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ANCIENT ARMS AND ARMOR OF JAPAN

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By

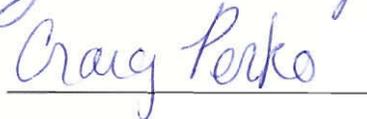
Nicholas Holmes



Jonathan Magnan



Craig Perko

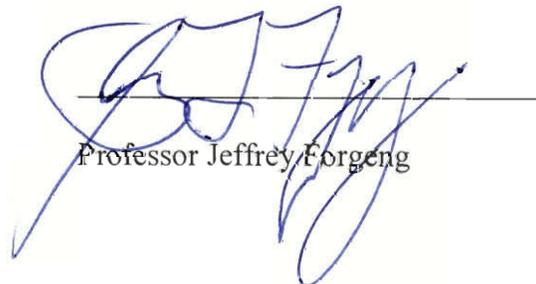


Paul Tessier



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Approved:



Professor Jeffrey Forging

1. Japan
2. Arms
3. Armor

Abstract

This project documents our research into the arms and armor of Japan between antiquity and the nineteenth century, as well as the Japanese military tactics of that period. It also provides an overview of Japanese history as context for this information. Photographic and written documentation of the Higgins Armory Museum's collection of about 300 pieces of Japanese arms and armor are also provided. These aspects of the project were combined to create a web-based virtual exhibit as a final product.

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Japanese Historical Periods

Nara	710-794 CE
Heian	794-1185
Kamakura	1185-1333
Muromachi	1333-1568
Azuchi-Momoyama	1568-1600
Edo	1600-1868
Meiji	1868-1912
Taishou	1912-1926
Shouwa	1926-1989
Heisei	1989-present

These dates were obtained from Irvine 2000.

Japanese Map



Map courtesy of Studyabroad.com (<http://www.studyabroad.com>)

Map slightly modified: "Rice Plains" (and accompanying lines) added, Osaka removed and replaced with Kyoto and Nara. Toyota renamed Nagoya.

This map should aid in an overall understanding of Japan's history and geography.

Introduction

This IQP focuses on the Higgins Armory collection of Japanese Arms and Armor. There are two main parts to this IQP, this document and a virtual exhibit of artifact information. The document is divided into four sections covering the history, military tactics, weaponry and armor of Japan. The virtual exhibit combines the information provided by the Higgins Armory through Professor Forngeng (including the notes by Morihiro Ogawa) with photographs of each artifact as well as analysis by our team.

The first chapter of this document focuses on an overview of the general history of Japan by Craig Perko. This is not an in-depth study of Japanese history; it is just a general overview that places events and situations mentioned in later sections into a cultural context.

Following is the chapter on the military tactics of Japan by Jonathan Magnan. This section focused on the usage of weapons and armor throughout history, giving possible insight on why armor or weapons developed in certain ways. This is prominently seen in the development of armor after the Edo period for instance. There is also a chapter covering the development of Bujutsu, the basic principles of combat.

The chapter between the one on military tactics and Bujutsu concerns the development of the samurai class throughout Japanese history. This chapter is written by Craig Perko.

The next two sections by Paul Tessier with assistance by Craig Perko are an in-depth look at all forms of Japanese weaponry. With a significant focus on the sword, this section covers the smithing, components and development of Japanese weaponry over

their history. This research was prominently used in the examination of the Higgins collection. The diagrams used in this section were created by Craig Perko.

The final section is by Nicholas Holmes. It covers the development and construction of Japanese armor, focusing on the development of armor after 1000 CE through the Edo period. The Higgins collection is mostly armor pieces, making this section perhaps the most relevant for examining the collection. The images and diagrams used in this section are photographs of Higgins artifacts taken during the course of this project.

The rest of this IQP focuses on photographing and documenting each of the hundreds of pieces of the Higgins collection, with notes and photographs for each, and combining this information with preexisting notes taken by Ogawa as well as information provided by the Higgins Armory. This combined information has been made into a virtual exhibit of the Higgins Japanese Arms and Armor collection. The virtual exhibit is a collection of web pages which allows users to access general information on Japanese arms and armor, images of the various Higgins Armory artifacts, and any specific notes that we made about each piece. The virtual exhibit was constructed by Paul Tessier.

1. General History of Japan

Japan's recorded history begins at about 600 BCE, when the legendary emperor Jimmu Tenno conquered much of Japan's two hundred islands, creating Japan's first true empire. This period is, however, merely legend, and the only relic from this time is the indigenous religion of Japan: Shinto.

Shinto is the worship of supernatural beings known as *kami*. They exist everywhere, and can be powerful, like the sun goddess Amaterasu, or weaker, like the *kami* found in individual houses. This worship idealizes purity and 'rightness of action', and shows the Japanese penchant for cleanliness, even from their first days of existence. (Sansom 1958: I, 5)

Japan's ruling class was created out of this religion. Everyone who would be emperor had to trace their family back to Amaterasu, and this divine descent was their reason to rule. Although this seems similar to the European idea of divine right, in truth the resemblance is only skin deep. An emperor has the right to rule because he *is* partly a god, not because he was born privileged.

These rulers had great power over 'normal' men and women for as long as there has been a Japan. The exact form of government varied greatly from tribal to monarchic until emperor Jimmu Tenno conquered much of Japan and, although Japan did not fully unite or remain united, it used his government style for quite a while: a god-ruler known as an emperor.

The emperor had theoretically infinite power, but unlike most similar monarchies, an emperor rarely, if ever, actually *used* his power. They provided religious guidance and

stability, but did not have much in the way of a standing army, and demanded little in the way of taxes, instead simply content to perform rites and ceremonies, and be a pillar of Japanese culture. Although this meant that the emperor had little military force and could not stop the various *daimyo* (military lords) from warring amongst themselves, it also meant that a mandate from the emperor carried behind it the force of a god to the highly religious Japanese. (Sansom 1958: I, 8)

Japan's first real contact with China came at about 200 BCE. China's culture was, at the time, the most advanced in the area by far. Japan's written language and much of their mannerisms are Chinese derivatives, although at the time Japan was still too disorganized and China too distant for any continual contact between them. In fact, Japan's Chinese influences at this time were mostly indirect, brought to them through the region known today as Korea. Despite this, China had a great influence on Japan's early development, and continued to influence Japan heavily until the fifteenth century (Sansom 1958: I, 13).

China was not the only influence on the culture and people of Japan. Japan's culture is heavily shaped by its geography. As a series of volcanic islands, Japan has limited land to farm, which is made worse by the fact that Japan's islands are, by and large, mountainous and not very cultivatable. Only three large plains are available for most of the food production in Japan, so most of Japan's extensive wars were motivated by competition for this land (Sansom 1958: I, 3). Everyone struggling for the best land set the stage for the militaristic rule of Japan: a heavy emphasis on the rights and powers of the military class until World War II.

It is this development of the military noble class, called *bushi*, which means ‘warrior’, that sets Japan apart from most cultures. It is estimated that a full 10% of the population were *bushi*, far higher than the European countries, which were, at most, 1% (Perrin 1979: 33). This heavy reliance on the military led the military to develop a particular set of mannerisms, and even before Japan had reached a state where it could be said to be truly civilized, it was developing *bushido*, the way of the warrior. Perhaps due to the number of *bushi* and the battle-torn lifestyle, *bushido* was very heavily fatalistic. A *bushi* prided himself on his resistance to pain, his ability to ignore personal hardship, and his willingness to die.

The sixth century CE brought relative peace to the land as a particularly powerful clan conquered the central islands. It was still far from truly peaceful, with a number of unfriendly clans and the natives known as Ainu attacking from the wilder regions in eastern Japan, but the civilization had grown far enough to allow the nobles to concentrate on things other than war.

Now having free time for learning and study, Japan sent students to China to learn all they could of culture and technology from that realm. Over a hundred years were spent catching up to China, technologically and culturally. The Korean peninsula in this time was rife with war, and in an effort to convince Japan to side with them, one of the countries in that region introduced Chinese Buddhism in 552 CE (Sansom 1958: I, 47-48). Buddhism appealed to the aesthetic views of the Japanese. Due to this appeal and significant political maneuverings, this doctrine was accepted in conjunction with Shinto, creating a kind of balanced double religion, both of which were equal in the eyes of the emperors.

Chinese culture was avidly absorbed by the Japanese up to the eighth century, culminating in a time known as the Nara period. It was initiated by the construction of the capital in a town called Nara. Nara imitated Chinese architecture and culture to such an extent that they even based their roads on the roads of the Chinese capital. Some of it still stands today, a treasure of almost unequalled cultural value.

The court at Nara only lasted from 710 to 774, but those years were considered a golden age (Sansom 1958: I, 83-128). It faded into the past as Japan grew out of strictly Chinese culture and into its own, basing the new court in Kyoto. Japan began to filter China's culture and technology, accepting only what they considered good, useful, or beautiful.

By the year 900, Kyoto was the Paris of its time, filled with art, culture, style, and arrogance. More than just a somewhat decadent culture of artists and poets, it was a center of learning: Japan's first university opened, and provincial schools were set up across Japan to further education. The love of learning and art was and is the backbone of truly Japanese culture, and as Japan separated further from Chinese culture, the Japanese began to write and paint with their own styles and subjects.

In 961, there were so many poems from so many Japanese in so many competitions that the emperor had to set up a poetry bureau to judge them all. This continued for hundreds of years, each generation of Japanese elite becoming more decadent and less concerned with day-to-day matters. By 1100, civil war erupted.

For the next five centuries, Japan had its 'dark ages'. Unlike the dark ages of Europe, which consisted of a decline in arts and sciences, Japan did not fall into barbarism, but instead continued to study art and culture along side the continuous, brutal

wars like the War of Ounin, a decade-long war that revolutionized Japanese armor in the mid to late fifteenth century. (Sansom 1958: II, 217-230)

The combination of feudal service, in which nobles serve their lord militarily, with bushido, the honorable way of the warrior, led to the creation of samurai. The samurai were warrior-philosophers of the highest caliber, and well respected and feared by the people of Japan. They were the highest social order, having nearly unlimited power over all the orders beneath them. Embracing the ideals of bushido, they were highly skilled and learned warriors, and eventually became known world-wide for their ability in combat.

In the early thirteenth century, the emperor, a thirteen-year-old boy, was suddenly faced with attack by the Mongols (Sansom 1958: I, 438-467). Unable to handle this himself, he gave the title of *Sei-tai Shogun*, which means 'barbarian-subduing generalissimo', to one of his finest generals. Along with the title came extreme power, and a responsibility to protect Japan from the Mongols. (Turnbull 1982: 47-49)

Fortunately, this responsibility was fulfilled. The first attack by the Mongols was met and defeated. After this defeat by the samurai, the Mongols created a fleet of ships of numbers unmatched for centuries and attacked Japan en masse. This second attack is one of the most important events in the history of Japan. The samurai held the Mongols off for months, but were steadily losing to the powerful Mongols with their explosives, pike men, and short-bows. With the Mongols on the edge of victory, Japan was favored by a hurricane they named the *Kamikaze* (divine wind), which destroyed almost the entire Mongol fleet. Buoyed by this timely hurricane, the Japanese took back the land they had lost and drove the Mongols away, this time permanently.

The *Seii-tai Shogun*'s power was so great after the battle that the emperor allowed him to keep it, rather than face the popular general and attempt to take it back. The shogun arranged for the position to be hereditary, and so were born the Shogunates, the successions of military rule in Japan. The Seii-tai Shogun was superior to the emperor in true power, and the emperor became more of an ornament and religious icon than a true leading force. (Sansom 1958: I, 438-467)

This began an era known as the Muromachi period. The true rule of Japan was in the hands of the Ashikaga Shogunate - the line of Ashikaga men who took the title Seii-tai Shogun. The era, which lasted until 1573, was filled with internal strife and civil war. The Ashikaga shoguns were, by and large, terribly incompetent and indolent. They were, however, quite fond of art and culture, and the Muromachi period was known for the artistic and cultural innovations. In addition, the Muromachi period was the period which is generally recognized as the peak of sword crafting. The katana (Japanese swords) from this era are superior even to those made today.

In 1542, Japan was contacted by European powers. Europe brought with it the smoothbore musket and Christianity. By and large, Christianity failed, but the musket did significantly better, and was soon being not only mass-produced in Japan, but also improved over the European design and exported in great numbers. (Sansom 1958: II, 261-269)

It was the musket that brought the downfall of the Ashikaga Shogunate. Smaller factions could equip their men with muskets and do impressive damage, more than an equivalent number of samurai. This caused a number of previously insignificant factions to gain power in a situation of rising chaos.

Three of Japan's greatest men arose from this period of chaos. Oda Nobunaga, who brought central Japan to heel (mid to late sixteenth century); his successor Toyotomi Hideyoshi, who finished uniting Japan (late sixteenth century); and, lastly, Tokugawa Ieyasu, who consolidated everything under the Tokugawa Shogunate in 1603, creating a government which lasted hundreds of years. This time was known as the Edo period, and it was a period of radical policy changes in the Japanese government. One such policy change was in how Japan dealt with foreigners.

