ This was just one month after the devastating firebomb attacks of March 9–10, 1945, that became known as the Bombing of Tokyo and cost the lives of 80,000 to 130,000 people. Yoshioka Kenji (1906–90), who already had made his name with several large-format war paintings, contributed *The Takachiho Paratroop Unit Attacking an Enemy Airfield on Leyte*. With its huge size and image composition, his painting clearly echoed Tsuruta Gorō's *Heavenly Soldiers Descending on Palembang*. However, its material (color on paper) and its rough painting style suggest that the artist had to cope with material shortage and time pressure.

Paratroopers once more featured prominently on the silver screen—albeit in a slightly different format. The animated film *Momotarō, Divine Warriors of the Sea* (*Momotarō Umi no Shinpei*) was released in April 1945. The feature-length movie had been produced under the guidance of the navy's information department. Its protagonist, Momotarō, was the well-known hero of one of Japan's most popular folktales. The film reenacted the Celebes invasion with Momotarō and his friends as part of a large parachute unit who jump out of their transport aircraft under heavy enemy fire. After landing in enemy territory, they gather their canons and machine guns from airdropped containers and chase away a frightened enemy who eventually surrenders. The movie's final scene shows young cartoon characters back in Japan playfully reenacting the paratroopers' feat by climbing onto a tree and jumping into a contour line of America

marked on the ground. The obvious message was that for Japan's paratroopers, defeating the enemy would be child's play.

The climactic Battle of Okinawa that lasted from April to June 1945 was the last time that Japanese airborne troops were sent into combat. Of the Army's paratroopers, 168 members who had been reorganized as *Giretsu Kūteitai* (Heroic airborne unit) took part in a desperate one-way mission.⁷² On May 23, 1945, twelve Mitsubishi Type 97 heavy bombers took off from Kyushu, each with 14 soldiers on board. They were heading toward U.S. airbases in Okinawa, where they were to deploy the troopers after crash-landing on the Kadena and Yontan airfields. Four bombers returned because of engine trouble, and most of the remaining aircraft were shot down by U.S. anti-aircraft guns. Only one airplane was able to make a belly landing at Yontan airbase. The Japanese troopers who survived the crash landing stormed out of their airplane. Throwing grenades and incendiary bombs they destroyed or damaged over 30 U.S. aircraft and set a quarter of a million liters of fuel on fire. Within an hour, U.S. reinforcements arrived, and in the ensuing fighting, all Japanese soldiers were killed.

Conclusion

The historical significance of Japan's paratroopers transcends their actions on the battlefield and reveals complex connections among warfare, propaganda, and national mobilization. Initially set up to overwhelm the enemy by surprise, Japan's airborne troops proved to be surprisingly effective in the glorification of the battle front. Their early successes were eagerly absorbed by Japan's government-directed propaganda; and even in the final stage of the war, the public image of the death-defying "heavenly soldiers" persisted.

During Japan's long retreat, the paratroopers' military significance all but vanished. At the same time, their importance for boosting the nation's morale and confidence rapidly increased.

Japan's new type of warfare also had a wide-reaching impact on the country's silk industry. With the collapse of a lucrative export market, government restrictions on "nonessential" goods, and impending seizure of its machinery, a once-thriving industrial sector seemed to be doomed to extinction. Yet researchers began to develop aviation-grade silk fiber; businessmen cleverly navigated Japan's New Economic Order; and company leaders readily responded to increasing military orders. Silk turned from a luxury item into an integral part of an all-important military implement. Thus, Japan's sericulturists, silk weavers, and parachute makers not only thrived but also were able to

commence large-scale production that by far surpassed actual military demand.

The dynamic relationship between paratroopers and parachute makers also sheds new light on the mobilization and militarization of the home front. With the massive hiring of young women for parachute production, the myth of the paratrooper merged with the notion of the self-sacrificing factory worker. Drawing on the image of heavenly soldiers supported by frail maidens in the factories, the mobilization of women and students for all sectors of Japan's munitions industry entered a new stage. Branded as industrial warriors and organized like military commandos, young workers threw themselves into the escalating battle of the factories to fight an increasingly hopeless war.

