

THE ARMAMENT INDUSTRY OF JAPAN FROM THE FOUNDATION OF YAMATO-STATE (660 BC) TO THE PRESENT

INTRODUCTION

The military history of Japan, especially the art of war and the fighting techniques of samurai armies between the 12th and 17th century as well as the rise and fall of the Japanese Imperial Armed Forces in the 19th and 20th century, are not widely known in Europe. Solely between the beginning of the 17th century until the mid 19th century and the period after the World War II (WW II) until present underwent times of peace. Within the long periods of wartime many civil wars were fought by rival daimyo (local feudal lord) but Japan also fought wars and battles outside the country to gain more power in the Pacific region and in East Asia. As a result of these wars the demand for weapons was high.

In the essay, the term “armament industry” is used as a part of the national economy which has the task to plan, produce and supply all weapons which were demanded by the armed forces. The effectiveness and efficiency of a national armament industry depends on many conditions. The most important conditions are the existence of natural resources (i.e. raw materials and water, etc.), a well educated and skilled labour-force, a highly developed infrastructure and a frictionless functioning of the financial- and bank-system. From the early days on, Japan suffers from considerable lack of raw materials. However, Japan is rich in woodland and water power. Since the 12th century the Japanese craftsmen have been skilful at forging metal. Since the mid 19th century the education system has been well developed too and since the Meiji-restoration in 1868 the financial and the bank system have been rapidly developed.

The paper describes in the first part the armament industry in the early period from the foundation of the Yamato-state in 660 BC until the end of the Kamakura-shogunate in 1333. The second part gives an overview of the armament industry of the period of the long lasting civil war between the mid 15th century and the first half of the 17th century. The armament industry since the Meiji-restoration in 1868 until the end of the Second World War in 1945 has been described in the third part. The fourth part gives an overview of the armament industry of Japan since the foundation of the Japanese Self Defence Forces after the Second World War in 1954. The Conclusion gives final remarks and a prognosis of the future development of the armament industry in Japan. To understand the development of the armament industry in Japan and the real demand for weapons within the centuries in Japan, the author gives a short overview of the important historical facts of each described period at the beginning of every part¹.

PART ONE: THE EARLY PERIOD AND THE KAMAKURA-SHOGUNATE

Japan's culture lasted until 10.000 BC when a hunter-gatherer society now called “*Jomon*” emerged. The word “*Jomon*” is used after a distinctive designed used on the pottery of that time. The “*Jomon*” culture was replaced 300 BC by a well developed society with agricultural life called “*Yayoi*” (after the location where their pottery was first unearthed). There are no written records in Japanese about these early societies. Most of what we know about these societies we can read in ancient Chinese chronicles, the best of which is the Wei-Chih of the Wei dynasty written in the 3rd century AD. In this chronic Japan is called “*Wa*” (dwarf). The “official” establishment of Japan is attributed in the first two domestic histories written in Japanese called “*Kojiki*” and “*Nihon Shoki*” to the emperor Kamu Yamato Iware Biko (Jimmu Tenno) who left Kyushu (the most southwards larger island of the Japanese archipelago) for Honshu (the main island of the Japanese archipelago) in 667 BC. In 660 BC² he founded the Yamato-state in central Honshu in the Kinki region (the area around modern Osaka, Kyoto and Nara). The *Kojiki* and *Nihon Shoki* were compiled in 712 AD and 720 AD but the two histories

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are highly unreliable on matters before the 6th century AD and they are internally inconsistent. Notwithstanding references in domestic chronicles to emperors ruling Japan in the centuries before the birth of Christ, by the mid of the 4th century AD there was certainly a royal family of some sort holding at least a limited autocratic power in an apparently – more or less – unified nation.

After the unification, Japan turns the attention to the Korean Peninsular. During that time the Korean Peninsular was divided into three kingdoms (Paekche, Koguryo and Silla) which were struggling to attain whole power on the peninsular. In 366 AD the empress Jingu Kogo launched a full scale invasion of the Korean peninsular. Japan forced the king of Paekche to submit and extracted an oath from him that he would send tributes each year to the Yamato court. Further two invasions in 391 AD and in 410 AD happened against the kingdom of Koguryo on the Korean peninsular. Struggles and social upheaval during the 6th and 7th century AD had weakened the Yamato state. Therefore a planned invasion against the kingdom of Silla on the Korean peninsular was cancelled. In the 6th century AD the kingdom of Paekche called for help against the kingdom of Silla but the Yamato state never sent the amount of aid needed. To gain the necessary help from the Yamato state Paekche send many gifts to the court of the Yamato-ruler. In 538 AD a gift from the king of Paekche arrived which changed the course of history in Japan: Buddhist statues and sutras. In 661 AD Japan underwent a naval expedition to liberate Paekche. The Japanese expedition force, approx. 27.000 men with 800 ships, was nearly wiped out by a superior and better trained Tang-fleet at Paekchongang. Japan lost in the battle nearly 10,000 men and 400 ships³. This expedition force mark Japan's last attempt to land armed forces in Korea for many centuries, and marked the beginning of the "defence of our island new strategy".

At the beginning of the 8th century the power of the emperor was a strong factor in the Japanese society. During the 8th and 9th century the head of the clans in the provinces began to lay the groundwork for future provincial warrior families with great powers. The first provincial families who came to great influence were descendants of the imperial family. Three families determined the course of history of Japan in the next centuries. These families were the Fujiwara, Taira and Minamoto. The Fujiwara ruled between 866 and 1160 AD. After the Fujiwara lost their power, the Taira became the most powerful clan between 1160 and 1180 AD. At the end of the 12th century the Minamoto clan became strong enough to oppose the Taira clan. Therefore in 1180 the Genpei-war (named after the Chinese pronunciation of characters making up the names Minamoto/Genji and Taira/Heike) between the Taira and the Minamoto broke out. The Genji/Minamoto won the war and Minamoto Yoritomo founded the Kamakura "bakufu" (military regime) in 1185. In 1192 the Tenno promoted Yoritomo to shogun. The Kamakura bakufu subsisted until 1333.

The population in the ancient period until the end of the Kamakura shogunate in 1333 has been increased from 400 BC approx. 100,000, 1000 AD approx. 4.5 million to 1333 approx. 7 million. The largest cities in 1300 AD were Kamakura (200,000) and Kyoto (40,000)⁴.

During the struggle for power in the 12th century a new warrior class was born, the "Samurai". The term samurai comes from the Japanese verb "saburau" (to serve). The earliest use of the term samurai appears to date from 8th century AD, but has no military context, and refers supply to domestic servants who had the care of elderly people. In the 10th century the duty of the samurai got a military dimension to serve as guards on behalf of the imperial court or the court of the local clans. During the Kamakura shogunate the class of samurai warriors played an important role for defending the country against the Mongol invaders in 1274 and 1281.