By 1614, an impressive array of Europeans had arrived in Japan, and brought their religion with them. By and large, Japan ignored their religions, but the Europeans themselves did not ignore their religious differences, and broke out into occasional skirmishes on Japanese soil. As Japan heard more and more about the Europeans' wars on land and sea and their giant cannon-bearing ships, it became steadily more nervous. Hearing of a plot to overthrow the Japanese government, shogun Ieyasu finally expelled all Europeans from Japan in 1614. (Sansom 1958: II, 399-405)

The few Christian Japanese were hunted down as dissidents, and the Japanese closed their borders, even to themselves. The Tokugawa Shogunate curbed Japan's propensity to explore, inquire, and learn from the world by locking all of Japan away and using secret police to root out dissidents. They also performed the most vast disarmament in history. (Turnbull 1982: 47-49)

It is impossible to get perfect details from this era, as Japan had cut off virtually all contact with the outside world, and the Japanese records are not quite clear on the subject. However, what is certain is that the Tokugawa Shogunate ordered that gunpowder could only be made in the capital city of Nagahama, and then steadily

enforced this rule until very few gunpowder manufacturers existed outside of the government's own employ. They continued placing restrictions on guns and steadily ordering fewer and fewer themselves, until by the beginning of the eighteenth century they had all but ceased ordering them (Perrin 1979: 63). To make this disarmament reach further, they collected weapons from the citizens of Japan to melt down and use for nails in the construction of a great statue and shrine to Buddha. This was never constructed, but the swords and muskets were melted down. By the middle of the eighteenth century, most young Japanese had never seen a gun, let alone actually seen one fired.

Discarding their most advanced military ability is a uniquely Japanese phenomenon. It allowed Japan freedom to develop its culture without much interference from outside forces, and by the eighteenth century, Japanese arts had reached a peak. At this point, the haiku came into being, and the code of bushido that the samurai followed was further refined to include the unwritten code of *giri* - dedication first to his superior, then to his parents, then to his wife and children, and only then to himself.

The literacy rate was about 40% among all men (far higher than any European country), and Confucianism and intellectualism became important aspects of Japanese culture (Sansom 1958: III, 69-72). But, locked up by itself, Japan did not develop in the direction of war, and so when in 1853 the Europeans arrived, Japan had no defenses against their ships.

Not that the ships had to attack: their presence was enough to terrify the Japanese, especially since the western world had just conquered China. But the Japanese weren't the type to give up. They allowed the Europeans their extraterritorial rights (the Europeans could not be tried in Japanese courts, and were above Japanese law), but they

prepared to take them back. Their attempts were somewhat hampered by the Haitorei edict of 1876, which all but banned swords and guns, and removed many of the samurai's rights.

These events led to the Meiji Restoration, an interesting period of leaping forwards and backwards simultaneously. Attempting to regain Japan for themselves and reinstate the emperor to true power while retaining Japanese culture, the Japanese simultaneously made great jumps in technology and industry. Fourteen years after the Europeans arrived, Japan cast off the decadent Shogunate and restored the emperor to power. Renaming himself the Emperor Meiji and moving to Tokyo (renaming it in the process), this emperor is known as one of the greatest of Japanese history. (Turnbull 1982: 165-174)

Meiji surrounded himself with the best and brightest young samurai he could find and caused a tremendous upheaval along every axis of society. Politics, society, economy, and military were all completely torn down and reconstructed. Following their ages-old policy of learning, they sent out students, carefully chosen as the brightest of their fields, to many different countries to learn all they could. Simultaneously, they were learning all the technology that foreign technicians were willing to teach, to industrialize Japan as fast as possible. This is the most impressive and rapid conversion to an industrialized nation in human history, going from less than 30,000 industrial workers to over 400,000 in one decade.

In 1889, Japan declared a constitution based on Germany's government. In 1890, it declared the Rescript on Education, which declared that Japanese should be willing to die for the Emperor and Japan, and to observe filial propriety. It was taken to heart by the

Japanese populace, now in a patriotic fervor. In 1900, it was declared that ministers of the army and navy must be generals or admirals on active duty - a reward for their services in re-creating the government and creating, from scratch, a modern army. (Westbrook 1999: 348-352)

Also as a side effect of this modernization, the position of the samurai was weakened: there was little purpose for them in the new world. By 1900 swords had become strictly optional and samurai had begun to 'sell back their titles', giving up their rights as samurai to become important figures in the new government. This was not bloodless, as the Satsuma Rebellion proved. Hundreds of samurai, armed with swords and spears, assaulted a castle heavily defended by conscripts with guns. They still almost won, until overwhelming reinforcements arrived. (Turnbull 1982: 180-186)

Japan emerged from its modernization into a world busily taking apart China. Apparently emulating their Western colleagues, the Japanese began to take pieces of Asia as well. With the Japanese ascension to a world power, the Western world decided to release their Extraterritorial rights in Japan in 1894 and it became, once again, autonomous and completely free of unwanted outside influence by 1899.

Japan remained free of such influence for only another half-century. Gaining further confidence in an extremely one-sided war against Russia from 1908 to 1912, Japan then began invading Asia in 1937, perhaps as an after-effect of World War I. (Turnbull 1982: 169)

But Japan came out on the losing side of World War II, and was forced to accept American soldiers and bureaucrats, and to follow certain American rules. To destroy the symbols of Japan's military force, the Japanese were forced to give up their swords

entirely, surrendering virtually every sword in the nation to foreign troops. The only exceptions to this rule were artistic swords, which could not leave the museum, temple, or collection.

This symbolized the final blow to the last few samurai still clinging to their titles. It also ended Japan's combat-heavy tendencies. As of today, samurai are only legends, and Japan has turned its gaze from war and towards infrastructure and economy. The Meiji restoration which industrialized them served them well: as an industrialized nation, Japan could compete on the world market.

Japan's culture evolved again, to suit the current world, but still with its emphasis on learning, respect, and dedication, as their core beliefs have always been. This has led to their re-emergence as an economic powerhouse on the world market, and their workers becoming, in some ways, as renowned as their warriors: Japanese workers tend to have loyalty first to their company, then to their family, and only lastly to themselves. They perform very fine work with a devotion and skill that results in high quality and a very low error ratio. They also have the highest rate worldwide of working themselves literally to death. A fitting testament to their history as samurai with similar qualities, and a fitting continuation of their traditions, as best they can.

2. Military Tactics of Japan

For most of Japan's history, Japanese military tactics developed independently of outside influences. Japan remained heavily isolated from the outside world, having contact only with China, through Korea, and being invaded by the Mongols in the 13th century. Therefore, most of their tactics developed through the long history of civil wars that engulfed Japan up until the Edo period.

Since the beginning of recorded Japanese history, the Japanese have been adept at archery. Due to the mountainous terrain throughout Japan, archers, positioned correctly, would have the advantage of higher land, able to rain arrows upon their adversaries. Archery was taught as a fundamental art to the samurai, along with horseback riding, swordsmanship, spearmanship and swimming in armor; it was therefore a weapon and skill predominantly unavailable to the peasantry. Up until the 9th century, archery was the preferred form of combat for the samurai, with many battles consisting of bands of samurai on horseback riding against each other letting loose volleys of arrows (Turnbull 1982: 19).

Horses had been prominent in Japanese history since the Heian period, and the early samurai was well versed in combat from horseback. Many samurai were mounted archers, as well as versed in swordsmanship and spearmanship from horseback.

The Japanese of these early periods believed in the individual samurai as the main combative unit. Skill in various forms of weaponry and single combat was paramount, with most conflicts taking place with relatively small numbers of combatants. Many combats of this era were settled by duels or small skirmishes of high-ranking samurai and their retainers.

In the 9th century, 200 years of peaceful administration broke down in Japan. With the numerous wars for power reaching a larger scale than before, the sword overtook the bow as the main implement of combat (Yumoto 1958: 27-28).

The Mongol invasions of 1274 and 1281 CE brought about several refinements in Japanese battle tactics. Forces shifted from predominantly cavalry to infantry, with swords becoming significantly larger and heavier, and a far more widespread use of *yari* (spears) and *naginata*. Forces now consisting mostly of infantry also transitioned to lighter armors as compared to the heavier armors used from horseback. Conscripted peasants, or *ashigaru*, equipped with *yari* became a very large part of the military structure (Turnbull 1982: 62). The *ashigaru* were poorly trained and forced to supply their own armor, as well as prone to desertion and fleeing when faced with overwhelming odds.

The period from 1300 to 1600 CE was one of feudal barons and of great internal strife throughout Japan. It saw the continuously increased use of *ashigaru*, refinements in fortifications to protect against cavalry charges, and later against firearms, as well as the gradual decrease in power of the Shogun as the power of the *daimyo*, or feudal barons, in their independent provinces increased. However, army sizes up until the late 15th century did not increase past a few thousand samurai at any time.

The typical Japanese army of the periods between 1300 and 1600 CE consisted of samurai, *ashigaru*, officers and the large amounts of servants, weaponsmiths, fletchers and other non-combatants needed for an army to function. The troops were organized usually in units no larger than one hundred men, commanded by a superior officer, who was a samurai. Units of samurai would be led by a prominent samurai, while some

samurai of lesser rank led units of *ashigaru*. The army units would be positioned around the leading general, or in some cases the *daimyo*, to provide protection and to maintain lines of communication. Flag-bearers and signal-bearers were used to communicate between units and issue orders. Archers would usually be at the head of a military formation to provide advancing fire or to slow an attacking army. Light cavalry would be used as flanking troops, while heavy cavalry would charge infantry formations, particularly *ashigaru*. *Ashigaru*, being under-trained and badly equipped, as well as not adhering to the strict warrior codes of the samurai, were by far the most likely to rout in battle.

Communication and trade with the west brought about the introduction of firearms to Japan in 1543, which greatly altered military tactics due to their ability to penetrate armor at a distance (Turnbull 1982: 78). After only 10 years, Japanese-produced firearms rivaled the imported European models. Peasantry could be taught very quickly how to operate these firearms to the best of their limited accuracy and range, and were formed into units called “ashiguers”.

During the Momoyama period (1568-1600), Oda Nobunaga, a *daimyo* and great tactician, used firearms to a great extent in his conquest of Japan (Ratti 1973: 56). In his most famous battle, the battle of Nagashino in 1575, he positioned 3000 ashiguers three deep across a shallow river behind defenses and slaughtered numerous charges of mounted samurai, killing more than 3500 while taking minimal losses (Perrin 1979: 19).

The wars of the Momoyama period were the largest seen on Japanese soil. The conquest of Northern Kyushu in 1576 and the siege of Minimata castle by the Shimazu clan involved over 100,000 men (Turnbull 1979: 7).

Nobunaga's successor Hideyoshi enacted a series of changes to Japanese culture of great importance to Japanese military history. The increased, effective use of *ashigaru* in battle, especially by Nobunaga, led Hideyoshi to enact policies to disarm the peasantry, since they posed a significant danger to the class structure. Also of great danger to the samurai class were firearms. Nobunaga's prowess with ashiguers was destructive to mounted samurai, and the penetration of firearms through even the best armor was unrivaled. Therefore, Hideyoshi had all firearms that weren't held by the government confiscated and destroyed. These changes were to lay the groundwork for the Edo period's enforced peace, ending the history of large-scale civil wars throughout Japan.

The Edo period (1600-1867) brought a few centuries of peace to Japan, arms and armor taking on far more ceremonial and ornamental purposes, and military tactics stagnated. During this period, the forced disarmament of the peasantry resulted in the development of specific unarmed and specialty forms of *bujutsu* for self defense (Turnbull 1982: 145). Many were developed specifically for combating *ronin* (disenfranchised samurai), and focused on disarming and subduing opponents while unarmed or armed with weapons such as the staff. These techniques developed into the *kata jitte*, a martial art based on using the staff to disarm and subdue opponents typically wielding katanas.

When Japan was reintroduced to the west in 1853, the Japanese were forced to discard their policies of seclusion and adapt to the technological advancements that were introduced. By 1868, the massive shakeup from the west brought about many rebellions and the downfall of the Shogun and restoration of the Emperor, beginning the Meiji Restoration. At this time, weaponry and armor were modernized, bladed weapons and

traditional forms of armor falling out of favor to make way for the era of firearms and artillery.

2.1 Troop Types

Before the Mongol invasions of the late 13th century, the Japanese soldier was exclusively the well trained samurai. Typically mounted, heavily armored and wielding *yari*, bow, katana and *naginata*, they fought in duels or battles with small numbers of warriors. With honor as important as it was, a samurai would search for an opponent of near equal status, and each would shout out a history of the great deeds of their family line (Turnbull 1982: 19).

Following the Mongol invasions, with the realization that larger forces were necessary for protection of each daimyo territory, peasantry came to be heavily conscripted. In most cases they were forced to supply their own armor, and were usually equipped with *yari* as they were the simplest weapons available that retained some effectiveness in the hands of unskilled peasants. They fought in units of approximately sixty, as infantry, commanded by a samurai officer. *Ashigaru* were instructed in use of the short bow as well in a few cases. However, the training involved to use bows effectively prevented this from becoming very widespread. Following the introduction of matchlock muskets, *ashigaru* carried them into battle almost exclusively, due to the ease of training with them.

Wealthier samurai continued to ride into battle mounted in units of either heavy cavalry, with katana or *yari*, or as lighter cavalry, using bow, katana or *yari*. Other samurai fought as units of infantry, using a wide array of weapons, including *yari*,

katana, bow, *nodachi*, and *naginata*. Finally, samurai also served as infantry officers, commanding units of *ashigaru* in battle.

