A Socio-cultural study of Japanese leather[1]

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I. Traditional Japanese leather-making

Japan, like other countries in the world, has used leather since time immemorial. During the Jomon period,i.e. 14,000 BCE to 1,000 BCE, Japan was inhabited by hunter-gatherers. Then, the Japanese archipelagos were abundant with wild boars, rabbits, weasels and deer. There are excavated stone tools which were apparently used to separate raw hides and skin from the animal flesh. After eating the meat, people must have tried to make leather by chewing small strips of raw skin. The enzymatic reaction of human saliva and the chewing of the skin softened it. It took many hours to finish even a small strip of leather in those days. Large animals such as cattle and horses were not known. Only after they were imported from the continent in the *kofun* period (3rd to 6th century AD), could Japanese inhabitants start making large pieces of leather. Cattle and horses were first kept to cultivate wet rice fields and as carriers. Only after the Meiji period, i.e. after the late 19th

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century, did Japan start growing cattle both for meat and leather-making. Until then, wild boars, bears and deer, particularly deer, remained the commonest animals to eat and their skins used for leather (Takenouchi 2008). Raw animal skin rapidly degrades or putrefies due to bacterial effects. Leather, on the other hand, is resistant to microbiological degradation.

Long and tedious process of tanning

There are several methods of turning raw animal skin into leather and different methods were used throughout the ancient world. The oldest ways of making leather are tanning and tawing. While tanning process requires tannin, an acidic chemical compound such as oak bark, tawing uses aluminium salts (alum), and makes the leather white but water-sensitive. The shortcoming of alum-tanned leather is that it is not durable enough for daily use so vegetable tanning predominated. Both the word 'tanning' and the work of 'tanners' derive from the tannin used in vegetable tanning, which uses natural occurring tannins from tree bark.

The preparation of vegetable tanning starts with 'curing'. After obtaining animal skin and hides, curing them with salt to prevent putrefaction from bacterial growth is essential for the entire processing work. The curing process involves a large amount of salt which also removes excessive water from the skin and hides. Next, the raw skin or hides are soaked in lime(liming process) in order to remove hair from the skin and hides easily. The process requires 'bating', 'deliming', and 'curing' as well. In the bating process, enzymes which break down proteins and peptides are used to remove unwanted proteins. With the use of enzyme, bating makes clean, smooth and soft hide surfaces. Once bating is complete, the hides and skins are treated first with salt and then with sulfuric acid to bring down the pH of collagen to a very low level. This process is known as pickling. This is necessary so as to facilitate the penetration of the tanning agent into the skin and hides. After these processes, the skin and hides are beaten and oiled in a drum for many hours

before dressing is done. One of the shortcomings of this tanning method is that the liming and deliming process damages the fiber and weakens the original strength of skin and hides.

Next, 'beamhouse operation' which is a tannery section where hides are prepared for tanning, starts: skin and hides are soaked and dipped many times in the pools of vegetable solutions for months to make hard and resilient leather.

In order to shorten the tanning process, the use of chemical chromium was developed in the late 19th century, reducing the entire tanning process just into a few weeks, and has become universally widespread. Vegetable tanning, though expensive, is still used since there is a strong demand for heavy, hard, and durable leather.

The advantage of oil tanning

On the other hand, oil tanning, which is as old as vegetable and aluminum tanning, is near-extinct. While it has a great advantage of not using lime at all and can make a smooth and environmentally friendly leather, the disadvantage is the amount of time needed to soften the leather using labor and oil. Although employed from time immemorial, oil tannig gradually disappeared from the mainstream leather making ouiside of Japan except among the minority tribes of Tungus and Native Americans. In Japan however, oil tanning (which is called 'white tanning' in Japanese) was used until the late 1950s among the majority of middle and small scale tanning factories, until the chromium tanning took over the manufacturing industry after that.