The Japanese recruitment system, arms and armour gradually developed in accordance with times and necessities. For example, early Japanese swords were straight and only for thrusting until they became curved in the 9th century in order to be used for slashing. In the early years the backbone of the conscript army was the infantry linked to a central taxation system. The infantry was well trained and fought as five-man squads from behind the protection of heavy wooden shields. The "heishi" (soldiers) were equipped with a sword, yari and bow. The most important assault weapon of the early days

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was the “yumi” (crossbow). Each company were equipped with two ooyumi. By the middle of the 10th century the ooyumi is found only as a siege weapon, and by the time of the Genpei-war in 1180 it had fallen completely out of favour. The heishi and the samurai were trained in the use of the Japanese bow, the “yari” (a special kind of spear), the sword and dagger. The use of the bow in Japan has a long tradition. There is evidence of its use for hunting in the Jomon period. The design of the bow is still used today in the martial “art of kyudo” (=the way of the bow). It was about 2,5 meters long and constructed from laminations of deciduous wood and bamboo, reinforced with rattan. The whole bow was then lacquered. It was designed for mounted as well as dismounted combat, having two-thirds of the length above the grip and one-third below. The Japanese long-bow has no simiral in Asia⁵.

In the late 4th century and the early 5th century AD the Yamato-state used bronze weapons. The late 5th century shows an advance in most weapons and armour. Because bronze was only allowed for religious and ritual objects, weapons and armour were made of iron. The first armour that has emerged from the 4th century is of two types: tight fitting solid plate cuirasses called “tanko” (literally “short shell”) and a skirted cuirass of lamellar construction called “keiko” (“hanging shell”). Full armours were perfected in the 10th century for protection of mounted commanders. The equipment was almost of native Japanese design with perhaps a little Korean influence on the shape of the sword blade and the form of the arrow head. Due to the humidity of the Japanese climate the iron had to be protected and black lacquer was employed for this purpose. The helmets were extremely unusual in shape having a bold ridged plate from the crown of the head to the bow region, where it projected several inches in front of the wearer’s head. During the Nara-period Tenno Shomu (724-748) built a storehouse at Nara to house the arts and crafts of his age so that they could be preserved for posterity, 90 lamellar armours and ten plate armours were placed therein. Unfortunately a rebellion caused them to be removed, never to be returned. Swords, bows and arrows and spears have survived in a very complete state⁶.

Nothing is known about the type and design of ships that took Japanese soldiers to Korea and fought the battle of Paekch’on River in the 7th century. The Japanese ships were probably no more than troop carriers. Throughout the early periods until the 16th century the vessels are “ships used for fighting” rather than “fighting ships”. The Japanese type of early warships had no Chinese-style tower and multi-storey decks. Contrary to the Japanese fighting ships, the ships of the Tang-fleet were equipped with a tower and multi-storey decks. Therefore the ships of the Tang-fleet had a far higher value in the battle⁷.

The horse as a mean for warfare was introduced to Japan from the Asian-continent in the 4th century AD. Horses of that time were smaller than horses of today. Horses were only 120 cm tall and had a weight of only 250 kg. Horses of today are 160 cm tall and have a weight of nearly 500 kg. A samurai-warrior full dressed with his armour weight nearly 100 kg. Therefore it was not able for the horses in ancient Japan to be very fast. We can imagine that a cavalry attack was not as fast as a cavalry attack in the 18th century in Europe⁸.

The production of swords and daggers and the blades of the yari depend on the quality of the raw material iron ore and on the production of iron. The Japanese method of production of iron is called “tatara-buki”. The “tatara-buki” process has a history stretching back more than one thousand years. The word tatara itself seems originally meant fuigo, or bellow, buki means air blowing. The tatara was first used in the Izumo region that is one of the heartlands of early Japan. In the Oku-Izumo mountain region good quality iron sand and a large amount of charcoal has also been produced since the early days. The region is now a part of Shimane prefecture which lies in the western part of the main island Honshu. The Izumo region is rich in iron sand. This was the main reason why the iron manufacture firstly developed in the Izumo region⁹.

The sword was the most important weapon of the samurai. It became a part of the soldier himself, upon which his all might well depend. The forging of a blade of the sword was a religious act and the workshop was purified before any part of the long process began. The earliest sword smiths may have been Chinese or Koreans. To know whoever began the craft is

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of no great consequence because the Japanese sword is quite different from any produced swords in the world. The sword smith was of the artisan class. He, with the armourer, was privileged for they furnished the samurai's all important arms. The forging of a Japanese sword took days or weeks and was considered a sacred act. The sword blade is formed from a combination of different types of steel: harder outer jacket steel wrapped around a relatively softer, inner core of steel. This creates a blade which has a unique hard, highly razor sharp cutting edge with an inner core which is resilient and able to absorb shocks in a way which reduces the possibility of the blade breaking when used in combat. The samurai used swords of different size and length. The longest sword is called "*katana*" (large knife), the shorter "*wakizashi*" (side insertion). The "*tanto*" (dagger) was much more important than the sword in deciding the outcome of a one-to-one combat. The military equipment changed his design in the Kamakura period. Firstly the helmet bowls were made slightly lower and more rounded and a closer examination would show that from twelve/eight plates were used fastened with much smaller rivets. The lamellae were reduced in size with a consequent increase in the number required for each lamination of an armour but being smaller they were also of thinner iron or hide and whilst still being strong they reduced the overall weight. Armoured sleeves as worn on the left arm only were now given additional plates¹⁰.

PART TWO: CIVIL WAR IN JAPAN AND THE "PAX TOKUGAWA"

The Kamakura shogunate was overthrown in 1333 by a coalition led by Emperor Go-Daigo. Go-Daigo himself was overthrown in 1336 by Ashikaga Takauji who established a new shogunate in the Muromachi district of Kyoto. Beginning with the Onin war (1467-1477) the country slipped into the century of civil war known as "*Sengoku jidai*" (Warring States period 1467-1568) in which feudal lords ignored the shogunate and the imperial court and struggled with each other for local hegemony. From the mid 16th century, a movement towards national reunification emerged out of the violence of warring feudal daimyo and was carried through by three powerful war lords, Oda Nobunaga (1534-1582), Toyotomi Hideyoshi (1537-1598) and Tokugawa Ieyasu (1543-1616). The short but spectacular epoch during which Oda Nobunaga and Toyotomi Hideyoshi established their military control over the country and began to reshape its feudal institutions is known as the "*Azuchi-Momoyama*" period (1568-1600), named after the famous castle of Nobunaga in Azuchi and the headquarter of Hideyoshi in the district of Momoyama in Kyoto. Hideyoshi had the visions of conquering Korea and establishing an enduring dynasty, though he lived to see his Korean invasions end in brutal failure. His death in 1598 left his heir vulnerable to rival daimyo. One of these, Tokugawa Ieyasu won the battle of Sekigahara in 1600 against the pro-Toyotomi warriors and assumed the title of shogun. Ieyasu established the powerful and enduring "*Tokugawa shogunate*" (1600-1868) in the city of Edo, the nowadays Tokyo. The Tokugawa system, oppressive as it was in many respects, gave the country more than two centuries of peace and relative seclusion from the outside of the world. Therefore the period was also named "*Pax Tokugawa*" (peaceful Tokugawa period).