2.2 Military Formations

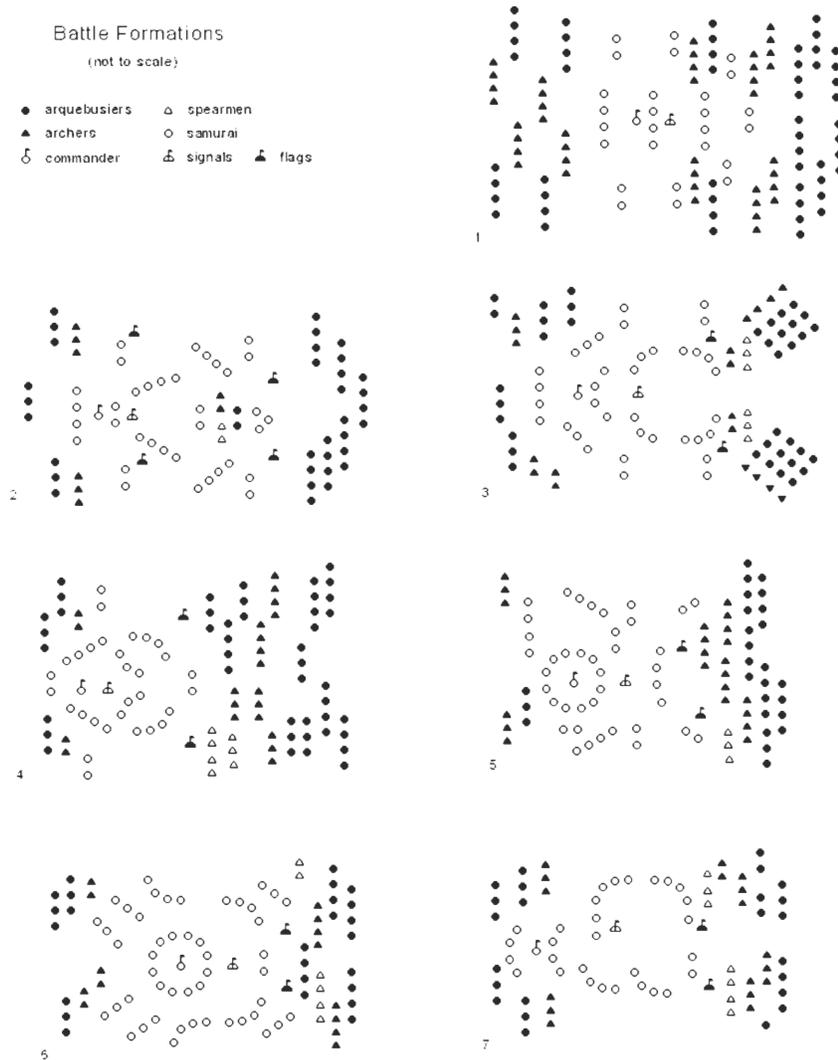


Figure 2.1 Diagram of battle formations

During the mid to late 16th century was the period of massive civil wars throughout Japan. The proliferation of firearms, the increased use of *ashiguers*, and the increased use of fortifications were all prevalent during this period. The military formations of this time had been refined and battle-tested for centuries and are the culmination of Japanese large-scale military tactics.

There were seven formations used primarily, each with set positions and formations for each type of troop. Each could be scaled up or down as necessary, so each formation could be used with a few hundred or thousand troops (Turnbull 1979: 10-12).

1. *Ganko* ('birds in flight'). A balanced arrangement of troops that is easily adaptable to changing situations in battle. *Ashigaru* with matchlocks protect the front and rear, with some on the flanks in case the opposing army shifts its position. The commander's entourage is situated in the rear, but not so far back as to hinder communications.

2. *Hoshi* ('arrowhead'). This formation is designed to be used for charges at the enemy. A thinner screen of ashiguers is used than in the Ganko formation with samurai following next to fill the gaps caused by the ashiguers' assault. This is a highly mobile formation, with the signaling devices and drums situated around the commander, who is far in the back of the formation. As this formation is designed for rapid penetration into the enemy's ranks, there is little protection on the flanks, coming from archers and spears.

3. *Saku* ('keyhole'). This formation is designed to combat the Hoshi formation. There are six ranks of ashiguers as well as two ranks of bows angled to intercept the charge of

the Hoshi formation and supply large amounts of crossfire. The samurai and spears in the center of the formation are used to blunt the charge.

4. *Kakuyoku* ('crane's wing'). A formation designed for surrounding the enemy in battle. As with the previous formations, the ashiguers and archers are located at the front, followed by spread-out samurai formations who can approach from either flank or head-on. The formation is designed to resemble the Hoshi on the battlefield, masking the ability to surround the enemy, in an attempt to draw the enemy into expecting a charge, while instead enveloping them.

5. *Koyaku* ('yoke'). This formation is named after its resemblance to the yoke around the necks of oxen. The basis is designed to be used as a flexible defense, especially against *Kakuyoku*, but can also be modified to blunt *Hoshi*. The samurai towards the front can be used to stall the enemy long enough to determine what attacks they are using and counter with the reserves.

6. *Gyorin* ('fish scales'). A modified, blunted form of *Hoshi* used for charges when outnumbered. It is used to maintain sustained pressure against one section of enemy troops. Its name comes from how the samurai and reserves resemble fish scales.

7. *Engetsu* ('half moon'). This is a defensive formation used when boxed in by the enemy. This is adopted in battle when the army has suffered losses and is in danger of being surrounded. The broken ranks are pulled back into the formation while the reserve

troops form a half moon that can be adapted as the situation changes. The archers and ashiguers form deep lines with spearmen behind to blunt possible charges and prevent being broken.

2.3 Fortifications

The Japanese began to use fortifications in large numbers in the 14th century (Turnbull 1979: 14). These provided protection against archers and cavalry alike, however were often made of wood, and therefore easily burned. Fortifications tended to be built on the available highland of a province, positioned to protect trading routes (Ratti 1973: 58). By the 17th century, *daimyo* had large stone castles capable of holding entire samurai armies.

Japanese castles were composed of two parts, the outer wall surrounded by moats and the interior buildings made of wood with stone foundations. The lack of significant long-range weaponry prevented these structures from being burned and the most common method of laying siege to a castle involved attempting to starve them out, or direct assaults on the gates and walls.

The advent of firearms in Japan actually had the reverse effect on fortifications from that seen in Europe. While gunpowder brought about the age of cannons in Europe, ending the age of castles due to their ability to decimate walls, the Japanese never developed the casting techniques required to construct cannon, and therefore had very few cannon. The few they had were traded or seized from westerners' ships or from China. Without cannon to destroy fortress walls, fortresses actually increased in use and multiplied throughout Japan as they were erected to protect against the deadliness of

ashiguers. However, with the peace of the Edo period, these fortifications were gradually abandoned.

3. The Samurai

Japan's history is rife with wars and combat, and Japanese culture developed a unique class of warrior to fight these wars: a class called the samurai. Roughly equivalent to a knight in Europe, but vastly different in form and function, the samurai is perhaps the most Japanese phenomenon ever to be conceived, and is recognized worldwide as a warrior of great power and honor. (Sansom 1958: I page?)

Japan's warlike past led to an unusually high number of noble warriors, and a very high degree of respect for these warriors. It is estimated that 10% of the population were *bushi*, or warrior nobles, as opposed to European countries, whose warrior nobles never accounted for more than 1% of the populace (Perrin 1979: 33). This extremely heavy emphasis on warriors led to a distinctive set of moral and physical attributes as time progressed and Japan entered recorded history - tolerance for pain and hardship, continuous strenuous training, dedication to their swords, and taking it for granted that death comes to all, and usually sooner than most to bushi. This code was called the code of *bushido*, which simply means 'the way of the warrior'. (Sansom 1958: II page?)

By 600 BCE, Japan consolidated under a series of emperors and the arts flourished under their rule. However, the emperors were hardly omnipotent, roughly equivalent to kings in a feudal society: the lords of the individual lands held much of the power, and often fought each other. In addition, natives and unaligned lords skirmished in the mountainous regions and eastern regions. Thus, there was always a call for *bushi*. By the year 900 CE, the *bushi* had evolved even further, into *samurai*. Samurai followed the ideal of bushido, and as time progressed, they cultivated their ideals, fostering the complex combination of war, poetry, dedication, and martial skill that the samurai

became known for. Although the term *bushi* was used before the term samurai, they are currently used interchangeably.

Only nobles were allowed to be samurai: in exchange for the lands that they ruled, they were required to give military service to their lord, similar to Europe. However, Japanese lifestyle was significantly different from that of Europe, leading to a completely different style of warrior.

Japan had, since the earliest days of its history, had a peculiar obsession with purity of mind and body. This manifested itself in their early religion, Shinto, which was a combination of purifying yourself and communing with spirits of nature. Samurai, above all others, were expected to follow these guidelines, valuing their purity of thought and action. (Sansom 1958: I page?)

Even further, when the doctrine of Chinese Buddhism was accepted into Japan over the sixth and seventh centuries, the idea that one should strive for perfection by dedication and denying worldly impulses was taken to heart by samurai. They dedicated their bodies and minds towards this perfection and purity, ignoring what they deemed weak impulses of the flesh. Thus they became superior warriors, training and practicing to the exclusion of almost everything else. (Ratti 1979: 35)

Samurai were retainers of the throne and the feudal lords and, as such, received stipends from their superiors. Depending on the rank of the samurai, this ranged from below survival level to quite well off. The work ethic in Japan has always been high, especially among the samurai who dedicated their lives to bettering themselves, and relieved of the need to work for sustenance, they quickly turned their efforts to other uses. (Ratti 1979: 36)

By the tenth century, Japanese culture was growing very complex. Learning was treasured as highly as swordplay, and was also seen as one of the paths to enlightenment. The samurai began to seek out intellectual pursuits in addition to their combative ones, mastering poetry, calligraphy, and courtly graces. This led to a depth of character that few warriors outside of the Orient had, and art, culture, and education flourished in Japan. (Turnbull 1982: Chap I)

When the Mongols attacked Japan, much power was given to a *Seii-tai Shogun*, or 'barbarian-subduing generalissimo'. In reward for his successful defense of Japan, the emperor allowed him to keep his great military power. This created the reigns of shoguns, known as Shogunates (Sansom 1958: II). The country had already been highly military in nature, and the power of the shogun, which far outstripped that of the emperor, ensured the continuation and promotion of further militaristic development. This created an age of samurai unequalled since: the samurai of that time were more numerous, skilled, and politically powerful than any other time. (Turnbull 1982: Chap I)

By the fourteenth century, the quality of Japan's classical arms production, most notably swords, peaked. Most swords from this era are superior to any sword made of steel even today, and after this time it could be said that the samurai and the sword began to decline as the gun was introduced and put into mass production in the sixteenth century. (Sansom 1958: II page?)

The samurai did not simply decay and vanish, of course. They were very much still a force to be reckoned with and excellent examples of Japanese dedication and nobility, but they were significantly weakened by the gun. With a gun, the lowest, most untrained peasant became a real threat: a gun could be used from great distances. In the

beginning, the problem was not so great: the samurai's excellent armor was capable of deflecting the bullets. However, as time went on, the guns grew more powerful, capable of killing a samurai through armor no matter the samurai's skill. (Perrin 1979: Chap 4)

The samurai, as a whole, refused to carry and use the undignified and somewhat dishonorable weapon, meaning that only the peasant warriors carried these guns. However, in Japan's attempt to conquer Korea (1592), the extended combat made it very clear that guns reigned supreme over other weapons. Virtually all reinforcements sent to Korea were gunmen, and even the samurai who commanded the armies were forced to use guns as resistance mounted. Eventually, they were turned back due to vastly superior numbers, and Chinese guns harried them all the way back to Japan. The sword and skill of the samurai were becoming obsolete as the long-range killing power of the gun felled samurai before they could even attack. (Perrin 1979: Chap 4)

Then the greatest resurgence of the samurai occurred. Deciding they preferred bushido to efficiency, they abandoned their guns in a dramatic denial of progress. The shogun, himself a samurai, backed several important reforms and actions which restricted and collected those that could produce a gun or gunpowder, forcing them to produce only for the government and live under the government eye. Then the shogun took all the guns in Japan and either melted them down or stored them away. It took over a century, but the last battle in Japan in which guns were a significant factor (before their reintroduction in the nineteenth century) was in 1637, and even then, they were used by some of the last foreigners in Japan, not the Japanese. The only guns produced in Japan after this time until the late 1800s were the few dozen that the government ordered each year, and they were never used in battle. (Perrin 1979 Chap 5)

The power of the samurai had nearly disintegrated under the power of guns, but they came out of the struggle with a fierce devotion to their ancient ways and an eye for the past. Samurai were strong between the seventeenth and nineteenth century (called the Edo period), and the ancient, almost lost art of sword smithing began again. Although some of the skills and sword crafting art had been lost, the new smiths began to re-learn these details. (Ratti 1979)

The shogun reigned over Japan, keeping the political system more or less in stasis, until the reintroduction of the outside world in 1853. With the sudden need for progress, a powerful group of young samurai banded together and revolutionized Japan, taking it by storm and industrializing it in a feat of modernization that has yet to be matched anywhere else on earth. Known as the Meiji restoration, this period marked a return to the world for the Japanese, and by World War I, they were on par with global powers as to military might (Sansom 1958: III).

This had its price, though, and even before World War II came around, the samurai as a class were less the warrior-philosophers of old and more bureaucrats and generals. Although still known by the title of samurai, they did not represent the values and abilities of the ancient samurai.

When World War II did come around, Japan was on the losing side, and surrendered unconditionally in the end. The governmental reorganizing and guidance performed by Western powers disbanded the samurai class completely, spelling the end of the last remnants of the warrior-philosopher.

But to this date, nothing quite matches the power, skill, dedication, and education of the samurai. Their ethos and methods became so well respected across the world that

just the mention of the word 'samurai' brings up an image of an honorable warrior of great skill.

Nowhere, though, were they more respected and revered than in Japan. Japanese people retain attributes similar to the samurai's, and are known for many of the things that the samurai were known for: honor, dedication, respect, and education. Worldwide, Japanese are known for their dedication to their work and their loyalty to their employer, their polite respect, and their excellent school systems and commitment to learning. Even though the samurai are gone, it appears that their spirit lives on in the Japanese people and culture.