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Notes

¹ One noteworthy exception is the production of balloon bombs, a small fraction of which was made from rubberized silk. See Robert C. Mikesch, *Japan's World War II Balloon Bomb Attacks*

on North America (Washington, DC: Smithsonian Institution Press, 1973), pp. 61-63; and Ross Coen, *Fu-go: The Curious History of Japan's Balloon Bomb Attack on America* (Lincoln: University of Nebraska Press, 2014), pp. 31-33.

² Patricia Tsurumi, *Factory Girls: Women in the Thread Mills of Meiji Japan* (Princeton, NJ: Princeton University Press, 1990); and David G. Wittner, *Technology and the Culture of Progress in Meiji Japan* (New York: Routledge, 2008), pp. 43-71.

³ Between 1898 and 1900 overall revenues from silk export amounted to over 90 per cent of Japan's expenditure on the imports of warships, weapons, machinery, iron, oil, and steamships. See Nakamura Masanori. *Nihon no rekishi dai 29 kan Rōdōsha to nōmin* [Japanese history vol. 29: Workers and peasants] (Tokyo: Shōgakukan, 1976), p. 89.

⁴ Hooks and Jussaume show in their case studies of Japan's aluminum and aircraft industries how, during the war, "the Japanese state became less intrusive and ultimately more civilianized; the U.S. became more interventionist and militarized." Gregory Hooks and Raymond A. Jussaume, "Warmaking and the Transformation of the State: Japan and the U.S. in World War II," in Yamanouchi Yasushi, J. Victor Koschmann, and Narita Ryūichi, eds., *Total War and 'Modernization'* (Ithaca, NY: East Asia Program, Cornell University, 1998), pp. 61-94.

⁵ Barak Kushner, *The Thought War: Japanese Imperial Propaganda* (Honolulu: University of Hawaii Press, 2006); and Benjamin Uchiyama, *Japan's Carnival War: Mass Culture on the Home Front, 1937-1945* (Cambridge: Cambridge University Press, 2019), pp. 67-104.

⁶ Williamson Murray and Allan Reed Millett, *Military Innovation in the Interwar Period* (New York: Cambridge University Press, 1996).

⁷ Tanaka Kenichi, *Aa junpaku no hanaoite: rikugun rakkasan butai senki* [Pure white flowers adorning their shoulders: An account of the battles of the army paratrooper units] (Tokyo: Gakuyō Shobō, 1972), pp. 1-13.

⁸ Bōeichō bōeikenshūjo senshishitsu, *Rikugun kōkū no gunbi to un'yō 2* [The army's aerial armament and operations 2] (Tokyo: Asagumoshinbunsha, 1974), p. 309.

⁹ Tanaka, *Aa junpaku no hanaoite*, pp. 12-13.

¹⁰ The Battle of Crete (20 May-1 June 1941) received considerable day-to-day coverage in Japanese newspapers, beginning with "Chichūkai no eijūyōkichi doku, kureetashima wo kōgeki seieibutai wo taikyōkūyu" [Main British bases in the Mediterranean, German attack on Crete, massive airborne operation of elite troops], *Tokyo Asahi Shinbun*, May 21, 1941.

¹¹ Bōeichō bōeikenshūjo senshishitsu. *Rikugun kōkū no gunbi to un'yō 2*, p. 309-10.

¹² Ministry of War, "Daiichi teishinshūdan" [The first Attack Group], October 1941, [Japan Center for Asian Historical Records](#) (hereafter JACAR) Ref.C12121031900.

¹³ Nihon Kaigun Kōkūshi Hensan Inka. *Nihon Kaigun kōkūshi 2 Gunbi hen* [The history of Japanese naval aviation 2 (armaments)] (Tokyo: Jiji Tsūshinsha, 1969), p. 929.

¹⁴ *Ibid.*, p. 931.

¹⁵ For details see Nihon Kaigun Kōkūshi Hensan Inka. *Nihon Kaigun kōkūshi 2 Gunbi hen*, p. 935.