Since the early Muromachi period the Iwai and Haruta schools of armors have been held sway but during the first quarter of the 1500s there came to the fore a family which had hitherto made horse bits, but now turned their hands to armor making with the result that they surpassed all who had worked before them and held the lead until 1868 when armor was finally discharged. This was the famed Myochin family whose first master Nobuie may well have introduced the high-sided, multi-plate helmets which proved so efficient in the most terrible battles in the sengoku-period. The Japanese suit of armor in the sengoku-period which was only worn by the shogun, highest military class, samurai and emperors were both powerful, unique works of art made by craftsmen of the highest skill level. Each suit of Japanese kikou (armor), Japanese kabuto (helmet) and truly has a soul or chi as well as a personality all of its own. These stunning works of Japanese art are made strictly in the authentic and traditional manner - all by hand and all by highly skilled craftsmen. Japanese Samurai armor and Samurai helmets and mempo (face mask) are superbly constructed, beautifully detailed and constructed by the highly skilled craftsmen. To offset the plain, utilitarian form of the new helmet, and to provide visibility and presence on the

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battlefield, armourers began to build fantastic shapes on top of the simple helmets in metal or lacquered paper over a wooden armature. These shapes mimicked forms from Japanese culture and mythology, including fish, cow horns, and the head of the god of longevity, bolts of silk, head scarved, ichi-no-tani canyon, and ace heads, among many others.

In the sengoku-period as battles became more and more complex, the "ashigaru" (literally "light-foot") became more and more important. While the ashigaru was the foot soldier, the cavalry was the territory of the samurai. Ashigaru were armed with spears or katana and in the 1500s they were armed with matchlock rifles too. Their armour consisted of conical hats, breastplates and occasionally greaves protecting the legs. An ashigaru had a helmet which played an important role for daily life in campaign. The ashigaru often used his hat as plates and dishes, i.e. to cook rice.

The population from the beginning of the 15th century until the beginning of the 18th century increased from 1400 AD approx. 8 million, 1600 AD approx. 12 million to 1750 approx. 28 million. The largest cities in 1700 AD were Edo (1.2 million), Kyoto (370,000) and Osaka (410,000).

Production of firearms in the sengoku-period: Though many battles were fought during the period of the "Warring States" samurai warfare hardly developed, but just before the mid 16th century a rapid change in the armament happened because the introduction of firearms and the development of the structure of castles. The most important influence on the warfare in the mid 16th century was the introduction of matchlock muskets which were brought by Portuguese traders in 1543 to the small island of Tanegashima near the island of Kyushu. The Portuguese arquebus was a simple, but well designed weapon. Both armourers and sword-smiths tried their skill at forging barrels and, after many failures at fitting satisfactory breech-plug, some Japanese rifles were finally made and before very long they were being produced with the necessary powder in many parts of the country and by the 1550s they were regularly seen in action in battles. For example, in 1549 Oda Nobunaga placed an order for 500 arquebuses with the gunsmith of Kunitomo.

The efficiency of the matchlock musket has been assessed in experiments. Five bullets, each of 8 mm calibre, were fired at a target in the shape of an armoured samurai from a distance of 30 and 50 metres. At 30 metres each of the five bullets hit the target area of the chest, but only one out of the five hit the chest area at 50 metres. The experiment shows that the bullets could do damage within 50 metres. In a second experiment a rifle was fired at ranges of 30 and 50 metres against 24 mm and 48 mm wooden boards and 1 mm and 2 mm iron plates. At 30 metres each was pierced clearly. At 50 metres the 24 mm wooden board and the 1 mm iron plate were again pierced through. At 50 metres the bullet entered the 48 mm wooden board for three-quarters and the 2 mm iron plate got a dent on the inside, but not pass through¹¹.

The Japanese warlords also used canons in their warfare. The first breech-loader canon arrived to Japan in 1551. Attempts were made to copy the cannon too, but not with the same success as it happened with the rifles. At the beginning of the Tokugawa period in 1603 it is estimated that there were nearly 200.000 firearms in Japan, but by the end of the Tokugawa shogunate in the 1850s there was still the same number. Later in the Tokugawa period Japan got few pieces of wheel-lock and flintlock muskets. These new models were built in small numbers, but the technical system was never further developed. When European returned to Japan in the mid 19th century the same models of rifles were used by the samurai as at the beginning of the 17th century¹².

Late Edo arsenals emerged in two forms. First, artisan manufacturing centres produced under contract to the central government. They were either managed by local domain-management or privately run. They included the Ishikawajima shipyards (today Ishikawajima-Harima Heavy Industries, Japan's sixth-largest defence contractor today) and the Hyogo Iron works (today Kawasaki Heavy Industries, Japan's second largest defence contractor today).

Naval shipbuilding in the sengoku-period: Japan undertook efforts to built warships in the mid to late 16th century, when daimyos built coastal navies of several hundreds of ships. These vessels may be regarded as floating fortresses rather than true warships, and were only used in coastal actions. They used oars for propulsion and had also one or two masts to use wind-based propulsion via sails.

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The largest of these ships were called "Atakebune". The crew of an atakebune consists of 80 oarsmen, 60 samurai with three canons and 30 matchlock rifles. In 1578 Oda Nobunaga had made six iron-covered Atakebune. The ships were called "Tekkōsen", meaning "iron ships", which is not to imply they were of iron, but that their superstructure may have been reinforced with iron plates against cannon and fire arrows. The medium sized "Sekibune" ships, smaller craft, and most Japanese transport ships had a single mast that only sailed in favorable winds. The crew of a sekibune consists of 40 oarsmen, 30 samurai with one canon and 20 matchlock rifles. A sekibune had no superstructure. The smallest warship was the "Kobaya". A kobaya was manned with 20 oarsmen, 18 samurai with 8 matchlock rifles. Like the sekibune a kobaya had no superstructure¹³.

The most developed naval ship of the sengoku period was a large atakebune named "Nihon Maru". It was the flagship of Hideyoshi's invasion fleet for the Korean campaign. The "Nihon Maru" was built 1591 by Kuki Yoshitaka and had a superstructure which looked like a Japanese castle of the period of warring states.

The warships of the Tokugawa naval forces in the mid 19th century had the same design as the warships of the sengoku-period. After the arrival of commodore Perry and his black ships in the bay of Edo the first modern warship of Japan was built in Kagoshima in 1854. The Shohei Maru was 27.5 metres long and was equipped with 10 canons. Between 1854 and 1867 the shogunate created a small navy consisting of 20 warships and 22 auxiliary warships. From these 42 ships only 9 were built in Japan¹⁴.

PART THIRD: FROM MEIJI-RESTORATION UNTIL THE END OF THE WORLD WAR TWO

The seclusion of Japan was threatened in the 19th century as Russian, British, and American vessels began to probe Asian waters and press for trade with China and Japan. The shogunate's failure to expel the barbarians, the concession of unequal treaties, and the opening of ports after Perry's visit in 1853 set in motion a chain of events that led the powerful domains of Satsuma, Chōshū, and Tōsō to use the imperial court to challenge the shogunate which was overthrown in the Meiji-Restoration of 1868. The sudden arrival of US Navy Commodore Matthew Perry with four steam-powered warships in Japan 1853 was a show of force that highlighted the vulnerability of Japan's insular society and its weak forces. Centuries of isolation had led to a deep-seated distrust of foreigners, and by the mid 19th century this attitude, a mixture of ignorance and pride, had brought the country to a position of grave danger. Japan was militarily in no condition to meet the challenges of European and US imperialism. Before Perry the contact with West had been maintained through the Dutch trading post at Dejima near Nagasaki. Through this small dent in Japan's isolation had come the western, or more specifically Dutch, learning known as Rangaku. Rangaku consisted of essentially technical information.

