

A Sustained Society: Japan of Edo Period

- An Experience of Ultimate Sustainability -

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Introduction

Humankind is truly at a crossroads from which it may degenerate into oblivion destructing its abode, the Earth, or it may change its course and sustain its civilization for the foreseeable future. The material that is available to humankind and all the co-inhabitants of the Earth is physically limited, and the energy that is usable for long is only that from the Sun. All the other energy sources can be exhaustible; they will not last too long at the current rate of exploitation. The material naturally available is present usually in a relatively low-entropy state. Or rather only those material that is so can be reasonably usable. Once such a material is processed, utilized and then discarded/dispersed into the environment, its entropy is enormously increased. Then it is hardly possible to recover it in a low-entropy state. Hence such a material is non-renewable in practice, though it never disappears. This writer attempted to estimate the resource availability on the Earth and the anthropogenic exploitation rate in terms of major elements (Ochiai, 2000).

These are the obvious conditions imposed on all the living organisms on this planet. We, human beings, are only one of the several million species of organisms on this Earth and have to share the resources available with all the living organisms. Only we, a conscientious being, can change our way of life by our own volition. If we continue our (meaning “wealthy nations”) present way of life, the planet overexploited would eventually retaliate and force changes upon us.

The human history has recorded numerous examples in which civilizations collapsed because of their overexploitation of the environments (Ponting, 1993; Diamond, 2005). These experiences are more or less local. However, what we are now facing is a possible collapse of the spaceship Earth, or rather the human civilization on it. This spaceship is closed in terms of material; i.e., no significant amount of material comes in and out. The only significant input is the solar energy. This is the only truly renewable resource available to all the living creatures on the Earth.

Therefore, an ultimate sustainable society should use only the solar energy and other (virtually) inexhaustible energy source such as geothermal one and ocean tide, and make a judicious use of non-renewable resource. The wind power and hydropower are dependent on the solar energy.

The present world human population is about 6.2 billions and the terrestrial surface area is $1.49 \times 10^8 \text{ km}^2$. The population density is then $42/\text{km}^2$. The question is then how to construct a sustainable human civilization with this current or perhaps more

appropriate population (likely less than the current one), where the term “sustainable” is used in the sense of the previous paragraph.

Japan is a country consisting of four small islands, completely surrounded by the sea. It inadvertently experimented during the Edo period (1600-1867) to sustain such a country virtually without input of energy and material from the outside; i.e., depending solely on the solar energy. The population density during the Edo period was approximately 80/km², which is about twice as high as the present world population density. In a sense, it was a small-scale model for the spaceship Earth. It not only succeeded in sustaining the relatively high density of population and a vibrant culture, but also improved its environment; that is, it increased the forested area, made the soil more fertile and its waterways cleaner.

Japan was an agrarian, pre-industrial society at the time. The industrialization starting in mid 18th century in the West has changed enormously the material and energy use of mankind. Industrialization is the major reason for an increased material wealth of mankind in general but also is the major cause of the present crisis of environmental degradation and excessive exploitation of resources. It may not be possible for the mankind to go back to the pre-industrial society, but the mankind has to approach as close as possible to that level of resource use in order to sustain itself. Hence the Japanese experience may be worth to be told.

A Model of Ultimate Sustainable Society – Japan in Edo Period

An Outline

Japan had been a fairly open society up until about 1615, open to the outside. Free trade was conducted with a number of European countries, China and Korea. Material was transported in and out of Japan, though perhaps the total amount was not very significant compared to the GNP, if GNP of that time could be estimated. However, Japan was in turmoil during 16th century; many warlords fought each other for the hegemony of Japan. This internal war devastated the Japanese lands, and reduced the population.