Japanese tanners didn't use vegetable tanning since there was not a strong demand for heavy and hard leather for shoes and boots unlike the western countries. Instead, Japanese stuck to the archaic method of oil tanning. In Himeji and Tatsuno in Western Japan for example, they soaked skin and hides in a river rich in bacteria which opens up the pores in the skin and hides and loosens the hair. After being taken out from the river, the skin and hides were soaked in a warm solution full of enzymes from fermented rice husks before removing the hair. After

hair removal, the skin and hides were heavily salted overnight before the workers started stamping and kneading by foot. For hundreds of hours, periodically oiling with rapeseed oil, removing the salt in the river, and drying under the sun several times. Oil was the only substance added to the skin and hides during this long process of stamping, and stretching the skin and hides. Only in the 19th century when the military created a demand for heavy leather for boots and gear, did Japanese tanners turn to vegetable tanning and the use of tannins from trees. (The stripping of bark from living trees, it should be noted, has a significant and negative effect on forests. Moreover, according to Shoji Nobi, a Japanese leather historian, Japanese tanners did not like the large tanks full of dark colored tannin solutions as they reminded them of 'night soil' buckets.)

It is not clear when Japan acquired its first oil tanning technology. But there are traces of similarities between Japanese oil tanning methods and those which were developed in ancient civilizations such as Mesopotamia and India. There are also documented stories about craftsmen coming to Japan from the Asian continent. One such story is that when Japanese Empress Jingu subjugated several Korean kingdoms in the 3rd century, she returned with tanners from the Korean peninsula. Accordingly, in ancient Japan people engaged in leather production were called *Kudara-tehito,* i.e. artisans from *Baekje* or *Komabe*, people of *Gogureo* (Matsui 2012:132). According to Matsui their technology probably included brain tanning. Before then, Japanese tanning was 'simple' involving only the removal of fat from the skin and washing and drying the hide on the riverside several times. But the knowledge brought from Korean Peninsula seems to have added the skill of smoke tanning which is used in the final process of brain tanning (Matsui 2012:132).

II. Socio-cultural background of Japanese leather workers and their stigma

Japanese skinners and tanners may have originated from those called *etori* (bait catchers). They were public servants, from the 8th to the 16th centuries, who

served the royal court by getting bait for falconers. Some of the *etori* became skin and hide tanners making leather for armor, weapons and saddles for wartime samurais during the 15th to the 16th century civil war period (Sengoku period). When the ancient legal system (*ritsuryo*) crumbled in the late 8th century the royal court ran out of funds and the craftsmen were dismissed. They scattered into several regions where they took up leather making (Harada 1973).

Buddhism was introduced to Japan in the 6th century and has had a major influence on the development of Japanese society since. Buddhism brought with it the Indian concept of ritual pollution which was used to organize a social hierarchy. As a result, tanners, who handled animal remains with all of the accompanying odors from decomposing meat and blood, were considered polluted. Derogatorily labeled *eta* or 'the filthy' they became 'untouchables'. When epidemics occurred, for instance in Kyoto the ancient capital, tanners were believed to be the source of disease since they used the river flowing into the capital to soften hides.

At the same time however, the perceived ability of the tanners as 'untouchables' to 'handle' pollution gave them supernatural powers, including the ability to ritually 'purify' others and places. Thus, tanners were hired as '*kiyome*' (ritual purifier) to 'clean' important and sacred sites such as temples, shrines, and castles. They also became the operators of funerals and graveyards, as well as crime hunters and night watchmen for the very capacity of handling pollution and danger (Amino 1978).

The pure and the impure oscillates in Japanese minds and rituals. Since the post-medieval period this concept has helped maintain a social hierarchy. The Tokugawa shogunate, established in the late 17th century, placed tanners at the bottom of the hierarchy because of their untouchability and forcred them to live in settlements outside of main villages. These hamlets are called '*buraku*' in modern Japan, a shortened form of '*hisabetsu buraku*' or discriminated hamlets and the inhabitants are called '*burakumin*' or '*kawata*', people whose livelihood is leather-making. This derogatory connotation attached to '*buraku*' is a modern creation and did not exist in the original word of 'buraku' (De Vos & Wagatsuma 1972). In an

interesting paradox, the legendary figure of the master craftsman tanner who came to Japan from the Korean peninsula is enshrined as the 'god of leather tanning'. The name of the shrine is Takanogi shrine and the leather god is called *hijiri* i.e. the saint. Today, the shrine stays in the Himeji area where there are several ancient tanning villages. According to legend, a tanner craftsman from Korea settled in the Himeji region where he found a river, running through the city to be suitable for tanning. The river called *Ichikawa* is considered a river of mystery because when a raw hide is soaked for a day, the hide becomes soft and the hair is easily removed. Much later, a scientific analysis found there are many bacteria in the water which accelerates the decomposition.