¹⁶ For a full account see Okamoto Takeyoshi and Horikawa Tatsumi, *Nanpō shinkō rikugun kōkū sakusen* [The Army's air strategy during the southern advance] (Tokyo: Asagumo Shinbunsha, 1970), pp. 490-505; Gordon L. Rottman and Takizawa Akira, *Japanese Paratroop Forces of World War II* (Oxford: Osprey Publishing, 2005), pp. 27-44.

¹⁷ Minoru Nomura, "The Petroleum Question" in Akira Iriye, ed., *Pearl Harbor and the Coming*

of the Pacific War: A Brief History with Documents and Essays (Boston: Bedford/St. Martin's, 1999), pp. 145-46. More on the strategic importance of oil can be found in Miwa Munehiro, *Taihei'yō Sensō to sekiyu: senryaku busshi no gunji to keizai* [The Pacific War and oil: Military affairs and the economy of strategic goods] (Tokyo: Nihon Keizai Hyōronsha, 2004).

¹⁸ Ishii Masamichi, *Rikugun nenryōshō Taihei'yō Sensō sasaeta sekiyu gijutsushatachi no tadakai* [The Army's fuel arsenal: The fight of the fuel technical experts that supported the Pacific War] (Tokyo: Kōjinsha, 2002), pp. 106-12.

¹⁹ Ogura Akira, "Parenban sekiyu butai no tsuisō [The reminiscence of the Palembang oil corps]," in Heiwa kinen jig'yō tokubetsu kikin, ed., *Gunjin gunzoku tanki zaishokusha ga kataritsugu rōku dai yon kan (heishi hen)* [The pain of soldiers and of people who served as temporary civilian employees of the military: Volume 4 (soldiers)], (Tokyo: Heiwa kinen jig'yō tokubetsu kikin, 1994), pp. 175-85.

²⁰ Ibid., p. 176.

²¹ Ishii, *Rikugun nenryōshō*, p. 196.

²² Nomura, "The Petroleum Question," p. 146.

²³ For details see Gregory James Kasza, *The State and the Mass Media in Japan, 1918-1945* (Berkeley: University of California Press, 1988), pp. 200-206.

²⁴ Nippon news #88, released on February 9, 1942.

²⁵ Already in May 1941 the German newsreel *Wochenschau* used the "Ride of the Valkyries" as background music for their coverage of the airborne invasion of Crete.

²⁶ Nippon news #93, released on March 17, 1942.

²⁷ The lyrics can be found in Kitajima Noboru, ed., *Shōwa ryūkōkashi* [A history of popular songs of the Shōwa era] (Tokyo: Mainichi Shinbunsha, 1977), p. 137.

²⁸ According to *Nihon kokugo daijiten* [Comprehensive Japanese dictionary] (Tokyo: Shōgakusan, 2006) the term *shinpei* appeared already in *Keikokushū*, an 827 CE collection of Chinese poetry.

²⁹ For the text of both songs see Fujikura Kōgyō KK. *Rakkasan o tsukuru kokoro* [The spirit of making parachutes] (Tokyo: Fujikura Kōgyō KK, 1943), p. 1. In striking contrast to these morale boosters, one of the most popular songs sung by WWII U.S. paratroopers, "Blood on the Risers," tells the gloomy story of a "rookie trooper" who forgot to hook his static line and falls to his death.

³⁰ For more details on how Japanese movie makers followed the censor's standards of the *kokusaku* films see Peter B. High, *The Imperial Screen: Japanese Film Culture in the Fifteen Years' War 1931-1945* (Madison: University of Wisconsin Press, 2003), pp. 376-81.

³¹ *Shashin Shūhō*, January 20, 1943, pp.10-11.

³² There is an interesting parallel: The German painter Wilhelm Baitz submitted a similar monumental painting "Die Fallschirmjäger" (The paratroopers) to the Große Deutsche Kunstausstellung that was held in Munich in 1942 under the auspices of Adolf Hitler.

³³ Niizeki Kennosuke, *Sora no chūtai* [The squadron in the sky] (Tokyo: Nakamura shoten, 1943), quote taken from the book's preface by Major Nishihara Masaru.

³⁴ Taira Satoru and Matoda Sei, *Shōkokumin no tamenō rakkasan monogatari* [A story about parachutes for young citizens] (Tokyo: Kin no hoshi sha, 1943), pp. 162-67.