Tokugawa Ieyasu won the crucial battle in 1600, and the emperor gave the title of Shogun (the Generalissimo) to him in 1603. The Tokugawa clan established its Shogunate system based in Edo (today's Tokyo) in 1603, and completed the unification of Japan in 1615. They tried to remove the Christian (Catholic) influence on some daimyo's (warlord) and the general populace, because the Christian doctrine was a grave threat to the secular authority of the Shogun. Eventually they banished all the Christian missionaries, and banned all the foreign trade and communication except for that with China, Korea and the Netherlands (1637). The Dutch convinced the Shogun that the Protestant, particularly, that of Holland would not be a threat, and besides that they were not interested in spreading Christianity. Their coming and going was, however, strictly controlled and they were allowed to reside on one small island off the shore of Nagasaki. The Japanese themselves were forbidden to travel abroad. Hence Japan virtually closed itself to the outside world, in terms of material, energy and human population. They

imported a very limited amount of such luxury items as silk from China and books from Netherlands, and exported silver, gold and later ceramics.

Japan, in a sense, embarked on a large-scale survival experiment based on only the material and energy available to them on the four small islands. It must be noted that the surrounding sea provided some food, other resources such as salt and also transportation means. The environment and the material wealth were in the beginning far from “good” because of the devastating effects of the internal war. Though improved since that time, the living condition of the general public during the period in terms of material was never very high, particularly so compared to the today’s standard. As a matter of fact, many of the poor farmers were just subsisting, and often faced starvation, when crop failures hit them. Crop failures did happen often during the period (Chapter 12 in Totman, 1993). Nonetheless, many of them including farmers could participate in a number of cultural activities, and hence their lives were far from subsistence level. The domestic culture was developed for the general public (as well as the powerful and the wealthy) in literature, performing arts, paintings, woodblock prints, and even mathematics. It has been suggested that Japan in that period was the top among the nations in the volume of books published. This presupposes the existence of a high literacy among the people, as will be mentioned later.

Not only did the Japanese collectively manage to sustain themselves and their society, they improved (rather than degrading) their environment; i.e, made their rivers and the surrounding sea cleaner and their soil more fertile, and increased the forested area (Diamond, 2005).

Social Background

Once the Shogunate system was established, a peaceful condition persisted the subsequent two and a half centuries. This was the single most important factor that Japan could sustain itself, for they did not have to waste material and energy only to destruct themselves and the environments. In 1721 the Shogun government started to take census every 6 years; hence there is a relatively reliable record of population since then. The population increased rapidly once the peaceful condition had started to prevail during the 17th century, and then it flattened out and remained more or less constant at about 30 millions throughout this period, which is about a quarter of the current population of Japan. The constant population was not a result of governmental regulation, but a result of natural causes and some intentional actions by people. The famine caused by crop failure due to unfavorable climate and other disasters was the major reducing pressure. It seems that the people tried to lower the birth rate in general, and that some form of abortion and infanticide were practiced occasionally when the increasing pressure overwhelmed the food availability (Chapter 12 in Totman, 1993)

The Japanese diet consisted of rice, vegetables and occasionally fish, but only rarely meat. Meat they consumed was mainly of those obtained by hunting, such as bird and wild boar, and not of domestically raised animals such as pig and cow. Cow and horse were kept, but mostly for the purpose of transportation. This diet system is much more efficient in energy use than the one dependent on meat.

80% of the population were farmers and produced all vegetations, and provided the basic material and food for themselves and the rest of the population. The rest consisted of “bushi” (samurai=warriors) and townspeople, merchants and artisans. Bushi (about 6% of the total population) was the ruling class and was not involved in the economic activities nor production processes. Under the Tokugawa system, their original role, that of warrior, became mute. Bushi of higher classes turned into bureaucrats. Because their salaries (given in terms of rice) were fixed and mostly inherited, they had become relatively impoverished as time progressed. Bushi of lower class (i.e., of lower salary), particularly, suffered from economic hardship. They turned to some devises of earning: teaching, writing, some special jobs and even farming and others. Merchants on the other hand gained the economic power, and hence became the main mover of the popular culture.