III. Tanning and the Market Economy

During the Tokugawa period, those who were engaged in tanning and butchering animals were called *kawata* or leather-paddy people. Rice farmers, on the other hand, grew rice in a *kome-ta* or rice paddy. Rice farmers were high in social status, below only the samurai. Samurai lords themselves were hierarchically ranked by the number of sacks of rice harvested by the farmers in their fief. Even though they had small plots of arable land, *kawata* being untouchbles were not given the status of rice growers. They were to make leather and live on the margins of society. But this low status secured them a privilege – the right to take away the dead animals. This hereditary right was not given to a family, but to a regional *kawata* hamlet. Some members of the hamlet became wealthy by 'hiring' tannery workers, lending money and trading leather. Some became 'pharmacists' making 'medicine' from harvested livestock organs. Some became managers and business dealers attached to such big business families. A few became extremely rich with access to the local *samurai* authority, but most remained poor wage workers. Significantly, the division between rice farmers and the *kawata* foretold the transition of Japanese post-medieval society from an agrarian economy to a market economy.

The *setta* and *tsunanuki* boom

The wealthiest people of kawata community were market oriented being involved in money lending and the highly profitable leather trade. Most peasants, even though higher in social status than the *kawata*, had no cash income. *Kawata* leather-makers, on the other hand, were paid in cash for tanning and for making or repairing *setta* sandals with leather soles and *tsunanuki*, moccasin-like shoes lined with leather.

Originally, *setta* were worn by tea ceremony masters and *tsunanuki* by rural peasants when walking on snowy streets and roads. *Setta* sandals and *tsunanuuki* became trendy and popular in Japanese cities in the late 18th century. According to Nobi (2018), two to three million pairs of *setta* were sold annually at the height of their popularity. Thanks to the boom of seta and *tsunanuki*, the value of leather increased tremendously as did the demand for tanners and cobblers.

Although the social status of Japanese tanners remained low and most of the added-value of leather to *setta* and *tsunanuuki* was captured by mercantile capitalists, the attitude of ordinary peasants towards leather and hides changed. Whereas, once the disposal of dead cow and horse carcasses was the province of 'polluted' untouchables, the great demand for raw hides led many common peasants to regard their dead cows and horses as assets to be sold (Nobi 2018).

IV. Japanese Traditional White Tanning and Deer Brain Tanning.

The uniqueness of traditional Japanese leather is attributed to white tanning and brain tanning. Basically, both use the same processing steps and both are oil tanning. Unlike western vegetable tanning, they do not use chemical agents such as lime, alum, or formaldehyde. Removal of hair is done by soaking the hide in river water. Soaking hides in a broth of fermented rice-husks or keeping them in a heated room to accelerate decomposition is sometimes used. After the removal of hair, the hide undergoes a stamping and kneading processes with salt and rapeseed oil, the only agents to accelerate the processing. The stamping, thinning, stretching and

scraping the hide with a sharp razor blade are done by hand by skilled craftsmen.

Brain tanning uses the same process, but deer-brain paste is used as the processing agent. This makes the skin softer, more resilient, water proof and long lasting. The leather is finally finished by smoke tanning, which was once believed by researchers to be only a color-staying treatment but is now considered to be a tanning agent as well as a water-proofing agent.