4. Bujutsu

Since the beginning of Japanese recorded history various forms of armed and unarmed combat have been developed. Bujutsu is the collective term for the fighting systems of Japan. It is principally based on arts that are used to develop practical fighting skills. The samurai learned the arts of archery, sword and spearmanship, military horsemanship and swimming in armor, or water combat, as well as various unarmed styles.

The basic concept of bujutsu relies on three possibilities when faced with imminent combat (Ratti 1973: 424):

- 1) To attack your opponent before he can strike at you.
- 2) To counterattack, deflecting your opponent's attack and then delivering your own attack.
- 3) To defend against your opponent's attack without engaging in a response attack of your own.

The following sections detail basic teachings and history about each art.

4.1 Archery

Kyujutsu, the art of the bow, is believed to have its origins when the samurai appeared on horseback. It was considered “an essential branch of the education of nobles and the habit of shooting from horseback while in swift motion, so as to deliver an arrow accurately in any direction, was diligently cultivated” (Gilbertson 1895: 112).

The basic system of training in archery was developed during the Heian period (794 – 1156 CE). This involved generally being on horseback and firing a series of

arrows against multiple stationary or moving targets. Among the different forms of archery were three-target shooting, bamboo hat shooting, dog shooting and hunts for various beasts including bears, dogs and birds (Ratti 1973: 228).

The Japanese developed numerous types of long, short and crossbows for use in war, recreation and ceremonies. The most prominent style however was the *daikyu*, a longbow of about seven and a half to eight feet in length, which required considerable power to draw and was very destructive in battle (Ratti 1973: 230). Short bows ranged from the battle-worthy *hankyu* to the practice *yoku* to the ceremonial *suzume-yumi*. There were also a few forms of crossbows, including repeating crossbows that were mostly used for castle defense.

Kyudo, which focuses on personal development as opposed to *kyujutsu's* more militaristic approach, developed as a discipline based on mixing special techniques with inner body and mind control through the longbow (Ratti 1973: 240). Actually hitting the target is secondary to flawlessness of motion, flowing gracefully from motion to action, it is believed that accuracy will result from coordinated control.

4.2 Spearmanship

The spear in Japanese history is second in importance as a weapon only to the bow and arrow. Japan is known in ancient Asian mythology as “the country of one thousand fine halberds” (Nakamura 1964: 490) and spears were employed heavily by both peasants and nobles.

There are two primary arts of the spear: *yarijutsu*, the art of the straight spear, and *naginatajutsu*, the art of the curved spear (Ratti 1973: 250). The *naginata* was also taught and used by many women during the Heian period, who were expected to be

capable of defending their husbands and families if need be with it. There were many different forms of each art, teaching different forms of stances, sweeps, parries, thrusts and jabs. However, by the Meiji restoration, most forms and schools had died off in favor of sword schools.

4.3 Swordsmanship

Kenjutsu, the art of the katana, is by far the most practiced and famous of forms of *bujutsu*. Many samurai devoted their entire lives to the sword, training from before age five with small practice swords, and continuing to fence throughout their lives.

The original techniques for *kenjutsu* were laid out by the mid-14th century by Choisai and Jion, who are considered the originators of the single-opponent system of fencing (Ratti 1973: 272). It regulated all forms of combat, including posture, stance, unsheathing of weapons, the movements and strikes and the targets on the body. Combined with the principles of bushido, this formed the principal school of swordsmanship. However, many practitioners developed techniques not in accordance of these rules and regulations, to the point where they seemed to be the norm, not the exception (Ratti 1973: 275).

Besides the numerous schools of *kenjutsu*, many practitioners also specialized in the various other types of swords. Dual-wielding, the art of wielding the katana in one hand and the *wakazashi* in the other, a technique of the Nito school, was incredibly complicated, and the circular motions and cuts were used to down numerous foes armed with swords and spears at a time. Techniques based on the *nodachi*, a long two handed sword, were incredibly destructive, especially to heavily armored foes. There were also

numerous techniques based on daggers, needles and other small blades used by samurai, peasantry and women.

Iaijutsu, the art of drawing the katana, is one of the most important schools of swordplay (Ratti 1973: 275-277). The concept is to draw and deliver a blow in one motion with blinding speed. It developed during the Edo period, drawing on roots from earlier periods, but came into popularity due to the increased need to defend oneself against *ronin* and brigands. This made it an apt form off the battlefield where samurai might be forced into combat at a moment's notice. Using or defending against *iai*jutsu required honed skills and very fast reflexes, practiced by the Japanese in forms of exercise as *kata*, a series of repeated movements for training. This art was widely used as both an accepted art in duels and to cut down unprepared samurai as well as peasantry to "test the blade".

The most popular modern-day form is *kendo*, which is a heavily modified version of the old techniques. It uses a staff made out of bamboo and was developed to minimize or eliminate the chances of injury in the practice of swordsmanship. There are three basic forms of techniques: cuts, thrusts and parries. Defensive headgear and body protective wear are used to further prevent injuries.

4.4 Military Horsemanship

Jobajutsu, military horsemanship, was a strictly samurai art, and has gradually faded out over time. It was naturally used in tandem with other martial arts, and was based on controlling and guiding a horse while maintaining precision and control of various weapons from the other schools. However the cost of upkeep and breeding of

horses gradually reduced their use in battle, and with the peace of the Tokugawa period, horses were eventually reduced to a ceremonial use.

4.5 *Swimming in Armor*

Swimming in armor was an art that developed due to the geography of Japan. Following the Mongol invasions, this art blossomed as the perceived need increased greatly. It remained a relatively small branch of schools being taught, but, unlike *jobajutsu*, it did not gradually die off. During the Tokugawa period, the various forms of swimming flourished, and over time developed into more of a training and recreational activity than a military art.

5. Japanese Swords

Important Terms Note:

The primary Japanese length measurement for swords is the *shaku*, which is almost identical to an imperial foot (the *shaku* is 11.94 inches), and this measurement splits the blades into three types. If it is less than a *shaku*, the dagger is known as a *tanto*. If it is more than one but less than two *shaku*, it is a *wakazashi*. Lastly, if it is more than two *shaku*, it is a *daito*, or long sword. *Daito* are commonly called *katana*, but correctly, only *daito* worn in *buke-zukuri* style, stuck through a belt-sash, are *katana*. If the same weapon is mounted *jindachi-zukuri*, suspended from cords, it becomes a *tachi*.

5.1 History of the Sword

Japanese swords are known for their craftsmanship, durability, and edge. Japanese sword-smiths have a unique method of crafting swords which results in capabilities above and beyond that of the average mass-produced sword. A well-crafted *katana* can cut through a thick nail without chipping, and can even cut through swords of inferior manufacture (Perrin 1979: Chapter 4).

The Japanese attributed a mystical nature to their swords and the act of crafting them. Perhaps the most important military object in Japan, they were exclusive to samurai, and no peasant, merchant, or craftsman (not even sword-smiths) could hope to carry a full-length *katana*. They were more than symbols of power in ancient Japan: they *were* power. A well-trained samurai with his weaponry was nearly unstoppable. *Katana* were considered to be the souls of the samurai. (Turnbull 1982: 8-9)

The blades of a samurai evolved as the samurai did. The art of sword making was learned from the Chinese before the year 600 BCE. Early Japanese swords show that they

simply copied the most common swords from mainland Asia, making rather crude, straight, double-edged broad-swords.

Legends say that the first true ‘Japanese sword’ was created by a smith named Amakuni around 700 CE, and these same legends give him credit for the creation of the folded steel process. The first recorded production is around 900 CE, but it is obvious that they had been in use for some time before then (Yumoto 1958: 25).

This legend theoretically covered the development of the double-bladed sword into a curved, one-edged sword style similar to all the classic Japanese swords. A curved sword was less likely to break if swung from horseback, as well as increasing the effectiveness of the blow. Also, if it only had one edge, then the back side could be used to reinforce the blade, making the blade more durable. These early Japanese swords, known as *koto*, were somewhat longer than a more modern sword and the blade was not smoothly curved: the curve was deepest at the top of the *nakago*, or the part of the blade which is covered by the hilt.

The exact length of the sword varied widely by era and personal preference, and they were sometimes ‘cut down’ to a shorter length. Early *koto* were often four to five feet long, but they generally shrunk as time went on. In addition, the bend near the hilt of the sword spread as bushi turned from cavalry into infantry, until by the late *koto* period, about the twelfth century, most blades were made with a smooth, uniform curve throughout. The *koto* period continued until the sixteenth century with blades of this style. (Irvine 2000: Chapter 4)

The mounting style for *koto* swords was to hang the scabbard from ropes or cords on the belt. This style of mounting a sword is known as *jindachi-zukuri*, and was popular

until the sixteenth century. After the sixteenth century, swords entered the *shinto* era as Japan entered the Edo period, and they were stuck through sashes in a style called *buke-zukuri*. Few bushi wore swords in *jindachi-zukuri* after that, although there was a minor resurgence in certain military branches in the late nineteenth and early twentieth century.

With the end of the *koto* period came the *shinto* period of swords. The period in history is known as the Edo period, but the swords are classified as ‘*shinto* period’. This lasted from the sixteenth century to 1867. The newly fashioned swords were known somewhat derisively as *shinto*, or ‘new swords’ (no relation to the religion, shinto, although written and pronounced the same in English). This was simultaneous with Japan’s rejection of the outside world in the Edo period. (Irvine 2000: Chapter 5)

In the nineteenth century, this degradation in sword-making skills was reversed and Japan attempted to recover the lost pinnacles of perfection. Their new swords were better than *shinto*, but worse than *koto*, and were called *shin-shinto*: literally ‘new new swords’, but translated as ‘new revival swords’.

Both blades and samurai suffered terrible blows when they were all but banned in Japan by the Haitorei Edict in 1876. There continued to be a samurai class, and there continued to be swords, but from about 1920 onwards, a new kind of sword known as *gunto* was made straight from steel-mill stock by machines. This, too, was a blow to classical Japanese sword-making, and the weapons were inferior.

But it was in 1945 that classical Japanese sword-work suffered an almost fatal blow, one from which it still has not recovered, even today. Following Japan’s defeat in World War II, the Japanese were ordered to surrender all their swords, to symbolically

and physically show their defeat. Sword-crafting was also banned at this time, although it has since been resumed.

As of 1958 there were more Japanese swords in America than in Japan, due to this disarmament: American soldiers would return from the orient with piles of swords, often as many as they could carry. The vast majority of these 100,000 or more swords were *gunto*, of course, but there were still a sizable number of *shin-shinto*.

Fortunately for those interested in weapon history, the rule was quickly altered to allow swords with ‘artistic merit’ to be kept in museums, temples, shrines, and certain personal collections. The art swords were rated depending on quality and cultural value as either ‘important art objects’, ‘important cultural properties’, or ‘national treasures’, in ascending order of value. (Irvine 2000: 115)

Today, these collections of valued swords still exist, and the nearly lost art of Japanese sword-craft has once again become a respected art. Most of the swords produced as ‘authentic Japanese *katanas*’ are, in fact, merely *gunto*, and worth only a fraction of what a true *katana* is. However, there are others who craft with a dedication similar to the smiths of old, and their new swords are superb in quality, better than most *shin-shinto* and, in some cases, rivaling the swords made during the pinnacle of the craft.

5.2 Construction of the Sword

The modern Japanese sword is a single-edged weapon with a slow, uniform curve to it to increase cutting power. The forging of this blade takes many hours or days, and is a fusion of more than a millennium of careful crafting, testing, and revising. Each smith

has their own exact style and philosophy, and the crafting of these swords is a draining and often religious experience for the smith.

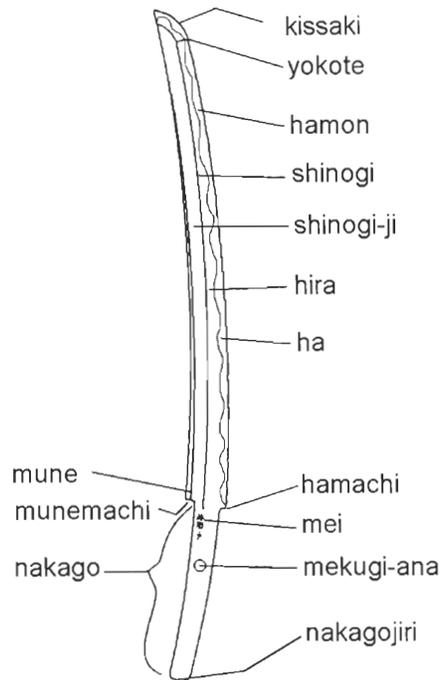


Figure 5.1 Diagram of a typical sword.