Firearms, first introduced by Portuguese in mid 16th century, were used extensively in the internal war period (up to 1615). Once the peace started to prevail, its use declined and its development was neglected. Bushi turned to sword as their status symbol. Toward the end of 16th century, i.e., before the Tokugawa rule started, weapons were confiscated by a decree from everybody except for warriors (“Katanagari”). In the beginning of Meiji era (1870’s), swords were removed from the former bushi (as depicted in the movie “Last Samurai”), and since that time it is a norm in Japan that nobody is allowed to carry weapons except for regular military personnel’s and a few special professionals (licensed hunters etc).

Because of this and other situations, city streets and highways were quite safe. It is known that only 24 policemen, from the top rank to bottom, were placed on the active duty in the city of Edo whose total population was believed to be about 1.2 million. The number of bureaucrats for this megalopolis was totaled about 280 including the police. This situation reduced the number of people to be fed, and made the social sustainability a little easier.

Japan was divided into about 260 autonomous small regions (called “han”). Each han had an independent administration, and the Tokugawa was simply the largest and strongest han. The Tokugawa government devised an elaborate system to keep other hans in line (e.g. see Chapter 4 in Totman, 1993), but the Tokugawa allowed each han to run its own business on its own term, unless it threatened the authority of the Tokugawa. It was a kind of federal system, where the problems were fixed by the local people who were most affected by the changes to be made and also most familiar with the situation, though in many cases a permission from the Tokugawa was necessary. However, the Tokugawa was also sufficiently strong in the political power so that it did control every detail of the conduct of people of bushi rank and all the other people, and even influenced the development of technology, when such a development might jeopardize their authority. For example, wheeled carts were forbidden in Osaka, the second largest city, because their use was considered to jeopardize the livelihood of the other transporters who were in service of the authority as well. That is, the society was far from a free, ideal society.

The Tokugawa established a national university in Edo, and each han followed suit establishing han-school. These were meant for the education of bushi-class. In addition, a large number of private institutions of various kinds including medicine, philosophy, mathematics and flower arrangement appeared, and they admitted people irrespective of

their social status. For example, a private medical school established by Ogata Koan admitted students from townspeople and farmer class as well as bushi class. Tera-koya was for the general public. “Tera” means “temple”; so it was initially conducted by temple monks. Later it became a general name for private basic educational institutions. They typically taught children of all ages the basic skills: reading, writing, arithmetic and abacus. The Tokugawa government imposed no regulation on these institutions. More than half of the whole population, and as much as three quarters of the children in big cities received at least the basic education at these institutions. That included, in many places, even poor farmers’ sons and daughters (note 1).

How did they do it?

The Use of Energy in Efficient and Renewable Manners

Except for a relatively minor use of non-renewable fossil fuel coal in certain regions, all the energy used was provided by the Sun (solar energy); that included human power (labor), plants, water- and wind-mills. Electricity was unknown, of course. Lighting was provided by plant oil and wax, and some fish oil. Mechanical work was mostly carried out by human power and a little by animals; this included long distance transportation. Their diet was mostly vegetarian, and little use was made of meat. The energy output efficiency of meat (i.e., the ratio of energy output to the total energy input including direct solar energy and all other energy necessary) is at most one-tenth of that of cereal.

One way to measure the efficiency of energy use would be to take the ratio of the energy value of material produced to the energy input (except for the solar energy). For example, in the rice production the energy input is the total energy used to produce a certain unit amount of rice, or rather its energy value, that is, the energy output. In the Edo period, almost 100% of the farming activity was carried out by human power. The implements used were not mechanical devices, but rather simple farming tools such as hoe, spade and sickle. The energy value required to produce these tools are negligibly small. The modern agriculture requires various kinds of mechanical devices; the production and use of them requires a large amount of energy. Ishikawa (1993) attempted to estimate the energy efficiency in various aspects of human activities in the Edo period. The following description is based on this source.

First the rice production; it was the basis of the economy of the period. Ishikawa made assumptions as follows. On the average 2.4 tons of rice was produced on one hectare of land; three persons worked full time for about a half year (183 days) to attain this production. The energy required for a day’s work can be assumed about 1000 kcal/person. Therefore, the total energy input is 5.5×10^5 kcal. The energy value of rice is about 3400 kcal/kg; hence, the total energy output is 8.2×10^6 kcal. Therefore, the energy efficiency in the rice production in the Edo period can be estimated to be about 1500 %, i.e., 15 times.