Smoke tanning craftsmen are highly skilled as the skin is easily charred. The smoke, which reacts chemically with the skin, is made by burning straw, pine needles and rosin. Both Japanese 'white' tanning (which is called shiro-nameshi in Japanese and is different from the English white tanning) and the brain tanning are 'oil tanning' with a tradition going back to ancient civilizations. The latter originated from Tungus nomads of Northern and Central Asia while vegetable oil tanning was developed among agriculturalists in milder climates. In Japan, both white tanning and brain tanning were used well into the 1970s. However, at the beginning of the 1920s, tanners began to use formaldehyde or alum instead of brain paste, relegating brain tanning to a sideline. The gradual disappearance of brain tanning is attributed to the strong smell of the brain solution.[2]

Following is the brain tanning process.

1) Dried skin pieces are soaked in water for 1-3 days. Surfactants are added to the water.

[2] This part follows Deguchi's fieldwork in Nara prefecture during 1971-72. I am deeply indebted to Dr. Kiminaga Deguchi who generously offered me the access to this field note.

2) A special knife is used to remove the hair from the root. The removed hair is used for brushes. After the shaving, the skin is again soaked in water.


3) Using a u-shaped bamboo board, the surface is scraped with a special knife to remove fat and subcutaneous tissue. After that, the skin is soaked in water.



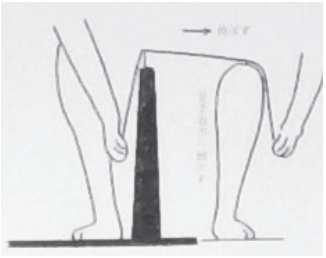
4) The grain of the surface is removed by a sharp blade. There were three kinds of special knives for this.

5) The skin is soaked in water to remove the blood stain and dirt.

6) It is wrung to remove excess water, and then hung on a woven rope for about 1 week. The drier, the better. The hard dried one becomes honey colored. This is what is called *itame* (dried hard pieces of hide).

7) The dried pieces of hides are then soaked in water for 24 hours and laid on a board to remove excess water.

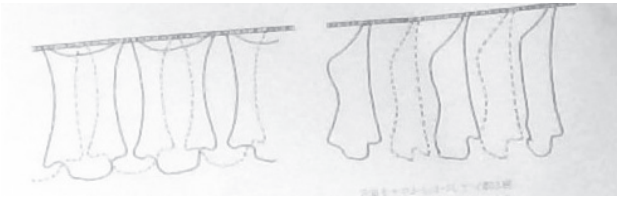
8) Using half-circled vertical blade on the wooden stand, the skin is pulled to both sides alternately. The water content of the skin is now around 50-60%. It takes 10 minutes or so to treat one piece of skin with this blade. The blade is first applied to the back side of the skin, stretching it and making minute cuts on the surface.



9) The skin is then dried for half an hour in the sun, leaving 45 % moisture.

10) After this drying process, the surface of the skin is touched-up with a blade. While the blade is worked, the skin becomes whiter as the blade makes minute scratches which reflects the sun. The minute scratches do not affect the quality of the leather.

11) The skin is now dried for at 3-4 days.



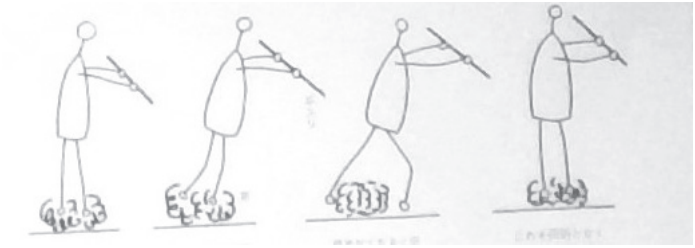
12) Next, the tanner uses the matured brain paste to soak the skin for half an hour. The hide is stamped in the pail in the meantime. Squeeze the liquid, wring well. (In the 1970s, people were using a drum for this process).

The ingredients of brain paste were originally made from deer or horse brains but the supply is limited so bovine brain and spinal cord mixture are commonly used. The brains were sealed for at least one year and as the decomposition progressed, the water decreases and becomes like a thick paste. The color gets slightly reddish in the center. The brain paste solution is 8-10% of water and the water temperature is around 45 -50 celsius. About 100 skin pieces can be treated in one time. After this process, the solution will be re-used the following day for the next batch. Processing is quicker if an old solution is added to a new one. The older the solution, the better.