³⁵ For a detailed account of Japan's prewar silk industry see Ishii Kanji, *Nihon sanshigyōshi bunseki* [An analysis of Japan's sericulture industry] (Tokyo: Tōkyō daigaku shuppankai,

1972).

³⁶ In 1905 the British company Courtaulds Fibres produced the first commercial viscose rayon. The Japanese firm Teikoku Jinzokenshi (Tejin) took up rayon production in 1927.

³⁷ It should be noted that many Japanese companies implemented this policy. Notable examples are the producer of nitrogenous fertilizer Nichitsu branching out into explosives or the piano maker Nihon Gakki converting its production into the making of aircraft propellers. See Barbara Molony, *Technology and Investment: The Prewar Japanese Chemical Industry* (Cambridge, MA: Council on East Asian Studies, Harvard University, 1990), pp. 216-26; and United States Strategic Bombing Survey, Aircraft Division, *Japan Musical Instrument Manufacturing Company (Nippon Gakki Seizo KK)* (Washington, DC: USSBS, 1946), pp. 1-12.

³⁸ Silk, with its unique qualities, would eventually be challenged by synthetic fiber. In summer 1942 the U.S. military began testing nylon parachutes—ironically as a response to the dwindling stock of imported Japanese silk. During the Pacific War, Japan's artificial fiber industry produced its own version of nylon called "nylon 6," but Japan never engaged in large-scale nylon production.

³⁹ *Nihon Sangyō Keizai Shinbun*, December 19 and December 20, 1942.

⁴⁰ Tanaka Kenichi, *Oozora no hana: Kūteibutai zenshi* [Flowers in the wide open sky: A complete history of paratroopers] (Tokyo: Fuyō Shobō 1984), pp. 267-68.

⁴¹ *Tokyo Asahi Shinbun*, April 20, 1941.

⁴² *Osaka Mainichi Shinbun*, March 1-March 9, 1941.

⁴³ *Osaka Mainichi Shinbun*, August 24, 1941.

⁴⁴ Chalmers A. Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975* (Stanford: Stanford University Press, 1982), p. 153; and Mark R. Peattie, *Ishiwara Kanji and Japan's Confrontation with the West* (Princeton, NJ: Princeton University Press, 1975), p. 219.

⁴⁵ In addition to Fukui weavers in other prefectures such as Ishikawa, Yamagata, and Yamanashi took up the production of parachute fabric as well.

⁴⁶ Edward Pratt, *Japan's Protoindustrial Elite: The Economic Foundations of the Gōnō* (Cambridge, MA: Harvard University Asia Center, 1999), p. 34.

⁴⁷ Hataya kinenkan yumeōre Katsuyama, *Orimono no machi, Kiryū to Katsuyama* [The textile towns Kiryū and Katsuyama] (Katsuyama: Hataya kinenkan yumeōre Katsuyama, 2012), p. 10.

⁴⁸ Matsumura Akira, *Katsuyama no kigyō* [The textile industry in Katsuyama] (Katsuyama: Katsuyama kyōiku iinkai, 1981), p. 2.

⁴⁹ Arai Yoshiyasu, president of Kaytay Texinno Inc., in 2011, quoted in Hataya kinenkan, *Orimono no machi*, p. 40.

⁵⁰ Fujikura Industry Co., Ltd., "Fujikurakōgyō Kabushikigaisha" [Fujikura Industry, Inc.], January 30, 1936, JACAR Ref.C05035280400.

⁵¹ Tanaka. *Oozora no hana*, p. 251.

⁵² *Ibid.*, p. 269.

⁵³ Tanaka gives the following numbers in *Oozora no hana*, p. 270: 1939: 4,500; 1940: 5,000; 1941: 12,000; 1942: 68,000; 1943: 94,000; 1944: 105,000.

⁵⁴ See [Fujikura Kōsō OB-kai website](https://www.fujikura-koso.co.jp/). (accessed March 30, 2020).

⁵⁵ A total of about 1,400 paratroopers were deployed during the 1942 campaign in the Dutch East Indies. About one thousand airborne infantrymen saw action in the Philippines in late

1944.