One of the most important aspects of sword creation is the technique of folding the steel. This was developed too long ago to be accurately measured, although legends place the time at about 700 CE. Folding involved taking the steel of the sword and bending it in half over itself, then hammering it flat and repeating the process at least a dozen times, and often as many as thirty. This made a number of thin layers of steel, adding rigidity to the metal and an easily recognizable ‘grain’ to the surface when polished. In addition, this removed any pockets of air from the steel. (Irvine 2000: 14)

Generally swords were created with the grain of the steel, or *hada*, running down the blade. Some had straight grains, called *masame-hada*. Others had waves, called *ayasugi-hada*. Certain schools of construction created the swords with the grain running directly through the blade, resulting in a blotchy, ringed pattern which weakens the blade but which some samurai found quite beautiful. This either resembled knotted wood and was called *itame-hada*, or a splotched, burlled appearance called *mokume-hada*. (Irvine 2000: 17)

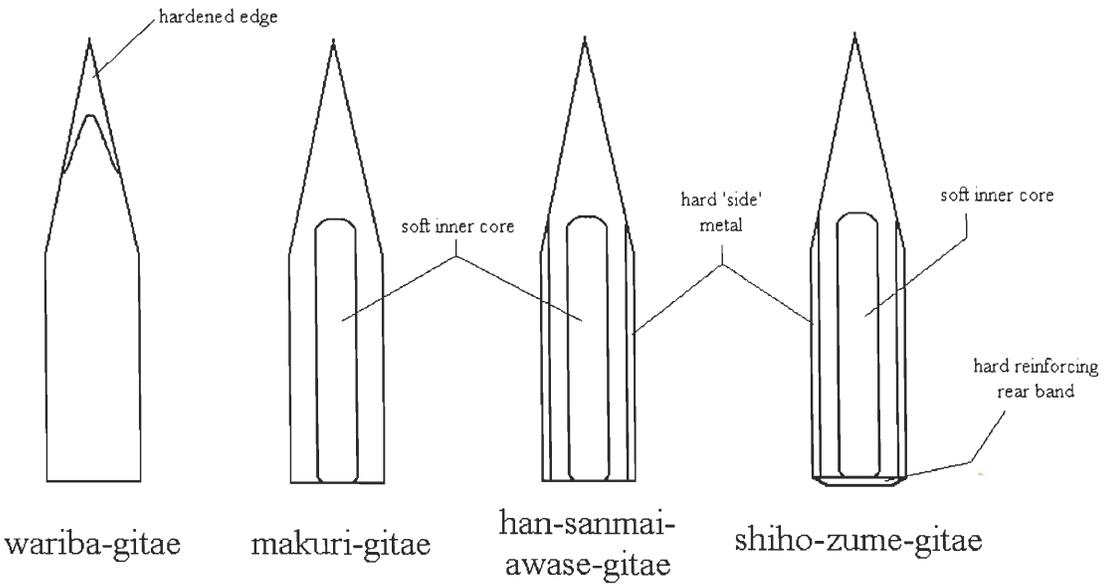


Figure 5.2 Sword folding techniques

As time passed, the Japanese developed a further technique to add durability to the blade. They made their blades significantly more complex by constructing the blades in multiple pieces. Swords created with one quality of steel are known as *maru-gitae*. An early step in the evolution of the sword was to temper the actual edge of the blade to be harder martensite-grade steel, and this was known as *wariba-gitae*. The ‘classic’

construction uses *wariba-gitae* and adds in a soft core steel to allow the blade a unique degree of flexibility. The vast majority of ‘good’ *katana* and *wakazashi* are of this type, known as *makuri-gitae*. However, over time, more complex blades were created. Adding hard outside sheaths to the soft stock steel allowed the wielder to parry without fear of the side of the blade becoming significantly damaged, and this is known as *han-sanmai-awase-gitae*. The last generally accepted category is with an added rear support, known as *shiho-zume-gitae*. Generally, the more complicated a blade’s construction, the more durable and effective it is.

A Japanese sword is actually made up of two types of steel. One is folded significantly more than the other is, and this metal is therefore significantly harder. When both sections have been folded adequately, they are bent into a ‘U’ shape and the softer piece is inserted into the harder piece, at which point they are hammered out into a long blade shape. By the end of the process, the two pieces of steel are functionally the same piece, but with different rigidities. If the smith is performing *han-sanmai-awase-gitae* or *shiho-zume-gitae*, then pieces of hard steel are added to the outside of the blade in a similar fashion. (Irvine 2000: 15)

This determines the shape of the cross-section of the blade. Each blade has a unique profile, and the middle ridge (*shinogi*) is the most prominent attribute. The blade can be flat, perhaps even tapering at the *shinogi* (*shinogi-hikushi*) or ‘fat’ and trapezoidal, bulging at the *shinogi* (*shinogi-takushi*). It can have the ridge towards the back of the blade for a sharper angle but more fragile blade or a more moderate ridge placed about midway between the tip and the rear. The sword also has an exact tip shape, which is considered an extremely important characteristic: the tip can be long (*o-kissaki*), short

(*ko-kissaki*), medium (*chu-kissaki*), or even hooked backwards (*ikuri-o-kissaki*). In addition, whether the front edge is curved (*fukura-tsuku*) or straight (*fukura-kareru*) is also important. (Irvine 2000: 17)

When finished, the steel is not quenched or tempered in the conventional European fashion. Steel's exact flex and strength vary dramatically with heat variation, and depending on how hot it gets and how fast it cools, the steel has vastly different properties. If steel cools quickly, from a hot temperature, it becomes martensite, which is very hard. Slower, from a lower temperature, and it becomes pearlite, which has significantly more flex but doesn't hold an edge. To control the cooling, the sword is heated and painted with layers of sticky mud. A thin layer on the edge of the sword ensures quick cooling, but not so fast as to crack the sword steel (this makes the actual edge of the sword extremely hard martensite). A thicker layer of mud on the rest of the blade causes slower cooling, and softer steel, giving the blade the flex it needs (this makes the rear and inside of the sword into pearlite). When the application is finished, the sword is quenched and hardens correctly.

When the blade is cool, the mud is scraped off, and the blade has designs and grooves cut into it. One of the most important markings on the sword is performed here: the file markings. These are cut into the tang, or the hilt-section of the blade, where they will be covered by a hilt later. The tang is never supposed to be cleaned: if you do, you can cut the value of the sword in half. The purpose is to show how well the blade steel ages. A number of different types of file markings are used, including horizontal, slanted, and checked, known as *ichi-monji*, *kosuji-chigai*, *suji-chigai*, *o-suji-chigai*, *katte-agari*, *shinogi-kiri-suji-chigai*, *taka-no-ha*, and *gyaku-taka-no-ha*. A grid of marks, from raking

the file diagonally both ways across the tang, is called *higaki*, whereas specialized ‘full dress’ file marks are called *kesho-yasuri*. Lastly, if the blade is very old, it may have been shaved instead of filed. This is called *sensuki*.

A hole is drilled into the tang as well, called a *mekugi-ana*. This hole is to anchor the hilt, and some of the older blades have more than one due to the length of the blade.

Some of the marks on the blade are aesthetic: signatures and dedications written in *kanji* and engravings depicting gods, dragons, or other ‘acceptable’ beings, called *horimono*. Some are more practical, grooves for lightening and extra flex. Grooves come in wide (*bo-hi*), twin narrow (*futasuji-hi*), twin wide and narrow (*bo-hi ni tsure-hi*), short (*koshi-hi*), twin short (*gomabushi*), twin long with joined tips (*shobu-hi*), twin long with irregular breaks (*kuichigai-hi*), and halberd-style (*naginata-hi*).

When the rough blade was completed, the blacksmith would turn the blade over to a polisher, whose job it was to polish the steel of the blade to a glittering shine and sharpen the edge for battle. This takes hours for every inch of blade, and is painstaking work with different kinds of very fine stone. Early polishers used three types of stone, whereas a modern polisher generally uses seven. It almost always takes longer than actually crafting the blade does, and a good polishing makes a blade look better, while a bad polishing makes the best of blades look like something from a corner store. (Irvine 2000: 18)

One of the ways which blades can be judged is by what this polishing reveals: the crystal-like qualities of the blade become quite visible, and the *hamon* (known in English as the temper line, where the sharp edge fades into the normal steel of the blade) shows the unique ‘nature’ of the sword. Blades each are distinct in their *hamon* and the grain

(*hada*) of their steel. The *hamon*, which is determined primarily by how the mud is applied, is often used as a kind of signature of the smith, above and beyond his own signature, and each tradition of sword smiths often has a particular style of hamon they prefer over all others. *Hamon* vary from straight to wavy to shaped like crabs or zigzags, and in their wandering they reveal important facts about the blade itself. A good polishing reveals what speed the edge was cooled at, from what temperature, and what the carbon content of the steel is. This is because it displays either *nioi*, which is a mix of extremely fine martensite with troostite (another type of tempered steel), or the more crystalline and obvious *nie*, which contains a lot of less fine martensite.

The work on the blade doesn't end here, though. From here it is passed on to a hilt-maker. Hilts vary in their exact nature depending on the era, but generally consist of the same general idea, with the variation being in the components used and in the wrapping style. The obvious part of the hilt consists of a metal or wooden grip called a *tsuka*, which can also be used to refer to the entire hilt. The cross guard, or *tsuba*, on Japanese swords (except for certain twentieth century sabers) is small and round, made of metal, and often very ornate.

There is a pommel at the base known as a *kashira*, and there is often a decoration under the criss-crossed wrappings called a *menuki*. A bamboo peg is slipped through the *tsuka* and through the tang of the blade, using the hole drilled in it. This anchors the blade securely into the hilt. To anchor the blade securely into the sheath it will soon have, the blade acquires a collar, or *habaki*, which extends an inch or so past the cross guard and keeps the blade from rattling.

The sheathes themselves are not an easy task. There are two types of sheathes, both of which require the same exacting work. One is the *saya*, which is generally made of wood and considered the ‘resting’ sheath, used in place of a more fragile and expensive sheath. The other sheath is the more decorative or battle-worthy sheath which is usually called either a *jindachi-zukuri* or a *buke-zukuri*, depending on whether it was supposed to be suspended from the belt by straps or thrust through a sash, respectively. Other types of mounting include the *kyu-gunto*, *shin-gunto*, and *kai-gunto* types for the twentieth-century military, but these swords were generally mass-produced and highly inferior, and few ‘true’ Japanese swords are mounted in these styles.

The technique of making sword blades was, of course, adapted to other weapons. In addition to creating swords, smiths created most notably the primary pole-arms of Japan, the *naginata* and *yari*. Even occasional guns were forged in this manner. However, the style itself forever remained associated with swords, and the creation of such valued swords has made Japan a nation forever associated with their own unique sword style.

6. Other Japanese Weapons

Japan's warring culture has led to the development of numerous weapons of highly diverse types and qualities. They are known for the unmatched quality of their swords, which often leads to other weapon types being ignored, but the weapons which arose from a millennium of combat are far more diverse and, in many cases, far more effective than the classical katana.

Swords were valuable and often exquisitely crafted, but their complex and time-consuming production limited overall usage. More widespread, especially in the early eras of Japan, were spears and halberds. Like Europe, Japan produced so many different categories of spear and halberd that each town and even each smith often had their own preferred type. Generally, though, they fell into two categories: *naginata* and *yari*.

Naginata correspond to European glaives. They have ridged, curved blades attached to a long wooden or bamboo hilt (Knutsen 1963: 27). They are commonly thought to have been invented by the warrior-monks of Japan, but this is a misconception brought about by the fact that when they fell out of style in the Muromachi period (1337-1573) the monks were the only ones who continued to be dedicated to them (Knutsen 1963: 36). Although the warrior-monks did excel in combat with *naginata*, the creator is lost into time: they are as old as the sword, and in fact were, in the past, merely sword blades mounted on long poles instead of short hilts.

Naginata are often produced by sword-makers and their apprentices due to their similarities to the blade of a sword. Although many *naginata* were produced cheaply for use by the soldiery, a *naginata* for a samurai would often have the same painstaking effort put into crafting it as a sword blade. The exact style of the *naginata* blade varied

widely: most were about two feet long, but otherwise there were no true set requirements for blade style. The naginata were separated into sub-types based on style, method of use, method of construction, and whether it was for training, demonstration, show, or actual battle.

Yari are the other kind of pole-arm. *Yari* vary from simple poles of bamboo with the tip hacked off at a sharp angle to finely crafted multi-pronged spears. *Yari* vary from town to town and smith to smith even more significantly than *naginata*, and come in as great a variety of forms as European pole-arms. Before the Muromachi period (fourteenth to sixteenth century) the *yari* was a peasant weapon, wielded only by common soldiery, and was generally of somewhat shoddy construction.

As time progressed, though, *yari* became more and more popular amongst samurai. By the end of the Muromachi period, *yari* were far more popular than *naginata* among both peasants and samurai. By this time, the *yari* had become somewhat more standardized, having lost much of the more fanciful designs and many of the longer-bladed designs.

In all periods in Japan either *naginata* or *yari* vied for most popular weapon with the sword. Samurai carried their swords and a pole-arm of some form into combat, and generally relied on the pole-arm until the shaft broke. Samurai have always been trained in more weapons than just the sword: most schools of combat train a samurai on pole-arm use as extensively as sword use.

However, both sword and pole-arm have limitations: the samurai warrior required an effective ranged weapon as well. A bow, early in the history of Japan, was usually the chosen long-range weapon of the samurai, and of the peasant warrior as well.

Generally, the bow was held in high regard in legends when used by a samurai, but often the same legends refer to samurai walking away from a battle with few, if any, wounds from the dozens of arrows fired at him by peasants. This is based on more than just the superhuman skill attributed to samurai in legends: samurai bowmen and peasant bowmen used entirely different sorts of weapons.

The peasant Bowman often used a short-bow quite reminiscent of simple bows everywhere: cheap, sturdy construction for mass production. Samurai, on the other hand, used a uniquely Japanese bow called the *yumi*. With the grip located about a third of the way from the bottom of the two meter long bow, these extended longbows were quite capable of punching through the lacquered samurai armor which deflected the arrows from peasant bows. It was a show of skill for a samurai to use this extremely long bow while riding on horseback, and demonstrations of this skill were common then and can still be found in Japan today. However, the bow became less important to the samurai after the tenth century, when focus shifted towards the sword. (Ratti 1973: 387-369, 461-462)

The bow was not limited, of course, to only two types: the Japanese came up with many variations of bow, including crossbows. But these were less popular than the primary two types, and by and large the Japanese stayed with the two kinds of bow above.