How about the situation in the modern rice production? It was estimated by the Science/Technology agency of the Japanese government that the production of 1 kg of rice requires about 2300 kcal of energy. Therefore the energy efficiency is about 150 %; that is, one tenth of that in the Edo period. About a half of this energy is required to

manufacture and use the various agricultural mechanical devices. The energy required for the production of chemical fertilizers, pesticides, *etc* is estimated to be about a quarter of the total. The issue of fertilizer in the Edo period will be discussed later. Suffice to say that the energy requirement for fertilizer in the Edo period was negligible.

The major difference in these two situations is human labor; farming was a very hard work in the Edo period while it is much less so in today's farming. In other words, reduction of the human drudgery in farming in terms of both farmers' work and the number of farmers needed to produce the same quantity of rice costs an enormous amount of extra energy. This is still economically possible only because a relatively cheap energy source, i.e., fossil fuel, is available for now.

A similar value has been obtained for the energy efficiency in fishing in the Edo period; i.e., the energy value of fish obtained/the energy input (human labor)=1000-2000%. In the Edo period, fishing could be done only in lakes, rivers and the sea water not too far from the seashore as the fishing boats could only be operated by human and wind power. On the other hands the energy efficiency in today's mechanized fishing industry seems to be about only 50%.

Until a quite recent time, domestic heating in Japan has never been "space-heating" of rooms or house. Fortunately Japan is located in the mild climate region and the severity of cold in winter is not extreme except for in the North. Hence no very elaborate heating system was used in most regions. This is an advantage that is afforded by the accidental location of the nation. It is very warm and humid in summer, however. The traditional houses and buildings were hence built in such a way to provide as much comfort as possible during the summer time. The building material was and still is mainly wood. Brick and stone are not suitable for building in Japan, as it is often subject to the earthquake. Wood happens to be a better thermal insulator than brick and stone. The structure of the traditional Japanese houses is not suitable for space heating; it is too porous and open. The traditional heating devices include "hibachi" and "kotatsu" (feet warming device for several people). These devices heat only locally the people sitting nearby. People wore more clothes when cold. The other device, called "irori" (hearth) was mainly used in farmhouses, and may be considered to be a space heater; it is a kind of fireplace. That was usually sufficient, but of course was not as comfortable as the space heating common in this country. It was very frugal energy-wise.

The traditional procedure of iron/steel production is called "Tatara" method. It used charcoal as the reducing agent. It has been estimated that production of 1 kg of base iron requires about 2.3×10^4 kcal, the major portion of which is the energy of charcoal. The modern technology has reduced this energy down to about 4×10^3 kcal. That is, the older technique's energy use was not very efficient. A large amount of wood had to be cut to provide the charcoal for iron production; hence the forest from which the wood was supplied was usually left to re-grow for at least 30 years before it was reused. The property of the iron/steel product from the old technology is known to be far superior to those obtained by the modern technology.

The long-distance transportation of rice, sake (alcohol) and other relatively heavy stuff was usually carried out by wind-driven boats; again this was made possible because of the geographical location of Japan. This transportation means is very energy-efficient.

The Use of Renewable Material

Only renewable material, i.e., those from plants, was used; the exceptions were iron and a few other metallic material obtained from non-renewable resources. Plants are renewable, but an excessive rate of their use would exhaust their supply, because their growth rate is limited. Other than food, plants provided material for cooking, heating (directly and as charcoal), building, furniture and other fixtures, fertilizer (as compost), oil for lighting, and so on. Today, Japan import more than half of its need for lumber/pulp, etc. In Edo period nothing was imported, and yet the forested area in many regions was even expanded during the period.