The young samurai who carried through the restoration wanted to preserve, revitalize, and strengthen the country. This process moved ahead rapidly during the course of the Meiji-period. The slogan of the new leadership of Japan was "fukoku kyohei" (enrich the country, strengthen the military). This meant reforming most social, political, and economic institutions along western lines. The Meiji state's first task was to consolidate its own powers, and among its first act in 1868 was the establishment of the Ministry of Military Affairs, including an arms office responsible for the standardizing the manufacture of munitions and other war materiel. The government requisitioned and turned over the Imperial Army and Navy the existing military arsenals, starting with those managed directly by the bakufu (the military government) and later adding the plants of the local daimyos. This requisitioning included the Ishikawajima shipyards in Mito and the Shogun's Sekiguchi factory in Koishikawa, renamed Tokyo Arsenal in 1870. Direct military procurement was an early and critical stimulus. By 1877 military spending accounted for nearly two-thirds of central government investment, and in the 1880s it averaged more than half. With all these measurements Japan achieved industrial progress and built up sufficient military power to defeat China in the First Sino-Japanese War in 1894-95 and Russia in Russian-Japanese War in 1904-05, and to annex Korea in 1910, emerging as the major imperialist power in East Asia. The economy benefited considerably from the

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mobilization for the Sino-Japanese and the Russian-Japanese War. At first, benefits were limited to the state-run arsenals. The Tokyo arsenal was expanded to 500 workers at the time of the Satsuma rebellion in 1877, and it employed more than 5,000 workers in 1905 at the end of the Russian-Japanese war¹⁵. Later in the mid 1880s the Japanese armament industry was shifting from state-owned to privately owned firms: the shift to private production had three lasting consequences. First, the state arsenals never regained their dominance in the economy. Second, Japanese bureaucrats used the shift to hone their fiscal policy skills and third, the shift helped consolidate industrial production, as a small number of large, privileged suppliers benefited disproportionately. Mitsubishi, Kawasaki and Osaka Steel Works received nearly 88 percent of all subsidies under the shipbuilding Encouragement Law between 1897 and 1918.

In the First World War, Japan joined the Allied powers, but played a minor role in fighting German colonial forces in East Asia¹⁶. After the World War One, Japan's economical situation worsened. The Great Kanto Earthquake of 1923 and the world wide depression of 1929 intensified the crisis. During the 1930s, the military established almost complete control over the government. Since 1930 the Japanese influence in Manchuria has been steadily growing. In 1931, the Japanese Kwantung army occupied Manchuria. In the following year an independent state "Manchukuo" was declared. In 1933, Japan withdrew from the League of Nations since it was heavily criticized for the actions in China. In 1937, the second Sino-Japanese war broke out and in December 1941 Japan attacked the USA at Pearl Harbour. Japan was able to expand its control over a large territory that expanded to the border of India in the West and New Guinea in the South within six months. The turning point of the Pacific War was the battle of Midway in June 1942. During this sea-battle, the Japanese Imperial Navy lost four large aircraft-carriers. From then on, the Allied Powers slowly won back the territories occupied by Japan. In 1944, intensive air raids started over Japan and after US military forces dropped two atomic bombs on Hiroshima and Nagasaki on August 6 and 9, 1945. Japan surrendered unconditionally on August 14, 1945. On the 2nd of September 1945 in Tokyo Bay representatives of Japan's government and her military signed the Instrument of Surrender on board of the battleship USS Missouri. At the end of World War II, Japan was occupied by the Allied Powers, led by the United States under General MacArthur. This foreign presence marked the first time in its history that the island nation had been occupied by a foreign power.

The population in the period from the beginning of the Meiji-Restoration until 1938 has been increased from 1872 approx. 34 million, 1900 approx. 44 million to 1938 approx. 72 million. The most important cities in 1900 were Tokyo (1.8 million), Osaka (995,000), Kyoto (380,000), Yokohama (326,000) and Nagoya (280,000).

*Automobile Industry*¹⁷: The first car dealer in Japan was an American company which set up a show room in Tokyo in 1901. In 1902, a technician named Uchiyama Komanosuke built two trial cars with a gasoline engine. Two years later, in 1904, a bus with a steam engine was produced in Okayama and in 1907 Uchiyama Komanosuke produced the Takuri, the first entirely Japanese-made gasoline engine car.

Not later than the Japanese-Russian war (1904-05) the military took a great interest in automobiles for transportation. Therefore the military studied the military use of vehicles in Germany and France. In May 1911 the first truck was produced at the Osaka Artillery Factory. As a measurement of mobilization in 1918 the Military Subsidy Law was established. Under this law, the military granted subsidies to automobile manufactures to produce automobiles to be used by civilians during peacetime and converted to military use in wartime.

In the 1920s after the great Kanto earthquake in 1923 Ford and General Motors (GM) established daughter companies in Yokohama (Ford) and Osaka (GM) and began local assembly and sales. Later Chrysler also followed. In 1925 these three firms produced nearly 20.000 cars, about 43 times the production of domestic cars (458 cars). After the outbreak of the Sino-Japanese in 1937 war the big three were gradually superseded for reasons of national security. In 1939 the production of Ford, GM and Chrysler in Japan withdrew completely. In sum, the big three produced nearly 209,000 units of cars between 1925 and 1935. The domestic production in the same period was only 12,127 units.

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Not until 1931 a Committee for the Establishment of a domestic automobile industry was formed and as a result in 1932, the Tokyo Gas & Electric Engineering Co., Ishikawajima Automobile Manufacturing and Dat Automobile Manufacturing together produced an experimental car called "Isuzu" (fifty bells). In 1937 the three companies merged to form Tokyo Motor Co. Ltd which became the forerunner of Isuzu Motors and Hino Motors. After the outbreak of the Sino-Japanese war in 1937 the ministry of war issued the "Five-Year Outline Plan for Strategic Industries" which applies the wartime system to the motor vehicle industry. During the five years the automobile industry had to increase the output from an annual initial production of 37.000 units to 100.000 units. The plan couldn't be carried out. In 1941/42 only 45,433 trucks and busses were produced.

The Japanese forces used motorcycles too. Since 1937 the Japanese industry has been produced more than 18,000 motorcycles of the Type 97 which was nearly a replica of a motorcycle of the US producer Harley Davidson.

*Infantry weapons*¹⁸: The first Japanese designed infantry firearms were adopted by the army. Invented by Infantry Major Murata Tsuneyoshi, the 11 mm calibre single shot rifle featured a turn-bolt action and was termed the Model 13 rifle (13th year of the reign of emperor Meiji). The rifle was mostly produced in the Koishikawa arsenal in Tokyo. The design, development, and production of small arms continued at Koishikawa arsenal until 1929, at which time the transfer of the small arms production section of the Tokyo Arsenal to the newly built Kokura Arsenal at Kyushu began. Another important arsenal for the production of firearms was the arsenal in Nagoya, established in 1923. For the production of firearms outside of Japan, arsenals in Mukden in Manchuria and Inchon in Korea were established in the 1920s and 1930s. According to U.S. Army Ordnance records, civilian factories did not manufacture complete weapons. They were mainly used to make component parts, which were then shipped to main or branch arsenals for assembly. The most important rifles used by the Japanese Forces during the Second World War were the Type 38 (6.5 mm) and Type 99 (7.7 mm) rifles. These rifles were designed by the artillery Colonel Arisaka Nariaki.