The Japanese also came up with hundreds of different arrowheads, some for piercing armor, some for piercing flesh, some to fly straighter, some to curve, and many just for decoration.

The gun was a much later development in personal weapons. By 1560, guns had entered mainstream use in Japan, where they gradually usurped the position of favored weapon from all other weapons through their unquestionably superior effectiveness in battle (Perrin 1979: 6-8). By 1567, the Japanese had not only become a major manufacturer of guns, but had significantly improved over the original model, with increased caliber, rain-proof powder, and skilled barrel craftsmanship (Perrin 1979: 17).

However, guns were unpopular with the samurai who sought glory, not a death by an anonymous bullet from a peasant. As the ruling class in Japan, they suppressed guns with powerful political actions and laws, forcing Japan backwards, to rely entirely on swords and spears. The last battle in which guns were a factor was in 1637, and guns didn't reappear until the Meiji Restoration in the late nineteenth century (at which point it was discovered that, with minimal retooling, the guns made in the sixteenth century held up fine to the stresses of the new ammunition and technology). There were only a few dozen guns manufactured per year, and they were restricted entirely to the government and left largely unused. (Perrin 1979: 89)

Those were the most popular weapons in Japanese history, but they were in no way *all* the weapons. From sickles with chains to three-piece-staves to pepper-bombs, Japan employed an incredibly diverse variety of weapons, each with at least one school dedicated to its use. When swords were restricted from non-bushi in the early seventeenth century, the Japanese used iron fans, heavy smoking pipes, nothing, and even cloth as weapons, creating exacting schools of martial arts and following their tradition of training, practice, and more training. Peasants, women, merchants, doctors, and monks all

had their own varieties of martial arts, all had their own weapons, and most usually trained extensively in them.

This warlike nature has made Japan contain some of the most feared warriors in the world: even when they moved away from medieval weapons, they transferred their zeal and pride over into their work, technology, guns, ships, and planes, earning a resource-poor set of islands a place among the most powerful nations in the world.

7. Japanese Armor

Japanese armor has evolved gradually throughout time, though the changing conditions around it certainly affected that evolution.

The traceable history of Japanese armor begins around 700 CE. Before this time, armor appears to have been primarily constructed of plates of stiff leather or iron. This plate armor was called *itayoroi* (Yamagami 1940: 10).

When the horse was imported from the continent between 400 CE and 600 CE it gave rise to a new form of combat that gave mounted archers a primary role. This change caused armor of the period to become the more flexible and lighter *sane-yoroi* (scale armor) (Yamagami 1940: 13). This new armor was formed of much smaller plates sewn together with dyed silk.

The Nara (710-794) and Heian (794-1185) periods saw gradual improvement to the design of armor. Plates and other easily corroded pieces used in armor of the period were generally lacquered black for protection from the humid Japanese climate. During this period, Japanese armor became more aesthetically pleasing. This attention to aesthetics is most obvious in the patterns of nature, such as flowers and insects, used on the dyed portions of armor (primarily the *odosige* (lacing braid)) during the period. This period was also the beginning of the many extremely ornate helms worn by many Japanese generals and other high-ranking people (Yamagami 1940: 13-15, 54).

During the Kamakura period (1185-1333) the beauty and craftsmanship of Japanese armor grew. This period saw a great deal of warfare between the Minamoto and Taira clans, followed by the Mongol invasions in the late 13th century (Irvine 2000: 36-39). These battles further spurred the development of weapons and armor, which was

furthered by the rise of *bushido* and the *bushi* (warrior class). War with the Mongols towards the end of the period caused a shift to the foot soldier as a primary unit, a shift that was due to the far greater usefulness of foot soldiers against cavalry, as well as the expense of horses and unsuitableness of Japanese terrain for mounted combat (Rutland 1973: 292). This caused many warriors to give up their *ouyoro* (large armor for horsemen) for the lighter, more flexible armors worn by infantry (Yamagami 1940: 30-36).

As Japan fell into a period of civil war known as the Muromachi period (1334-1572), the craft of armor making lost much of the grandeur it had attained during the Kamakura period, due to the greatly increased extent of the battles. Before they had primarily been skirmishes between nobles, but now peasants were being drafted into much larger armies. Additionally, the introduction of the gun at the end of the period caused a thickening of armor, which now had to protect against bullets as well as blades. Helmets also lost their knobs so bullets would glance off. (Yamagami 1940: 37-47).

Several less practical changes also took place during the Muromachi period. Armorers apparently became more renowned as this period has the first pieces of armor that were signed by their makers. Indeed, towards the end of this period, the famous Myouchin family became well known for their armor. They survive even today, preserving Japan's ancient craft of armor making. Family crests also became an important part of armor (Yamagami 1940: 37, 69).

At the beginning of the Edo period (1572-1868), the scale of battles for the Shogunate grew larger. Additionally, fighting became based more on infantry than on mounted archers. These factors combined to make armor of the period strong but light,

and almost entirely devoid of ornaments, though large, impractical helmets were popular for those powerful enough to afford them (Yamagami 1940: 40, 42, 46).

Even after the Tokugawa family was firmly established as leaders of Japan, and peace set in, armor continued to develop. For instance, from the Kan-ei to Kanbun period (1624-1673), many suits of armor were created that had bullet marks in them. These marks, called *tameshi* (tests) proved that the armor would protect the wearer from bullets (Yamagami 1940: 52).

The armor of the peaceful Edo period gradually lost its use in battle and became primarily an ornament worn by daimyo to show off their wealth and power. Late in the period, armor of earlier forms appeared. Though this armor wasn't as well made as that which it was imitating, it reflected nostalgia for earlier times (Yamagami 1940: 52).

Armor briefly became important again after the Edo period ended with the forced reintroduction of foreigners to Japan in 1853. This armor was mostly light and made from lacquered cowhide, and it fell back into disuse with the Meiji restoration which forced Japan's technology to catch up with that of the Western world. It saw most of its use in the major samurai uprisings of 1876 and the Satsuma rebellion in 1877 (Perrin 1979: 73,76; Yamagami 1940: 52, 53).

7.1 The Construction and Form of Japanese Armor

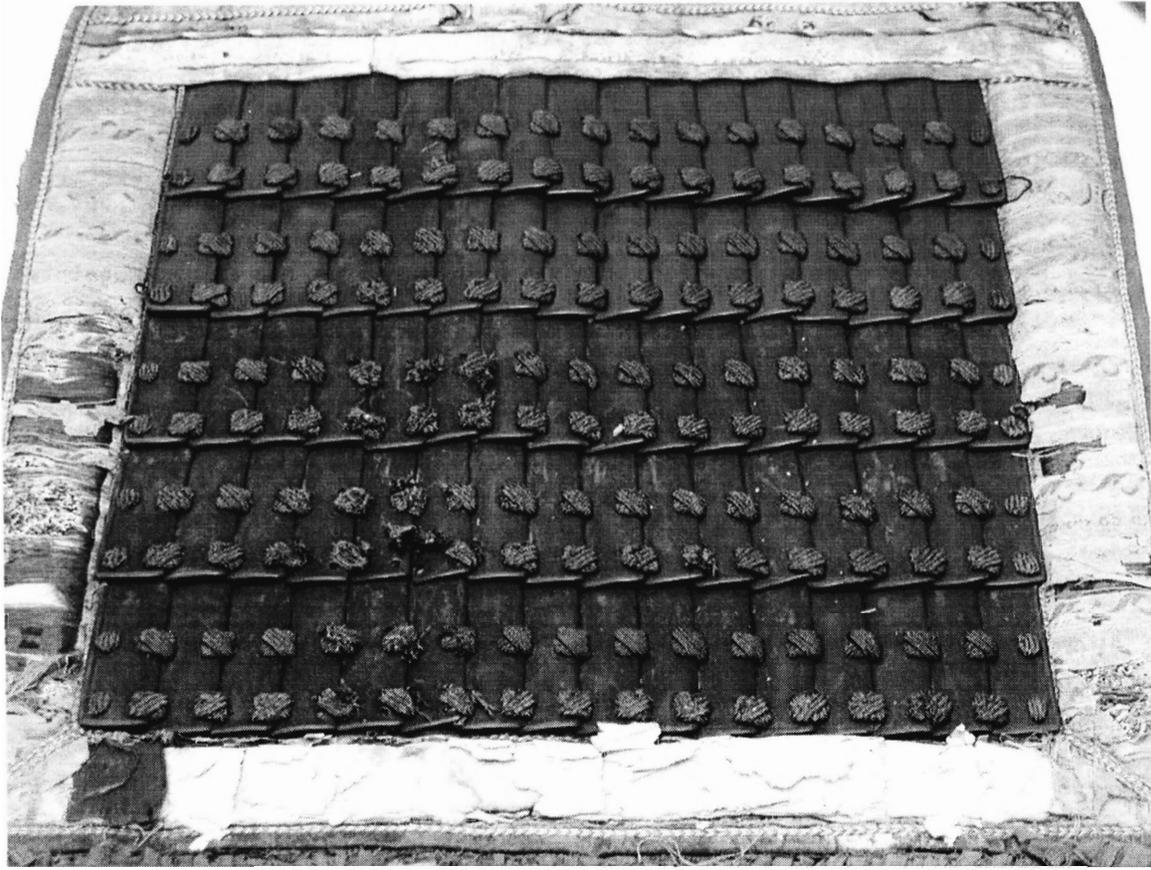


Figure 7.1 Image of *kozane* (from HAM 1175.8).

The creation of Japanese armor is a complex craft. The main parts are *kozane* (small, lacquered scales of iron and/or cowhide), the *odosige* (lacing braid) to hold the *kozane* together, and the *itadokoro* (iron plates) to provide more defense. The *itadokoro* were first used to supplement the *kozane*, but it became the primary building block of armor in the late Muromachi period (around 1500) (Yamagami 1940: 58).

The two principal kinds of armor that were in use from the middle of the Heian period (ninth and tenth centuries CE) until the early Muromachi period (fourteenth century CE) were the *ouyoro* of the mounted archers and the *haramaki* of the infantry. These armors had some parts of their construction in common, especially the use of many

kozane laced together into full armor, but the *ouyoro*i was by far the more complex of the two (Robinson 1969b: 173-181).



1. *tehen*
2. *kasajirushi no kan*
3. *hoshi*

Figure 7.2 Diagram of a helmet (from HAM 1885).

Perhaps the most significant part of the *ouyoro*i was the helmet (*kabuto*). By the late Heian period, generals (*taishou*) and other important *bushi* generally wore their crests in the *kabuto*. It consisted primarily of a bowl (*hachi*) and the neck guard (*shikoro*). The *hachi* was low and round, with a large, gilded hole in the center (*tehen*) for the warrior's queue of hair to pass through. It was formed of several plates held together with relatively large, conical rivets called *hoshi*. There was a ring called the *kasajirushi no kan* fastened to the back of the *hachi* that held ornaments such as badges of rank. To cover the face, a

convex iron plate was fastened to the lower edge of the *hachi*. The *shikoro* was formed of five curved, laminated plates, four of whose ends were turned outwards on either side of the face (*fukigayeshi*). The lining of the *kabuto* was flush fitted and made of leather with silk cords to hold the *kabuto* on the head. These cords were tied beneath the chin, knotted through holes in the plates on each side of the front plate. The brow and cheek guard (*happuri*) were tied on behind the head and beneath the *kabuto*. (Robinson 1969b: 177, 180)



- | | |
|--------------------------------|--------------------|
| 1. <i>kattari</i> | 4. <i>takahimo</i> |
| 2. <i>agemaki-tsuke no kan</i> | 5. <i>kohaze</i> |
| 3. <i>saihai no kan</i> | 6. <i>kusazuri</i> |

Figure 7.3 Labelled picture of a dou-maru (from HAM 2032).

The chest and upper legs were protected by the *dou*. This piece of armor was made to wrap around the body from the left side and had a separate side plate covering

the right side (*waidate*). The *waidate* was an iron plate covered with leather and featuring a gilded rim. It required cords around the body under the *dou* to be held on. A solid iron strip called the *muna-ita* was attached to the upper *kozane* with rivets. Cords fastened through the *muna-ita* and connected to toggles (*kohaze*) that were attached to the shoulder straps (*watagami*) on the back plate. An apron of leather (*tsurubashiri*) covered the front of the *dou* from below the upper breastplate down to the waist. The *dou* was held closed by cords tied around the *dou* called *takahimo* (Bryant, Glossary). The *saihai no kan* was probably a mere decoration, since there are no direct references to it.

The shoulder guards (*ousode*) were large, rectangular pieces of armor formed from seven rows of *kozane* and a curved iron cap called the *kamuri-ita*. A large, tasseled bow called the *agemaki* was tied through a gilt ring on the back plate called the *agemaki-tsuke no kan*. The purpose of the *agemaki* was to keep the *ousode* from swinging freely, which was accomplished via cords tied between them. Over the shoulder strap fastenings on the right side were three laminated short plates capped with a leather-covered iron plate (*sendan*). The left shoulder strap fastenings were covered with a solid iron plate called the *kyuubi*, probably since the left arm did not need the flexibility of the right for wielding a bow. There was also a close fabric sleeve worn on the left arm, with a rounded plate for the back of the hand. The right arm, however, was completely unprotected below the shoulder due to the flexibility requirements of archery. To protect the upper legs, there was a skirt attached to the *dou* called the *kusazuri* that was made up of three sections of *kozane*. (Robinson 1969b: 179)

The rest of the *ouyoro*i was much simpler. The shins were protected by greaves (*suneate*) of three iron plates joined by hinges and secured by two ties over fabric

leggings (*habaki*). The feet were protected by mere bearskin or sealskin boots. The hands were protected from the elements and the bowstring by soft doeskin gloves. The arms were protected by a sleeve with little or no armor called the *kote*. The thighs were not directly protected until the late Kamakura period, when the *haidate* was created. (Robinson 1969b: 178-180; Bryant 2001: Chapter 13).