Let us look at a few examples. The Japanese had an extensive supply of paper in the Edo period. How was it possible? Paper was made only from the annually grown portion of certain fast-growing trees. Therefore, trees were never exhausted. The Japanese method of making paper was such that the cellulose fiber to form paper was of much longer size, about 10 mm long, than that made in the modern mechanical procedure, which is about 1 mm long. This made the paper making easier and required less of other additives. The resulting paper is sturdy and yet flexible and lasts long. This alone still does not guarantee an ample supply, because the resource was very limited after all. The secret was “recycle” which will be addressed later.

Publication was quite extensive in the Edo period. It is estimated that the average number of publications was about 250 items per year for the population of 30 millions during 1600-1850. This was in a pre-industrial society. According to an official record, the number of publications in Canada in 1952, an industrial society, was 684 items per the population of 14 millions. This comparison would make the number of publications in the Edo Japan look very significant. In addition, daily newspapers were published in the capital and a few other cities, and arts work such as woodblock prints were also published extensively. This presupposes the existence of literate and cultured public, not only the bushi but also the townspeople and, perhaps, some farmers (note 1).

Printing in Japan had a curious history. The oldest known printed material on paper in the world was published in Japan in 8th century; literally a million copies of a Buddhism charm (dharani) was made. A woodblock printing method and copper plate etching appears to have been used. A printing method using metal moving types was invented in China and then in Korea, and was brought to Japan in the mid centuries (13-15th). The Portuguese introduced the modern European printing method of moving type to Japan in 16th century. The Japanese used the method with the movable types made of lead, and a few tens of books printed in this manner are known to exist. They used it for a while and then abandoned it altogether. The last printed matter by the method of movable types was made in 1611. They reverted to the woodblock printing. A few reasons can be suggested. One is the nature of Japanese writing. It consists of two sets of fifty phonetic letters plus several thousands of Chinese characters that are structurally complex. This would make the system of “movable types” made of metal cumbersome and complicated, including the enormity of the number of reserved types necessary. It is easier to carve out letters and characters as needed on a piece of wood. The piece of wood can be used over and over again; once done, the wood needs only to be resurfaced for reuse. Thus, it is much more economical and environment-friendly. The material is renewable. Intentional or not, this was the second reason. When it comes to printing other than letters/characters,

i.e., artworks, woodblock printing would be easier and more flexible than, say, metal etching. Eventually a multicolored woodblock printing was invented and was used to print artworks, and hence artworks were made accessible to the general public as well.

Recycling

If only renewable material is used and its rate of production is limited by the natural growth rate, material would never become abundantly available. It appears, however, that the people in the Edo period generally enjoyed relatively affluent (materially) lives, though many people in certain quarters (poor farmers) could not enjoy such lives. The luxurious lives in the Edo period obviously could not be compared to the today's materialistic life style in terms of quantity. With the only limited supply of renewable resources, the people in the Edo period managed to lead relatively comfortable lives. How?

The answer is “recycle”, “recycle” and “recycle”. They recycled almost everything and almost exhaustively. They also repaired almost everything over and over again until no more use could be made of it. Of course, most of the devices and implements were of simple structure and construction, and hence were easy to repair unlike some of today's electronic gadgets.

Let us again look at a few examples. Paper was 100% recycled. This is not an exaggeration. It was a business to recycle or rather buy back paper products. It is said that a poor person could live off collecting paper products or just parts of them discarded and left on street. Even toilet paper soiled was collected and recycled in certain regions. The Japanese paper could withstand reuse much better than the modern paper, as it was made of longer and stronger fibers. Likewise, most of clothes sold were recycled ones, as the production of fiber (mostly cotton) was limited, expensive and time-consuming.

The ash of firewood and charcoal was also collected and bought by a business. It was sold as fertilizer and also some chemical compounds such as potassium carbonate were extracted and sold. Even the candle droppings were saved, bought, reshaped and sold by a business.