The Japanese arsenals developed and manufactured light and heavy machine guns. Introduced into service in 1922 and designed by General Nanbu Kijiro, the light machine gun type 11 (6.5 mm) was widely used during the 1930s. This gun has many odd features. For example, its feed was via a hopper, using five-round clips of rifle ammunition. The type 11 was replaced by the Type 96 light machine gun, introduced in 1936. It has a 30 round box magazine. Light machine guns were backed up by heavy machine guns in both 6.5 mm and 7.7 mm calibre; one of the latter, the Type 92 was nicknamed "the woodpecker" by the Allies because of its unmistakable sound.

Other infantry weapons were pistols (Nanbu 8 mm), grenades, special grenade dischargers (the Type 10 grenade discharger was a 50 mm smoothbore, muzzle loaded weapon, which had a range of 175 meters), Nanbu 8 mm sub-machine guns Type 100 and anti-tank guns (37 and 47 mm) and 20 mm anti-tank rifles. The Japanese Infantry made use of infantry guns and mortars too.

*Battle tanks, armoured cars and vehicles*¹⁹: The battle tank didn't play an important role in military planning in Japan before the WW II. The battle tank was mainly a support weapon for the infantry. Therefore the first tanks were light and medium tanks which were easy to transport and easy to deploy in the jungle warfare. In 1918 Japan bought the first battle tanks from France and Great Britain. Approximately 1927 Japan built its own prototype of a light battle tank in the Osaka arsenal. In 1932 Mitsubishi built the model 2592, a light battle tank and in 1935 nearly 1,250 battle tanks of the model 2595. Note, 2592 means 2592 years after the foundation of Japan in 660 BC. Therefore the Type 2592 was developed in 1932. The first prototype of a modern battle tank was developed in 1929. The most used medium battle tank was the model 2597, built in 1937 in various configurations, i.e. as bridge layer, observation tank, recovery tank, but only in small numbers. The most sophisticated medium battle tank was the model 3, but only 60 were built before the end of the war. In sum not more than 6,450 tanks in all configurations were built until the end of the war. In comparison with the USA a small amount, produced nearly 86,000.

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In their war against China, the Japanese used a number of obsolescent armoured cars which included the Type 87 and the Sumida type ARM which has entered service in 1928. Most widely used was the Sumida Type 93 6x4 which was designed so that it could quickly be adapted for rail use by fitting six flanged steel wheels. The Type 93 had a crew of six, and mounted a single machine gun in the turret.

*Artillery and Anti-Aircraft Artillery*²⁰: Until the 1920s the Japanese Industry was not able to develop and produce modern artillery pieces for the armed forces. Therefore the Japanese Army used German built Krupp howitzers and cannons. Later the Osaka and Tokyo arsenal built Krupp howitzers and cannons in license. After the beginning of the 1930s Japan's armament industry built modern French designed Schneider canons and howitzers in license. In the middle of the 1930s the Japan armament industry was able to produce howitzers and cannons which were developed by Japanese technicians. During the Years after the First World War until the end of the Pacific War the Osaka arsenal became the principal centre of gun design and manufacture. The most used artillery pieces in World War One were 7,5 cm field and mountain cannons and in the Second World War 10,5 cm and 15 cm field howitzers.

*Electronic and Radar*²¹: At the beginning of the 1930s, Japanese electronic- and radar-specialists begun developing Japanese electronic and radar systems, but not earlier than the 1940s the first fully operational equipment were introduced into the armed forces. The army used a radar system which has a range of 35 miles and the navy implemented radar tracking system type 21. This type 21 has a range between 20 km (single battleship) and 100 km (wing of aircrafts). In comparison to the radar and electronic systems which were used by the forces of the allied powers, the electronic- and radar equipment used by the Japanese Armed Forces was not competitive. The lack of far reaching radar systems was disastrous for the Japanese Imperial Navy during the great sea-battles at the end of the Pacific War.

*Missiles and rockets*²²: Japan like the Third Reich, the USA and Great Britain tried to develop guided missiles and rockets. In the technical research laboratories of the Imperial Japanese Navy Surface to Air guided missiles were developed. All the developed missiles and rockets were not efficient enough to change the course of the WW II in favour of Japan.

*Aviation Industry*²³: The history of aviation in Japan began in April 1891 as Ninomiya Chuhachi succeeded in flying a rubber-powered model aeroplane. In 1910 two Army officers were sent to Europe to learn to fly an aeroplane. After their return to Japan they demonstrated their abilities with their imported Henri Farman and Grade aeroplane. The first airplanes which were built in Japan were replicas of foreign designs. The first airplane of domestic design was a float plane built by Nakajima Chikuhei in 1916. In the late 1910s the "Big Three" of the Japanese aircraft industry, Mitsubishi, Nakajima and Kawasaki began to develop and produce aircrafts and aircraft engines. The first use of an aircraft by Japanese forces in combat happened during the campaign against the German positions in Tsingtao in 1914. The aircrafts of the seaplane carrier "Wakamiya", became the first of its kind in the world to successfully attack land and sea targets. These planes would also take part in another military first: the first night-time bombing raid.

During the 1920s until the middle of the 1930s the aircraft industry of Japan depended essentially on foreign technology and French, English and German technicians helped to establish a domestic aircraft industry. However, by the 1930s Japanese Army and Navy officials were determined that the Japanese aircraft industry stand on its own feet, and the established a policy of self-sufficiency whereby only aircraft and engines of Japanese design would be considered. Not later than 1936 the Japans aircraft industry was able to produce their own domestic designed aircrafts and aircraft engines, i.e. the twin-engined bombers Mitsubishi Ki-21 ("Ki" stands for Hikoki, which means airplane) and G3M1 or the carrier-based bomber Nakajima B5N1. In March 1941 the aircraft industry was given their last prewar expansion by the government. With the outbreak of the war certain materials became critical. As a result, the Army and Navy each organized their own control of raw materials within their own sphere of influence. The material problem was further complicated by a persistent labour problem. Between 1941 and 1945 Japan aircraft industry built nearly 70,000 aircrafts. In comparison, between 1941 and 1944 the USA built nearly 261,000 aircraft and Germany in the same period nearly

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92,000. The aircraft manufactures in Japan were Kawasaki near Kobe and Nagoya, Kayaba, Kokusai, Mitsubishi in Nagoya, Nakajima in Ota, Rikugun, Tachikawa in Okayama and Kofu, Aichi near Nagoya, Kawanishi in Osaka and Kobe, Yokosuka, Kyushu near Fukuoka and Mansyu. Of these aircraft manufactures the most important were Nakajima with 19,561 built aircrafts (37.1%), Mitsubishi 12,513 built aircrafts (23%), Kawasaki with 8,243 aircrafts (14.9%), Aichi with 3,627 (6.9%) and Tachikawa with 6.645 aircrafts (6%). The most produced aircraft was the Mitsubishi built A6M (Zero fighter). More than 10,000 fighter plans of the A6M in various configurations were built between 1939 and 1945. Other aircrafts built in larger scale were Nakajima Ki-43 (5,919 Hayabusa fighters), Nakajima Ki-84 (3,514 Hayate fighters), Kawasaki Ki-61 (3,078 fighter aircrafts), Mitsubishi G4M and G3M (3,494 bombers) and Yokosuka D4Y (2,038 dive-bombers).