As has been said previously, the armor worn by the infantry was much simpler than the *ouyoro*i of the cavalry. They wore a simple, close-fitting cuirass of *kozane* that fastened at the right side (*dou-maru*), or in the center of the back (*haramaki*). These armors had shoulder straps covered in leather to hold them to the body. The upper plates of the breast and the back were also leather covered. The skirt over the upper legs was divided into three sections at the front, four at the sides and the back (Robinson 1969b: 180-181).

7.2 Armor of the Kamakura Period (1185-1333)

During the Kamakura period, Japanese armor underwent many changes to make it a better defense and more beautiful. A plate was added under the left armpit of the *ouyoro*i that was called the *waki-ita*. This addition protected the warrior as he fired his bow. The number of plates making up the *kabuto* increased, and the rivets became smaller. These changes were most likely made in order to make the helmet stronger. A divided apron called the *hiza-yoro*i was added to armor to protect the lower legs and knees (Robinson 1969b: 181-182).

As the battles began to concentrate more on use of infantry other changes also occurred, many of which were performed to decrease the weight of armor so a *bushi* could move with great agility as he fought on the battlefield. One of the most

fundamental of these changes was that the *kozane* became smaller. Another innovation of the Kamakura period was the arrival of armor for the thighs called the *haraidate*. This armor was a divided skirt that covered the fronts of the thighs. It was held on by ties around the waist and each thigh (Robinson 1969b: 181-182; Bryant 2001: Chapter 13).

In the fourteenth century, a new form of helmet was introduced called the *suji-kabuto*. This helmet differed from the older *hoshi-kabuto* by having smaller rivets that were spaced more closely. It also had a smaller *tehen* that was completely ornamental. This change was enabled by the warrior undoing his queue before wearing the helmet. Both of these changes probably also increased the structural integrity of the helmet. Additionally, the neckguard was made broader, and the turn-backs were folded back more sharply.

The wearing of *dou-maru* and other *dou* like it became widespread among all classes during this period (Robinson 1969b: 186). The *suji-kabuto* was generally used with this outfit.

During the 14th century, *kusari* (chain mail) was integrated into Japanese armor. Japanese mail is always mounted to fabric, never worn by itself as in European armor. Though it became a major part of armor in the 16th century, during this period it was only used as a connection piece. (Robinson 1969b: 186).

7.3 Armor of the Muromachi Period (1333-1568)

In the second half of the 14th century, the *ouyoro*i reached its height of maturity and complexity with many fine patterns in the lacing and in the leatherwork. For instance, horns on the front of *kabuto* became more common. *Oukuwagata* were particularly excessive horns that were worn with some *ouyoro*i. (Robinson 1969b: 186-187).

The *haramaki* was like the *dou-maru*, but it opened in the back instead of on the right side. It was originally designed for infantry, but, like the *dou-maru*, it gained some of the complexity of the full samurai armor (such as shoulder guards and a helmet). A plate covering the back opening was sometimes used, this was called the *se-ita* (coward's plate), a particularly Japanese name for such a piece of armor. Another variation on this light armor theme was the *hara-ate*, which only covered the front and sides of chest. (Robinson 1969b: 186).

As infantry became more prevalent, *bushi* began to wear full *kote* on both arms, since they were generally wielding a sword rather than a bow, and no longer needed the full freedom of movement required by the bow. (Robinson 1969b: 188).

The War of Ounin (1467-1477) caused several changes in armor, most of which were meant to decrease the weight of the armor and make it less encumbering. This allowed increased offensive power while on foot. A noticeable trend in these newer, lighter armors is that they were also more form-fitting than the older armors. Probably the most obvious effect of this trend is the complete abandonment of *ouyoro*i for the lighter forms of armor. This was obviously due to its restriction of movement when on foot and its weight. (Robinson 1969b: 190)

Solid plates of iron or leather called *ita-mono* began to replace the old lamellar construction, though the lacquer on them was sometimes molded to represent rows of *kozane*, probably to make it look more like traditional armor. This caused a change in the preferred method of lacing good armor. Formerly, *kebiki* (close-spaced) lacing had been the preferred type. This type of lacing required many closely spaced holes to be placed into the *kozane*. Since the *kozane* were now being made from larger plates, this type of

lacing reduced their strength unacceptably as the point of using larger plates was to increase the armor's strength. The solution to this problem was to use *sugake* lacing, because this type of lacing required fewer holes. (Robinson 1969b: 190)

Cuirasses were made in two sections, a front and a back. These sections were connected with a hinge on the left and a cord on the right, so they could be opened and closed. They were also made more form fitting and were simplified (Robinson 1969: 191). There were five plates making up each tasset, and usually between seven and eleven tassets on a suit of armor

Some other minor changes were also made to armor in the late 14th century. The *agemaki* disappeared since its function of tying the *ousode* was no longer required with the smaller *sode* of the new armors. With the disappearance of the *agemaki*, the *kattari* was introduced to hold a *sashimono* (small flag) that held the *mon* (crest) of the warrior. The fur boots of the cavalry were replaced with socks and sandals. This footwear was more comfortable to walk in and allowed more agile footwork. Shin guards were added to this suit, but they were usually just plates sewn to fabric (Robinson 1969b: 191, 198; Bryant 2001: Chapter 2).

As mentioned above, the gun caused several more changes in armor. The famous Myouchin family is credited with the creation of the first gun-resistant armor in Japan, but other armor makers soon duplicated many of their techniques. It had to increase in weight in order to deal with the increased damage a gun could deal. The best armor against guns and the other weapons in this period was made from plates of soft iron that were covered with hard steel. (Robinson 1969b: 192)

In the first half of the 16th century, the *koushouzan* began to be widely adopted, especially among the wealthier samurai. It was a *yoroi* with deep sides that were formed from many plates (between eight and seventy-two). Other changes during this period included the loss of many of the ornamental features that had previously appeared on *yoroi*, such as the gilt rims, and the *tehen*. This was probably because the average wealth of a warrior was now much less than it was previously (Robinson 1969b: 193).

The *hoshi-kabuto* was reintroduced in the late Muromachi period (around 1500), it was now made up of thirty-two to seventy-two plates, with up to 30 rivets per plate. These helmets were very strong, and thus very popular. (Robinson 1969b: 193)

The iron of this period would sometimes be finished with a russet material rather than lacquer. This material was translucent, and so did not hide flaws in the forging of armor as lacquer does. This means that it was the primary finishing material used by the most highly skilled armorers. (Robinson 1969b: 193).

In the second half of the 15th century, the famous Japanese half-mask known as the *mempou* came into use. The *hambou* (a variant of the *mempou* without a nose covering) was more popular, however. The primary purpose of these face pieces was to absorb shock and improve the fit of the *kabuto*. There was also a lining in the *kabuto* that consisted of leather or strong fabric. This was attached to the bowl, which was supported on straps that connected it to the lining. The *kabuto* was held on to the head by a cord attached through loops on the brim, as well as possibly loops and hooks on the masks. A piece of cloth called the *hachimaki* was wrapped around the head and worn under the helmet to absorb shock. (Robinson 1969b: 193-194).

In contrast to the new *hoshi-kabuto*, there were also simpler *kabuto* during this period that consisted of three or four plates. These *kabuto* were often made by the Hineno and Haruta schools of armorers for the lower ranking warriors due to the reduced labor needed for their creation, which also decreased their cost. (Robinson 1969b: 194)

With European contact starting in the 1500s, the Japanese were introduced to their armor. After seeing these forms of armor, Japanese armorers copied some of its attributes. Helmets, gorgets (neckguards which were often worn on the outside of armor, rather than the European style of inside the armor), and breastplates were popular pieces of European armor to copy. (Robinson 1969b: 196).

7.4 Armor of the Azuchi-Momoyama Period (1568-1600)

The giant armies of the Momoyama period required armor in large quantities, which meant that the average quality of armor decreased as the armorers struggled to meet this great increase in demand. (Robinson 1969b: 195)

During the second half of the 16th century, mail and splints were often used for armor that covered the limbs, and infantry even wore *kusari-katabira* (mail shirts). The other popular design for the lower classes was called *tatemi-gusoku*, which was made up of small plates and mail. A *jingasa* (simple lacquered hat) was issued to them to protect their heads. The expense of armor meant that not all warriors had full suits; the rank of the warrior would determine the completeness and quality of his suit. These suits of armor were called *kachi-gusoku* or *ashigaru-gusoku*. (Robinson 1969b: 195)

The lacing of armor during this period was made from braided silk or leather that was dyed in shades of cool colors such as blue, green, and brown. Purple was also used

by those who could afford the continual relacing it required, since that type of dye caused the silk to rot more quickly. (Robinson 1969b: 197).

Complex crests and flags were added to armor during this period, probably to provide a good distinguishing mark between troops of different *daimyo* (lords). In order to hold the *sashimono* (flag), the backplate of the armor was modified to carry a bamboo shaft. This flag carried the *mon* (badge) of the wearer or of his lord. (Robinson 1969b: 198)

As a way of personalizing their equipment further, many warriors wore helmet crests that they found important. These crests could be as simple as a sun or moon shape, or as complex as antlers or buffalo horns. The hook on the front of the helmet to which they were attached was called the *haraidate* (Robinson 1969b: 198; Bryant 2001: Chapter 8).

7.5 Armor of the Edo Period (1600-1868)

The Edo period was one of peace. It marked the end of large-scale conflict in Japan until the Meiji reformation. With this peace, armor began to decline in functional quality, and it became more ornate. The demand for quality armor did not slack off, since the samurai were required to continue to train for battle (Robinson 1969b: 199).

Early in this period, interest in the older forms of armor began to be revived. Ornamental features such as the *agemaki* were added back into armor, even when they conflicted with the newer parts. The *agemaki* is positioned in the middle of the back plate, and this conflicted with the *sashimono* that passes through that point on later armor. Due to the lack of detail in the ancient references the smiths were using, they made many similar mistakes in the recreations that caused the new armor to be difficult to wear or

use. (Robinson 1969b: 200) This interest in old armor was increased in the early 18th century with the publication of *Honchou Gunkikou* by Arai Hakuseki, the first history of arms and armor in Japan. This book described and illustrated many of the old armors preserved in temples (Robinson 1969b: 202).

The foremost among armorers during this period was the Myouchin family. From the early 17th century to the middle of the 18th century, they primarily produced breastplates ornamented with *uchidashi* (embossing). (Robinson 1969b: 200). Myouchin Muneakira (1673-1745) created many of the most beautiful *kabuto* during this period, especially of shapes based on those of seashells. According to Morihiro Ogawa, HAM 1175.1 was created by Myouchin Muneyasu in the 18th century. (Robinson 1969b: 202)

The *dou maru* was the primary type of armor in demand in the first half of the 18th century due to its similarity to the more recent forms of armor. This made it relatively easy to construct, and it resembled the newer armor that had evolved from it in appearance. However, it was a victim of the poor sources that were used by the armorers producing it, since the shoulder guards were often fastened incorrectly. The *kabuto* that was paired with this armor was generally of the 16th century style multiplate. The *kote* (arm guard) on this armor were constructed like the 15th century's *tsutsu-gote* (pipe shaped plates used to cover the forearm). (Robinson 1969b: 202)

The *sode* of this armor were generally *ousode*, or one of the smaller Muromachi period types of *sode*. The masks worn with the set of armor were generally *mempou*. The *haidate* (thigh-guards) were generally of either lamellar construction or a more modern plate construction. The plate shin guards consisted of three sections of plate that were

joined with hinges, and called *tsutsu*. There was also a version of shin guards that had large knee guards that were called *outateage no suneate*. (Robinson 1969b: 204).

In the second half of the 18th century, authentic ancient pieces of armor became more popular among the wealthy samurai. As the supply of armor did not match this demand, the prices were high and many pieces were artificially aged and sold as authentic. This was especially noticeable among the pieces that were easily destroyed. Due to this lack of supply, most sets of armor from this period consist of pieces from a wide variety of periods. Differing styles of armor were often mixed indiscriminately, even in sets that consisted of pieces from the same period. Towards the end of this period, many suits of *ouyoro* were produced, but the complexity of *ouyoro* and the many differences between *ouyoro* and modern armor meant that the new suits were merely poor shadows of the old ones. (Robinson 1969b: 206)

As the samurai became increasingly nostalgic for the times when battle was widespread, they began to revive ancient customs and elaborately enact them. It is likely that the main cause of nostalgia was that the samurai were supposed to constantly be prepared for battle, but the lack of large-scale conflict for so many generations had made them forget the reasons for many of these customs and the methods of war that went with them. (Robinson 1969b: 206)

Many of the armors made towards the end of the period were entirely of leather, and they have not survived very well due to their sensitivity to climatic conditions. (Robinson 1969b: 208)

Conclusion

This project had three primary objectives. The first objective was to research Japanese arms and armor. Our findings from this research make up the bulk of this report. The second objective was to photograph and document the Higgins collection of arms and armor in light of the information discovered during the research phase. The third objective was to combine the research information and the information about the Higgins pieces into a web-based virtual exhibit that would allow people to learn more about Japanese arms and armor and the Higgins collection of them.

Research

The research phase of the project had some problems. It began very slowly since the only books with any depth regarding Japanese arms and armor are those in the Higgins collection. The WPI library has nothing useful on these subjects. The closest library aside from the Higgins library that appears to have any useful books on these subjects is the Boston Public library. Additionally, most of the books available from used-book sellers were expensive, in the Higgins library, or both. However, the general history proceeded relatively smoothly due to the many references regarding it that could be obtained outside of the Higgins collection. This allowed us to make up for some of the slowness of the other research by allowing one group member to aid the others.