13) Hang the skin on the rope made of three fine ropes. Leave some moisture and make all the leather moisture the same. Keep it overnight to give good

moisture.

14) Do the stamping after folding the skin. 30 sheets of skin can be done at a time for at least 40 minutes.



15) Stretch the skin again on the bladed wooden stand. The blade is very sharp and if the skin is moved parallel to the blade, it will break.

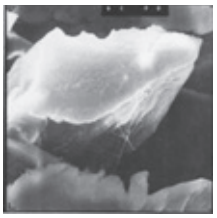
16) Hang on the wooden bar and hold it with both hands and kick the bottom part with foot, shin, and knee cap and stretch both horizontally and vertically. The last pull should be to the vertical direction.

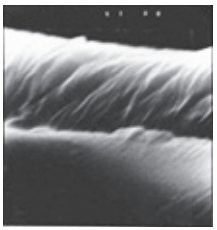
V. The characteristics of brain tanned deer skin

The component of brain solution is animal oil which works as softener. The brain paste can be used however old it is. The paste should be aged at least one to two years. Even if the brain paste is used excessively, the skin gets slightly oily and the smell is stronger but does not cause any harm to the product. The brain paste

makes the deer skin much softer, resilient and gives a nice texture with stretchable quality.

Brain tanned leather easily absorbs water. But unlike other leathers, brain tanned leather does not get hard after the leather is squeezed to remove the water; it returns to normal as soon as it is dry. Because of this quality, brain tanned deer skin was used as the uniform of firemen in pre-modern period era. Firemen in deer skin uniforms, splashed water over the bodies, before jumping into a fire.





(photos taken by Deguchi, 1971-72)

Brain tanned leather retain the color very well: while the tanning processing is ongoing, the skin can be colored at the same time. This is the unique quality of brain tanning. The worst drawback is the bad smell. The smell is strong and cannot be removed so easily. By 1975, its use died out completely.

Koshu Inden, the manufacturer of deer skin bags since 1865, still uses smoke tanning for coloring deer skin. According to Inden, deer skin today is chromium tanned, but the color stays better and longer if it is smoked and the skin gets softer after this process (Koshu-Inden 2017).

Concluding remarks

The tradition of the proper Japanese brain tanning continued until the 1970s but has since died out. However, Inden, a famous Japanese deer skin handbag manufacturer in Kofu maintains the smoke tanning method to color their deer skin bags which is highly appreciated internationally. Interestingly, oil tanning is also coming back into fashion nowadays.

The English word 'tanning' came from vegetable tannin. Such an archaic method of natural vegetable tanning is still observable in old cities like Marrakesh and Fez in Morocco, where coloring agents are also natural and plant-based.

But tanning can also be done by both vegetable and fish oils as I have discussed in this paper. People still use marine oils to produce chamois, for example, as it is essential to the process of preserving the leather and converting it to the soft absorbent material. People living in colder climates, such as present-day Greenland or Alaska, still work with hides, particularly seal skins, using fish oils. But processing remains a small scale ethnic tradition which is not commercially viable.

Japanese oil 'tanning' overturned the prevailing view of western leather professionals by proving that vegetable oil and human labor can make strong and resilient leather. The exquisite traditional technology of Japanese leather making received an international acclaim when Japan exhibited the Japanese leather in the Exposition Universelle of 1889 in Paris. The western leather specialists noticed

that Japanese leathers were strong and resilient thus they were used even for industrial purposes such as factory belts. However after synthetic materials such as PVC were invented in the early 20th century, the Japanese leather disappeared from the mainstream. Most Japanese leather manufacturers turned to chromium tanning which is faster, easier, and cheaper, although chromium tanning itself has serious drawbacks from the point of the health of tannery workers and of environmental issues. Recent trends of environmental consciousness way bring back the long-forgotten tradition of Japanese oil tanning as of eco-friendly leather making. A new trend of research for the best mix of oil tanning and mechanization has just begun.

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