The most successful flying-boat of the Pacific war was the Kawanishi built H8K flying-boat. The Achilles's heel of the Japanese was the production of multi-engined bombers. For example the Japanese aircraft industry was able to develop and built only a handful of four-engines bombers.

The Japanese aircraft industry also developed and produced a small amount of helicopters (240 Kabaya Ka-1) and aircrafts with a rocket and jet propulsion (7 Mitsubishi J8M Shusui and 2 Nakajima Kikka). The maiden flight of the Nakajima, which had a similar design as the German Messerschmitt Me 262, happened on 7th of August 1945 at Kisarazu Naval Air Base.

The *Kamikaze* ("divine wind") were suicide attacks by Japanese military aviators against Allied naval, designed to destroy as many warships as possible. Kamikaze pilots would attempt to crash their aircraft – often laden with explosives, bombs, torpedoes and full fuel tanks – into Allied ships. In Japanese, the formal term used for units carrying out suicide attacks is „*tokubetsu kōgeki tai*” (literally "special attack unit"). By the end of WW II, the Imperial Japanese Navy had sacrificed 2,525 kamikaze pilots, and the Imperial Japanese Army Airforce 1,387. The mostly used aircraft for Kamikaze attacks were Yokosuka MXY-7, Mitsubishi A6M and Nakajima Ki-43. The number of ships sunk by Kamikaze pilots is a matter of debate. According to Japanese propaganda announcement, the Kamikaze sank 81 ships and damaged 195. In a 2004 book, *World War II*, the historians Wilmott, Cross and Messenger stated that more than 70 U.S. vessels were "sunk or damaged beyond repair" by kamikazes. According to a U.S Air Force webpage approximately 2,800 Kamikaze attackers sunk 34 Navy ships, damaged 368 others, killed 4,900 sailors, and wounded over 4,800. Despite radar detection and cuing, airborne interception and attrition, and massive anti-aircraft barrages, a distressing 14 percent of Kamikazes survived to score a hit on a ship; nearly 8.5 percent of all ships hit by Kamikazes sank.

*Naval Shipbuilding*²⁴: During the Meiji era the shipbuilding industry was the core industry which involved elements of the machine, electronics, aviation, and telecommunication industries. The Meiji government adopted a policy of transferring technology from foreign countries first, and then supporting domestic industry production. The technology transfer began with the training given by Dutch engineers at the naval training school in Nagasaki in period of the late Tokugawa shogunate. In 1865, Japan signed a Japan-France Technology Aid Contract, and from 1865 to 1877, French engineers visited Japan for training. The knowledge of French engineers was important for the construction of new naval yards in Japan. After 1878, Japan received technological support principally from England. Japans' most important naval yard in Yokosuka in the bay of Tokyo were built between 1865 and 1872. The modern naval yard in Yokosuka was designed by the French engineer Verny.

After the suppression of the Satsuma revolt in 1877 the government began to arm the navy. Within a decade Japan bought modern warships in England (24 cruisers and 22 torpedo-boats) and built warships in the naval yards of Yokosuka and Kure. At the beginning of the first Sino-Japanese war in 1894 the Japanese Imperial Navy contained a fleet of 12 modern warships (*Izumi* being added during the war), one frigate (*Takao*), 22 torpedo boats, and numerous auxiliary/armed merchant cruisers and converted liners. Many of Japan's major warships were built in British and French

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shipyards (eight British, three French, and two Japanese-built) and 16 of the torpedo boats were known to have been built in France and assembled in Japan. Following the Sino-Japanese War, Japan began to build up its military strength in preparation for further confrontations. Japan promulgated a 10-year naval build-up program, under the slogan "Perseverance and determination", in which it commissioned 109 warships, for a total of 200,000 tons, and increased its Navy personnel from 15,100 to 40,800. The new fleet consisted of 6 battleships (all British-built), 8 armored cruisers (4 British-, 2 Italian-, 1 German-built *Yakumo*, and 1 French-built *Azuma*), 9 cruisers (5 Japanese, 2 British and 2 US-built), 24 destroyers (16 British- and 8 Japanese-built), 63 torpedo boats (26 German-, 10 British-, 17 French-, and 10 Japanese-built).

After the Russian-Japanese war, Japan continued in its efforts to build up a strong national naval industry. Following a strategy of "Copy, improve, innovate" foreign ships of various designs were usually analysed in depth, their specifications often improved on, and then were purchased in pairs so as to organize comparative testing and improvements. The last major purchase was in 1913 when the battle cruiser "*Kongō*" was purchased from the British Vickers shipyard. By 1918, there was no aspect of shipbuilding technology where Japanese capabilities fell significantly below world standards.

The post World War One naval arms race was of short duration, being ended in 1921-1922 by the Washington Conference and subsequent treaty limiting naval armaments, which set a 5-5-3 ratio for the capital ships of Britain, USA and Japan. In the period between the great wars Japan had naval yards in Yokosuka, Kure, Nagasaki, Tsurumi, Yokohama, Kobe, Sasebo, Tokyo, Osaka, Maizuru. The largest battleships were built by Kure (Yamato) and Mitsubishi in Nagasaki (Musashi), the most modern aircraft carriers by Yokosuka (Shokaku), Kawasaki in Kobe (Taiho).

*Nuclear, biological and chemical armament industry*²⁵: During World War Japan tried to develop nuclear weapons. The leading figure in the Japanese atomic program was Dr. Yoshio Nishina, a friend of Niels Bohr and a close associate of Albert Einstein. Like the German nuclear weapons program, it suffered from an array of problems. The work went slowly, but shortly before the end of the war he had designed an ultracentrifuge, which he was hopeful would achieve the required results. Only the design of the machinery was completed before the Japanese surrender

From 1931 to 1945 the Japanese Forces engaged in biological and chemical warfare experiments using live human subjects, which led to the first widespread use of bacteriological agents in the war. Important for the Japanese biological and chemical Industry was Unit 731 (the Japanese Army's bacteriological warfare centre) and its commander Lieutenant General Ishii Shiro. Many of the scientists involved in Unit 731 went on to prominent careers in post-war politics, academia, business, and medicine.

FOURTH PART: JAPAN AFTER THE END OF SECOND WORLD WAR

After the Second World War, Japan was badly devastated. All large cities with exception of Kyoto and the industry and the transportation system were severely damaged. After the occupation by the allied powers, Japan lost all the territory acquired after 1894. In addition, the Kuril Islands were occupied by the Soviet Union. The rest of the Japanese war machine was destroyed. The context for post-war Japanese political and economic history was shaped by foreign policy of the United States of America. The first priority of the US policy under the Supreme Commander Allied Powers General Douglas MacArthur was demilitarization. Under the terms of the July 1945 Potsdam declaration and the August 1945 Basic Post-surrender Policy for Japan, Japan could maintain industry to earn exchange for payment of reparation but could not make arms. In 1947 a new constitution went into effect: the emperor lost all political and military power and was solely a symbol of the state. Japan was also forbidden to ever lead war again and to maintain armed forces. With the peace treaty that came into effect in 1952, the occupation ended. Japan established its own Defence Forces in 1954. To avoid the appearance of a revival of militarism, Japan used nonmilitary terms for the organization and functions of the forces. The armed forces were designated the Ground Self-Defense Force (GSDF), the Maritime Self-Defense Force

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(MSDF), and the Air Self-Defense Force (ASDF), instead of the army, navy, and air force.