We had a hard time finding good material for certain topics even within the Higgins library. One of those topics was that of the Japanese gun, particularly its construction and design. Japanese archery also generally lacked of deep discussion. There was only one good reference for Bujutsu (Ratti 1973). We also found that the Higgins

library did not have many references that went into depth on Japanese armor, especially armor made during the Edo period. A group that wishes to focus on these subjects may wish to consult outside sources and used book stores (such as <http://www.abebooks.com>) to find relevant works. There were several references in the library that may have been deep and highly useful, however they were written in Japanese.

Artifact Documentation

The photography was not difficult, however it was very time consuming. We were able to take about 45-50 pictures (about 25 artifacts) in a two hour period (including setup and take down). There were about 360 artifacts total, and 720 pictures that are included in the final site. We used an Olympus C-3000 digital camera (3.3 megapixels) to photograph the artifacts. These pictures were then digitally touched up with JASC Paintshop Pro in order to remove the color cast caused by the lighting. Any features of the artifacts that would not show up in pictures were documented. The notes provided by Morihiro Ogawa were also integrated into this documentation.

Virtual Exhibit

This collection of web pages integrates the pictures and documentation of the artifacts with the research that we carried out in the first term of the project. It provides a page for each artifact that shows the type of the artifact, any particularly interesting features of the artifact, and our photographs of the artifact. It also provides a searchable form of the Higgins Armory database of artifacts. This form enables users to find

information about artifacts, and links to a short page about each artifact that also contains the pictures we took of the artifact.

The web page was created using Microsoft IIS and Frontpage. It was tested with IIS 5 under Windows 2000 and IIS 6 under Windows XP. We also created a version of the web page that works with PHP and the MySQL database under UNIX systems. This was tested on a Linux system and the WPI CCC system. See the file called readme.txt included on the Web Page CD for more information regarding the structure of the web.

Future Work

Future IQP students could easily continue this project. The sections of the report regarding Japanese armor could be expanded on, especially regarding work of Edo period armorers that resides in the Higgins collection. A project of this sort may also require research into works to add to the Higgins collection regarding Japanese armor. Similar expansion of the information regarding Japanese arms could also be the basis of future work, although it should be noted that, unless the students are highly proficient in the Japanese language, very few books can be found on most of these topics.

As a less direct continuation of the assignment, IQPs could be done along similar veins: utilizing the interconnected web page and database layout (and perhaps refining them), subsequent IQPs could photograph artifacts from other regions of the world and set them up in a similar, or perhaps merged, database.

Integrating multiple cultures into a single comparative web page should also be possible in the future, after several separate cultures have databases and web pages assembled. In short, this project is an excellent starting point for further expansion on Japanese armor, similar projects on other cultures, or increasing Higgins's web presence.

Bibliography

History

Sansom, George (1958) *History of Japan to 1334*. Stanford: Stanford University Press.

One of a trio of encyclopedic books on Japanese history, an extremely in-depth look at Japanese geography, peoples, and ancient history. Covers history from the end of the stone age to the beginning of the Muromachi period, including contact with China and the evolution of the Samurai.

Sansom, George (1958) *History of Japan 1334-1615*, Stanford: Stanford University Press.

The second of the trio of encyclopedic books on Japanese history, covering the Muromachi period, the introduction of the Western world and gunpowder, and the formation of the Tokugawa Shogunate, including detailed information about Oda Nobunaga, Toyotomi Hideyoshi, and Tokugawa Ieyasu.

Sansom, George (1958) *History of Japan 1615-1867*, Stanford: Stanford University Press.

The last of the three History of Japan books, this covers in great detail the Tokugawa Shogunate and its downfall in the mid to late nineteenth century due to European influence, and the Meiji Restoration, bringing with it massive industrialization, a revitalization of the empire, and a resurgence of Japanese pride.

Hall, John W. and Jeffrey P. Mass (1974) *Medieval Japan, Essays in Institutional History*. New Haven: Yale University Press.

The essays on economy and land possession supplement the political, cultural, and militaristic views taken by the *History of Japan* series. A number of relatively short essays are of interest to us, including “Kyoto as Historical Background” by John W. Hall, “The Early Muromachi *Bakufu* in Kyoto”, by Prescott B. Wintersteen, Jr., “The Muromachi *Shugo* and *Hanzei*” by Prescott B. Wintersteen, Jr., “*Ikki* in Late Medieval Japan” by Jeffrey P. Mass, and a large number of maps, figures, and tables.

Turnbull, Stephan (1982) *The Book of the Samurai*. New York: Arco Publishing.

Covers many of the effects of historical events on both the style and politics of samurai. Also contains many concrete examples of translated Japanese stories about samurai. Excellent illustrations.

Armor

Bottomley, Ian (1998) *Japanese Armor: The Galeno Collection*, Seattle: Marquand Books.

This book has no footnotes or bibliography. It consists of pictures of pieces in the collection with explanatory text, features many late pieces.

Bryant, Anthony J. (2001) *An Online Japanese Armour Construction Manual*.

<<http://www.geocities.com/sengokudaimyo/katchu/0.Katchu.html>>.

This website contains a short but informative history of Japanese armor with many pictures, as well as an extensive description of armor creation. It has a large, annotated bibliography, however most of the books are very obscure and/or only available in Japanese.

Irvine, Gregory (2000) *The Japanese Sword: The Soul of the Samurai*. London: V&A Publications.

This book contains some information on armor, and has a bibliography.

Perrin, Noel (1979) *Giving Up the Gun: Japan's Reversion to the Sword, 1543-1879*. Boston: David R. Godine.

This book has very useful information on the Japanese reaction to the gun, and some information on its effect on armor. It also contains an extensive bibliography.

Robinson, H. Russell (1969a) *Japanese Arms and Armor*. New York: Crown Publishers Inc.

This book has many pictures and diagrams, but no footnotes or bibliography. It totals about 50 pages of information, most of it covering Japanese armor.

Robinson, H. Russell (1969b) *Oriental Armor*. New York: Walker & Co.

This book has many labeled diagrams and pictures, as well as a bibliography. Only pages 177-217 cover Japanese armor, but these pages contain a great

amount of detail about the construction and appearance of Japanese armor during various periods.

Robinson, H. Russell (1965) *A Short History of Japanese Armor*. London: Her Majesty's Stationary Office.

This book has several diagrams and pictures. It also contains a one page bibliography.

Yamagami, Hatiro *Japan's Ancient Armor*. Tokyo: Board of Tourism Industry, 1940.

This book has several B/W pictures and some diagrams. It focuses on 1600 CE and before. It also contains a short bibliography.

Military Tactics and Bujutsu

Ratti, Oscar (1973) *Secrets of the Samurai*. Rutland: Charles E. Tuttle Company,.

Very extensive bibliography, footnotes collected at end of book. An extensive look at bujutsu in Japan and the art of single person combat.

Turnbull, S.R. (1979) *Samurai Armies 1550-1615*. London: Osprey Publishing.

No bibliography. A breakdown of military makeup, formations, tactics, armor and equipment during the era of firearms in Japan.

Turnbull, Stephan (1982) *The Book of the Samurai*. New York: Arco Publishing.

Not very extensive bibliography, many illustrations. Focuses on the samurai throughout the recorded history of Japan, well illustrated general covering of most topics. Focus on middle chapters of the book, where tactics, arts are discussed. The first and last chapters focus on the rise and fall in history of the Samurai.

Warner, Gordon, Don F. Draegar (1982) *Japanese Swordsmanship: Technique and Practice*. New York: John Weatherhill Inc.

Short bibliography. In depth about the usage of the sword, schools based on it, and it's role as the main armament of the samurai.

Yumoto, John M. (1958) *The Samurai Sword*. Rutland, Vermont: Charles E. Tuttle Company.

Covers the Japanese sword in detail. Only the first chapter on the sword history is of significance to tactics.

Weapons

Yumoto, John M. (1958) *The Samurai Sword*. Rutland, Vermont: Charles E. Tuttle Company.

Details the construction of the Japanese sword, down to *hamon* names and categories. Photographs and illustrations give clear examples of swords in Japanese style.

Knutsen, Roals M. (1963) *Japanese Polearms*. New York: Arco Publishing, Inc.

In-depth descriptions of dozens of different kinds of naginata and yari. Many illustrations and descriptions of individual pieces.

Ratti, Oscar (1973) *Secrets of the Samurai*. Rutland: Charles E. Tuttle Company,.

Useful for a look at the functionality of various weapons. Very in-depth look at weapons, styles, and the people who utilize them.

Glossary

Word	Definition
<i>Agemaki</i>	large, tasseled bow tied to the back plate of armor
arquebusiers or ashiguers	peasantry trained in the use of firearms introduced by the Portuguese in 1543. This term is most likely of Portuguese origin. European books seem to translate as "Arquebusiers" while Americans translate as "Ashiguer"
<i>ashigaru</i>	"light foot" usually conscripted peasantry equipped most often with yari
<i>ashigaru-gusoku</i>	(see <i>kachi-gusoku</i>)
<i>bujutsu</i>	Japanese martial arts
<i>bushi</i>	warrior class
<i>bushido</i>	code of conduct, chivalry, "way of the warrior"
<i>daikyu</i>	a longbow of about seven and a half to eight feet in length
<i>daimyo</i>	feudal baron of Japan, known primarily for their warrior prowess
<i>dou</i>	torso armor
<i>dou-maru</i>	close-fitting cuirass for infantry that fastened on the right side
<i>fukigayeshi</i>	curved, laminated plates assembled into the neckguard
<i>habaki</i>	fabric leggings covering shins
<i>hachi</i>	bowl of the kabuto
<i>hachimaki</i>	padding worn under the kabuto to absorb shock
<i>haidate</i>	thigh armor
<i>hambou</i>	mask covering only the lower face
<i>hamon</i>	temper line of a sword
<i>happuri</i>	brow and cheek guard
<i>haraidate</i>	hook on kabuto that holds a soldier's crest
<i>haramaki</i>	armor used primarily by foot troops that is much like <i>dou-maru</i> , but closes in the back rather than on the side
<i>hiza-yoroi</i>	divided apron used to protect the lower legs and knees
<i>hoshi</i>	large, conical rivets in the kabuto (lit. stars)
<i>hoshi-kabuto</i>	kabuto with large rivets called <i>hoshi</i>
<i>itadokoro</i>	iron plates used as sections of armor
<i>ita-mono</i>	Solid plates of iron or leather used in armor
<i>itayoroi</i>	plate armor
<i>jingasa</i>	simple lacquered hat
<i>kabuto</i>	helmet
<i>kachi-gusoku</i>	set of a lower class soldier's armor
<i>kamuri-ita</i>	curved iron cap on the ousode
<i>kanji</i>	Chinese character used in Japanese writing
<i>kasajirushi no kan</i>	ring fastened to the back of a kabuto
<i>kebiki</i>	close spaced odosige
<i>kohaze</i>	toggles used to fasten armor together
<i>koshozan</i>	do with deep sides formed from many plates
<i>kote</i>	arm guard

Word	Definition
<i>kozane</i>	small, lacquered scales of iron and/or cowhide
<i>kusari</i>	chain mail that is always mounted to fabric
<i>kusari-katabira</i>	do made entirely of kusari
<i>kusazuri</i>	skirt attached to the do protecting the upper legs
<i>kyujutsu</i>	The art of the bow
<i>kyuubi</i>	solid iron plate covering shoulder fastenings on the left
<i>mempou</i>	mask covering the nose and lower face
<i>mon</i>	badge
<i>muna-ita</i>	solid iron strip attached to the top of the do
<i>naginata</i>	a long spear like weapon, with a curved blade at the end
<i>namban-hachi</i>	form of kabuto that combines Chinese, Korean, and European helmet designs
<i>nodachi</i>	Sword with a cutting length of a meter or more.
<i>odosige</i>	lacing braid
<i>oukuwagata</i>	large, ornamental horns worn on some kabuto
<i>ousode</i>	large, rectangular sode found on oyoroi
<i>outateage no suneate</i>	leg armor with large knee guards
<i>ouyoroi</i>	large, ornate armor worn by nobles during the Kamakura period
<i>sane-yoroi</i>	scale armor
<i>sashimono</i>	small flag on a pole
<i>se-ita</i>	plate covering the back of haramaki and similar armors. (lit. coward's plate)
<i>sendan</i>	leather covered iron plate that capped the ones covering the shoulder straps
<i>shikoro</i>	neck-guard of the kabuto
<i>sode</i>	shoulder-guards
<i>sugake</i>	widely spaced odosige
<i>suji-kabuto</i>	kabuto with smaller rivets than hoshi and ornamental tehen
<i>suneate</i>	greaves to protect the shins
<i>taishou</i>	general
<i>tameshi</i>	test, particularly armor tested against gunfire
<i>tatemi-gusoku</i>	do made of itadokoro and kusari
<i>tehen</i>	large, gilded hole in the kabuto that allows a warrior's hair-tail to pass through the kabuto
<i>tsurubashiri</i>	leather apron covering the front of the do
<i>tsutsu</i>	pipe-like form of shin or arm armor
<i>uchidashi</i>	embossing
<i>waidate</i>	plate covering the right side used on armors that fasten on the side
<i>wakazashi</i>	Japanese short sword
<i>waki-ita</i>	plate to protect the left armpit
<i>watagami</i>	shoulder straps
<i>yabusame</i>	mounted archery
<i>yari</i>	spear
<i>yoroi</i>	armor