Human and animal wastes were completely recycled. They were collected, bought and sold to farmers as fertilizer by business establishments. That is, such items were made a salable commodity, though some farmers bought it directly from the consumers. Straw of rice plants was used extensively as wrapping devices for rice and other, as sandals, *etc.*, and it would be composted after all these uses. Likewise food waste was completely composted. The agriculture in the period was truly “organic”; of course nobody knew chemical (rather synthetic) fertilizer or chemical pesticide, *etc.* at the time. In some places, ammonia and nitrate were extracted from urine, and were used to make gun powder. This made unnecessary a sewage system, and did not load polluting substances on rivers, lakes and seacoast (Morse, 1888). By the way, city Edo established an extensive system of fresh water supply; perhaps more extensive than that of London at the time.

An umbrella was entirely made of plant material. The structure and the mechanism of opening and closing are the same as those of the today's umbrella. The stem and spokes were made of bamboo, and the cover is oiled paper. It is easy to repair, and every part of it can be recycled and was recycled.

It may be unnecessary to point out that any material containing iron and copper parts, no matter of what shape and conditions, were avidly collected and recycled. All these attitude and recycling business minimized garbage, and made easy the garbage disposal. Simultaneously city streets were made clean without much intentional cleaning, because almost any material would be picked up and sold to a business and reused. Every foreign visitor during the Edo period reported to corroborate such a state (see below).

Why could they do it? while many other societies failed.

This is a complicated issue. Some possible reasons are merely suggested, without much corroboration. They are:

- (1) The geographical location: it did not require elaborate heating systems; the ecology is relatively robust.
- (2) The Peaceful situation: they did not have to waste human, energy and material resources.
- (3) Basically vegetarian diet: vegetarian diet is much more energy-efficient, and besides, no grazing animals that disturb the environments.
- (4) The generally high educational level of people: they were informed of many issues.
- (5) The political system allowed a long-term view on the environment and others.
- (6) The cultural factors: basic attitude toward people, nature (environment) and the world.

We will discuss the cultural factors. They seem to instill in people an appropriate attitude toward the nature and the environments.

World view/value systems of the East and the West –Cultural background -

The Japanese culture seems to be based on a few basic tenets that are quite different from or even contrasting to those of the Western culture based on the ancient Greco-Roman culture and Judeo-Christian tradition. We will discuss three of them in connection with the present concern. They are: (a) man is a part of the Nature and man should live harmoniously with Nature, (b) everything is connected to everything else (holistic, interdependent), and (c) the important concern of an individual is feeling toward other persons, rather than his or her own individuality; this is often called “group mentality” as against the Western “individualism”(e.g., see Nisbett, 2003).

First of all, the Japanese knew nothing of “ecology” as a science, but their notion (a) is indeed the basic principle of ecology and the environmental ethics. This notion comes from the ancient religion “Shintoism”, a kind of pantheism. There is no supreme God in this religion. This is in a stark contrast to the Western notion (Judeo-Christian and also Islam) of man-nature relationship. Genesis 1.28 says this: “And God blessed them and God said unto them, Be Fruitful, multiply and replenish the Earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air and over everything that moveth upon the Earth ”.

The ways the people of the Edo period lived and the concerns they had were based on notions (a)~(c). First of all, the majority of the people in the Edo period were farmers, and they lived in and with Nature. Today, the majority of people lives in cities, artificially created environments, and can have no direct feeling toward Nature. Even if lived in and with Nature, the people in the West had different notions about the Nature and the Environment, and hence treated them quite differently from the Japanese of the Pre-modern period. That is, the Western people tried to subjugate the Nature to the will of man, and they still do.

Science in the modern (Western) sense requires an attitude to dissect the Nature, abstract factors from it and find relationships among those factors isolated (i.e., analytic). It tends to ignore the context, i.e., other factors which may be significant or insignificant in affecting the abstracted factors. If insignificant, the science could provide a useful model. Physics has been quite successful in constructing models of the Nature, as it deals with the phenomena that have strong correlations among small number of factors. This Western scientific attitude is contrary to the notion (b) of the Eastern concept mentioned above. It is likely that science in the Western sense did not develop in the Eastern society, mainly because of the notion (b). This does not mean that no science had developed in the East; it did but was of a different kind. The people looked at the Nature as a whole and learned a lot about it, but it was difficult to formulate it in terms of a small number of formulae or principles. Such knowledge had accumulated and had become something like a collective wisdom, and constituted the culture. And that was their science.