⁵⁶ Janet Hunter argues that already in prewar Japan the demand for cheap labor together with rapid advances in industrialization resulted in a predominantly female textile workforce. Janet Hunter, "Gendering the Labor Market: Evidence from the Interwar Textile Industry." In Barbara Molony and Kathleen Uno, eds., *Gendering Modern Japanese History* (Cambridge, MA: Harvard University Asia Center, 2005), pp. 359-92.

⁵⁷ Poem composed by Oki Tsuruma in Fujikura kōgyō, *Rakkasan o tsukuru kokoro* [The spirit of making parachutes] (Tokyo: Fujikura kōgyō KK, 1943), pp. 205-6.

⁵⁸ Taira, *Shōkokumin no tamenō rakkasan monogatari*, pp. 154-60.

⁵⁹ See Regine Mathias, "Women and the War Economy in Japan" in Erich Pauer, ed., *Japan's War Economy* (London: Routledge, 1999), pp. 65-84; and Yoshiko Miyake, "Doubling Expectations: Motherhood and Women's Factory Work Under State Management in Japan in the 1930s and 1940s," in Gail Bernstein, ed., *Recreating Japanese women, 1600-1945*, (Berkeley: University of California Press, 1991), pp. 267-95, 268.

⁶⁰ Thomas R. H. Havens, *Valley of Darkness: The Japanese People and World War Two* (Lanham, MD: University Press of America, 1986), p. 92.

⁶¹ Ministry of Munitions, "Joshiteishintaiseido kyōka hōsakuyōkō" [Policy outline to strengthen the system of the corps of women volunteer workers], March 18, 1944, JACAR Ref.A14101249000.

⁶² [Japan Employment Security Association](#), (accessed March 30, 2020).

⁶³ Ministry of Education, "Kessen kyōiku sochiyōkō" [Outline of education measures for the decisive battle], March 17, 1945, JACAR Ref.A14101334400.

⁶⁴ The United States Strategic Bombing Survey, Civilian, Manpower, Food and Civilian Supplies Division, *Japanese Wartime Standard of Living and Utilization of Manpower* (Washington, DC: USSBS, 1947), pp. 13, 73.

⁶⁵ See the Munitions Ministry's pamphlet that aims to bring the kamikaze ideology into Japan's factories. Gunjushō kōkūheiki sōkyoku, *Kamikaze* (Tokyo: Gunjushō kōkūheiki sōkyoku, 1945), pp. 23-25. For the "kamikazefication of the home front," see David C. Earhart, *Certain Victory: Images of World War II in the Japanese Media* (Armonk, NY: M.E. Sharpe, 2008), pp. 409-59.

⁶⁶ Source: Matsumura Akira, *Katsuyama no kigyō* [The textile industry in Katsuyama] (Katsuyama: Katsuyama kyōiku iinkai, 1981), p. 45.

⁶⁷ *Ibid.*, p. 45.

⁶⁸ The Navy became painfully aware of this dilemma during the capture of the Koepang air base in Western Timor (see figure 2) on February 20 and 21, 1942. Based on the Manado experience, where enemy fire had killed many parachutists even before touchdown, the designated drop zone was about twelve kilometers northeast of the airfield. Yet, when the first paratroopers finally arrived at the airfield it had already been taken by Japanese ground forces.

⁶⁹ Yamabe Masao, *Kaigun rakkasan butai: Eikō to kutō no senreki* [Naval paratroopers: War records of glory and hard struggle] (Tokyo: Kyō no wadaisha, 1994), pp. 253-54.

⁷⁰ I am obliged to David Earhart for pointing out this illustration in *Certain Victory*, p. 438.

⁷¹ Yasushi Masuko, "'Saikan Houkoku' and War Art Exhibitions," *Nihondaigaku daigakuin sōgō shakai jōhōkenkyūka kiyō*, No. 7 (2006), pp. 515-26.

⁷² For more details on the *Giretsu Kūteitai* see Akimoto Minoru, *Rakkasan butai: Tekichū ni kōka suru "Sora no shinpei" no tatakai* [Paratroopers: The fight of the “heavenly soldiers” who dropped into the middle of the enemy] (Tokyo: Kōjinsha, 2009), pp. 317-28.