An important factor for the Security of Japan is the US-Japan Security treaty in 1960. After the beginning of the Korean War, and accelerated by it, the recovery of Japan's economy flourished. The Korean War was an extraordinary "divine wind" for Japan. Special procurement by the U.S. military was nearly 70 percent of Japanese exports between 1950 and 1952 and contributed significantly to the rehabilitation of the Japanese economy. When the Occupation general Headquarter banned all aircraft production after the war, Kawasaki Heavy Industries converted its aircraft plants to produce busses and Nakajima became Fuji Heavy Industries and FHI produced Rabbit motor scooters after the war, selling many to U.S. soldiers.

In 1956 Japan normalized the relationship to the Soviet Union and, in 1972 the ones to China. After the painful period of post-war rehabilitation, the Japanese economy began to surge ahead in the 1960s, 1970s and 1980s. Growth slowed in 1990s, largely due to the Bank of Japan's failure to cut interest rates quickly enough to counter after-effects of over-investment during the late 1980s. Shortly before New Year's Day 1991, the Nikkei 225 index (stock market index for the Tokyo Stock Exchange) reached its record high of 39,000. By 1991, it had fallen to 15,000, signifying the end of Japan's famed "bubble economy". Subsequently, Japan experienced the "Great Slump in Heisei", which consisted of more than a decade of price deflation and largely stagnant Gross Domestic Product as Japan's banks struggled to resolve their bad debts and companies in other sectors struggled to restructure. In 2008, due to the global financial crisis, the economy of Japan was strongly hit and shrank 0.7% and is was expected to shrink around 5% in 2009.

The Government of Japan²⁶ has been dealing carefully with "arms" exports in accordance with the policy guideline named Three Principles on Arms Exports (hereinafter referred to as "the Three Principles") in order to avoid any possible aggravation of international conflicts. Under the Three Principles, "arms" exports to the following countries or regions shall not be permitted: (1) communist bloc countries, (2) countries subject to "arms" exports embargo under the United Nations Security Council's resolutions, and (3) countries involved in or likely to be involved in international conflicts. The Three Principles have been the basic policy concerning Japan's "arms" exports since they were declared at the Diet session in 1967. Subsequently, in February 1976, the Government of Japan announced the collateral policy guideline at the Diet session that the "arms" exports to other areas not included in the Three Principles will be also restrained in conformity with Japan's position as a peace-loving nation. In other words, the collateral policy guideline declared that the Government of Japan shall not promote "arms" exports, regardless of the destinations. The Ministry of Economy, Trade and Industry (METI) controls Japan's "arms" exports, based on the Foreign Exchange and Foreign Trade Law. The exports of "arms" and equipment for arms production listed in the Export Trade Control Order require export licenses to all destinations, since those transactions could be obstructive to the maintenance of international peace and security. In addition, "arms" trades mediated between foreign countries by Japanese agent need METI's permission. The term "arms" as referred to in the Three Principles is defined as "goods which are listed in a special list of the Export Trade Control Order of Japan, and which are to be used by military forces and directly employed in combat". Such "arms" include specially-designed parts and accessories as well as finished products. The question of whether each item falls under such "arms" or not will be judged objectively based on its shape, feature and other technical aspects, and regardless of its end-use. On the other hand, so-called dual-use items do not fall under such "arms." Based on other relevant laws, the Government of Japan also deals with in a strict manner: (1) direct overseas investment for the purpose of manufacturing "arms" abroad, and (2) participation in the overseas construction projects of military facilities. The export of technologies which are exclusively related to the design, production and use of "arms" as defined above (hereinafter referred to as the "military technologies") is treated in the same manner as the export of "arms." However, in order to ensure the effective operation of the Japan-United States security arrangements, the Government of Japan paved the way for the transfer of the military technologies to the United States as an exception to the Three Principles. Such transfer of military technologies to the

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United States is to be implemented in accordance with the Mutual Defense Assistance Agreement (the MDA Agreement) and the Exchange of Notes concerning the Transfer of Military Technologies concluded in 1983 under the MDA Agreement.

The population after the Second World War has been increased from 1945 approx. 71 million, 1950 approx. 84 million, 1960 94 million, 1980 117 million to 2010 approx. 127 million. The Japanese Self Defence Forces 2010²⁷ numbered 239,430 in 2005 with 147,737 in the Ground Self-Defense Force, 44,327 in the Maritime Self-Defense Force, 45,517 in the Air Self-Defense Force, and 1,849 in the Joint Staff Office. Reserves numbered 57,899.

*Automobile Industry*²⁸: After the war the automobile industry began with the production of small passenger cars in 1947. In 1948 the Automobile Industrial Association was founded. The foundation of other Associations followed. As a result the Japanese automobile industry became a success-story and the flagship of the industry. Today, the JSDF are equipped almost too 100% with domestically manufactured cars, trucks and vehicles for special purpose.

*The production of small arms and ammunition*²⁹: Howa machinery and Sumitomo Heavy Industries built the most important infantry weapons. Howa has designed and manufactured the rifle Type 64 (7, 62 mm) since 1964 and since 1989 the rifle Type 89 (5, 56 mm). Howa also manufactured mortars. Sumitomo has designed and produced a 7, 62 mm machine gun since 1962. The only ammunition production for small arms happened at Asahi-Seiki Manufacturing Co., Ltd., which received in 1961 the business rights for production and sales of ammunition from Toyo Seiki Co., Ltd.

*The production of heavy weapons (Tanks, armoured personnel carriers, artillery)*³⁰: After the WW II, the Japanese Industry began with the development of own tanks in 1955. The first battle tank, which was produced by Mitsubishi Heavy Industries between 1961 and 1975, was the Type 61. Nearly 560 were built. In 1962 the development of a stronger tank followed. Approx. 890 battle tanks of the Type 74 were built between 1975 and 1989. Since 1989 340 most modern battle tank of the Type 90 has been built by Mitsubishi Heavy Industries as main contractor. Sub-contractors are Japan Steel Works, Daikin Industries, Mitsubishi Electric, Fujitsu and NEC. In 1990 the development of a new battle tank started in the government's own research facilities. It is expected that the new battle tank goes into production in 2011. The Japan Industry, especially Mitsubishi Heavy Industries and Komatsu also developed and produced armoured personnel carriers and armoured infantry fighting vehicles. The most important Japanese Steel Works, especially the Japan Steelworks, developed and manufactured artillery howitzers and canons.

*Aviation Industry*³¹: In Japan, as elsewhere, the post-war aircraft industry emerged from a WW II alliance among military, the scientific community, and the aviation, electronics, and instrumentation industries. Military production remains the core activity. The four heavy industrial companies that dominate the Japanese aerospace industry- Mitsubishi Heavy Industries (MHI), Kawasaki Heavy Industries (KHI), Fuji Heavy Industries (FHI) and Ishikawajima-Harima Heavy Industries (IHI)-engaged in different parts of business together and separately. In 1955 MHI produced the US Jet F-86 "Sabre" under licence; in 1958 FHI (the Successor of Nakajima) designed and built the T-1, a Jet trainer. In the 1960s Shin Maywa (the successor of Kawanishi) designed and built flying boats, Kawasaki jet trainers, helicopters in licence and transport aircrafts. In the 1970s until now Mitsubishi built jet trainers and jet fighters, i.e. the F-2 a modernized version of the F-16 fighter. The latest project of the Japanese aircraft industry is the development of a fighter of the last generation which has the same configuration of the US fighter called "F-22 Raptor".

*Aerospace Industry*³²: Since the early 1950s Japanese scientists has been experimented with miniature solid-fuel rockets. In 1970 Japan launched its first artificial satellite Ōsumi and in 2003, three national aerospace organizations were merged to form Japan Aerospace Exploration Agency (JAXA). The primary spaceport of JAXA is located at the Tanegashima Space Center, on Tanegashima Island, 115 kilometers south of Kyūshū. On September 10, 2009 the first H-IIB rocket was successfully launched, delivering the HTV-1 freighter to resupply the International Space Station. In 2009 JAXA launched an H-2A rocket with its top secret payload from Japan's Yoshinobu launch complex on Tanegashima Island. That means

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that Japan now has three optical spy satellites and one radar spy satellite in operation.

"The satellite will gather intelligence for our defense and diplomatic purposes," told by Hisashi Michigami, an official at the cabinet office, for Kyodo News Service. "We hope to upgrade our ability to gather intelligence on our own. Intelligence gathering is vital to our national security."

*Naval shipbuilding industry*³³: The Maritime Self Defence Forces are a large fleet with significant blue-water operating capabilities. The force is based strictly on defensive armament. The first ships in the JMSDF were former US Navy destroyers, transferred to Japan in 1954. In 1956, the JMSDF received its first domestically produced destroyer since World War II, the Harukaze. Since 1956 Mitsubishi Heavy Industries in Kobe and Nagasaki built Submarines, destroyers, frigates and landing crafts, Kawasaki Heavy Industries in Kobe Submarines and Destroyers, Ishikawajima-Harima in Yokohama Destroyers. Smaller shipbuilders are Mitsui in Tamano, Sumitomo in Uruga and Hitachi in Maizuru.

The most sophisticated warships of the JMSDF are the AEGIS-destroyers and the "Hyūga-class" helicopter carriers (formally called helicopter destroyers (DDH). The first ship in the class, the "Hyūga", was commissioned in 2009. It was built by IHI and is stationed in Yokosuka port, near Tokyo. The "Hyūga" resembles a light aircraft carrier or amphibious assault ship such as the Italian Navy's 13,850-ton "Giuseppe Garibaldi", the Spanish Navy's 17,000-ton "Principe de Asturias" or the Royal Navy's 21,000-ton "Invincible-class" carriers. This ship will be capable of carrying 14 helicopters, 4000 people and 50 trucks. The ships are limited in their capacity to carry helicopters and fixed-wing aircraft capable of vertical liftoff, including Harriers and F-35 Joint Strike Fighter, and modification would be required to install a "HMS Invincible"-like 12°bow ski-jump ramp and other equipment needed to operate aircraft with even larger liftoff loads.

The 10,000 tons "Atago class" Aegis destroyers is equipped with the fire-control system for Aegis Weapon System Baseline 7 phase 1, which will combine American- and Japanese-manufactured systems to make up the complete Aegis system. The Atago and her sister ship the Ashigara were built by Mitsubishi Heavy Industries. The Aegis Combat System is an integrated naval weapons system. It uses powerful computers and radars to track and guide weapons to destroy enemy targets.

The mostly developed submarines are the "Sōryū class" submarine. The Submarines of the "Soryu class" are diesel-electric submarines being built by Kawasaki and Mitsubishi in Kobe. The "Soryu class" is currently the latest type of conventionally-powered submarine. It has a displacement of 2,900 tons surfaced and 4,200 tons submerged. The class will also have a Stirling Air-independent propulsion engine, allowing it to stay submerged for longer periods of time.

*Robot Industry*³⁴: The Japanese robot industry began in the late 1960s and had developed numerous practical applications by the 1970s. The year 1980 is considered the commercial start of high-tech robots. Japan's robotics industry is the world leader thanks to growing exports to emerging economies. Japan has become famous for its cutting-edge humanoid robots. There are areas of the service robot field in which Japan can hold its own against the West. The Ministry of Economy, Trade and Industry is promoting the 21st Century Robot Challenge Program with the aim of developing robotics as a leading industry by supporting R&D for existing robotic systems. Current activities include, for example, projects to develop a shared platform, and practical applications for next-generation robots and both human-friendly and supportive robots.

Also promoting a wide range of robot-related projects are by the Ministry of Internal Affairs and Communications, by the Ministry of Education, Culture, Sports, Science and Technology, and by the Ministry of Land, Infrastructure and Transport. According to a JRA study, there are currently some 130 Japanese robot manufacturers with proven production expertise, underscoring the high level of interest in robotics in both the public and private sectors.

CONCLUSION

The Japanese Armament Industry's journey through times which is the topic of the essay showed us the parallel

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advancement of high performance of the development of military goods and the demand for armament with the course of history. While the demand of armament was slow-moving in periods of peacetimes the development of armament fastened in periods of war time. In times of war the Japanese Armament Industry got important impetus from foreign products, i.e. the introduction of matchlock rifles in the 16th century and battle-tanks and airplanes in the 20th century. Because of the lack of raw materials the armament industry failed to support the warfare of the Imperial Forces in the World War Two (WW II). After the WW II the Japanese Armament Industry was dismantled, but not later than the Korean War in den 1950s the Japanese Armament Industry began their business activities. Nowadays the Japanese Armament Industry is a small part of the whole Industry, but it is able to meet most of the demand of the Japanese Self Defence Forces. To maintain the highest possible technical standard the Japanese Armament Industry makes a goal-directed research and development and undertakes a co-operation with the armament industry of USA. In 2011 by DefenseNews³⁵ published ranking of the 100 most successful armament producers in the world Japanese firms hold the place. It is apparent that these enterprises earn only a small amount of percent by selling armament, while other firms in the ranking earn more than 60 percent in the arms business. Because of the high standard of the Japanese Industry and its research laboratories, the Japanese armament industry at the beginning of the 21th Century is a high sophisticated part of the of the whole industrial sector of the Japanese Economy. The Japanese Armament Industry therefore can fulfil nearly all the wants of the Self Defense Forces.

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2 In the 19th century the Meiji government decided to specify a day on which to celebrate the founding of the nation. Adjusted to the modern calendar, the day, called Kigensetsu, fell on February 11. Kigensetsu, being closely associated with prewar nationalism and militarism, was abolished in 1948, but in 1967 the government decided to reinstitute the national day as "Kenkoku Kinenbi" (=commemoration of the founding of the nation).

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