Notion (c) would afford a sense of balance regarding the people; for example there is a sense of sympathy for losers among the Japanese. Winning is not everything. These are just a few examples of manifestation of the basic tenets.

Environmental Concern

Indeed the Japanese have lived very close to the Nature and the structures of their houses are conducive for interactions among people. Their houses are quite open and in close contact with the surroundings and the rooms are communal. In contrast, a house and rooms in the West are closed, independent castles for individuals.

The collective wisdom taught them that Nature should not be overexploited, and that everything is indeed connected to everything else. If they overuse some trees, they would soon face a difficulty to secure them. They recognized, for example, a relationship between the presence of forest in the upstream of river and the abundance of fish in its estuary. Recycling of human and animal waste was done, perhaps, out of necessity, but they learned that it helped to maintain the fertility of the soil and the cleanliness of the streams and lakes. As a result, rivers, lakes and estuaries, even the bay facing the city Edo were clean enough to provide abundance of fish, shell fish, and edible seaweed. Unlike the today's mechanical one, the fishing in that period was not over-exploitative. That means that fish may not have adorned the dinner plates so often as in today's life, though.

The drinking and cooking water was supplied from unpolluted rivers through an extensive water pipe system. As a result diseases due to use of the polluted water were rare; here is an observation by Dr. E. S. Morse, an American zoologist: "Diseases caused

by polluted water and imperfect sewage treatment systems in the United States are either unknown or very rare in Japan. In the US the polluted sewage water enters rivers and bays, and pollute them, killing living organisms. Apparently, those wastes were recycled back to the soil in Japan and make it fertile, but would not pollute the streams....” (“Japanese homes and the surroundings” (1888)) (see also note 2).

Love of Nature, trees, flowers and others made their environment clean and beautiful. A British botanist Robert Fortune wrote about Edo and its surrounding in 1860 thus: “Edo is a big city in the East...the Bay facing Edo is beautiful....The scenery from the castle can be favorably compared to many European cities. Hills are covered with trees, and roads are lined by trees and green hedges. Its beauty is perhaps the best in the world.....” (“Yedo and Beijing” (1863)).

The Japanese did not consciously concern themselves with these matters. It was rather their way of living. Unfortunately, some of the virtues have been eroded by the competitive pressures in the process of industrialization/globalization.

The Political/Economic System

The Japanese way of living with Nature as described above may not by itself be sufficient for sustaining such a society. The economic and political system must have allowed it to happen, if not fostering it. Though each of 260 small “han” (region) was under the general control of the central Shogunate government, it was allowed to have a sufficient autonomy. The bureaucrats in “han” government were bushi and were inherited. The people in “han” including bushi, townspeople and farmers had little freedom to leave their “han”. This situation allowed people, farmers and bureaucrats alike, to have a long view of their affairs and environments. If one’s children and grandchildren and their children inherit the same land and environment, one has to consider the welfares of the future generations, and would do something to maintain them. This concern was born by not only farmers but also bureaucrats who depended on their inherited natural resources. This stems from notion (c) mentioned earlier: “the important concern of an individual is feeling toward other persons, rather than his or her own individuality. This “other” includes future generations. The forests and the environments had been devastated during the internal war period (16th century). Once the peace was established, they (bushi as well as farmers) could afford to concern themselves with how the forests and the environments would affect their descendants as well as themselves. In other words, they could have a long-term view. In the representative democratic system as practiced today, it is hard for long-term views to prevail, as the government and its agenda may change every four years or so.

On this background, the 8th Shogun, Yoshimune, issued a decree to suppress unnecessary new land developments and production of luxury items in the beginning of 18th century (1720). This worked as a controlling factor of excessive consumption.

The present Japanese system, its economic system in particular, is often criticized for its inefficiency by the Western observers. The basic reason for inefficiency is believed to be the emphasis placed on the concern for other people, i.e., notion (c), (at least within the Japanese society) rather than the economic efficiency. This is reflected in the life-long employment, the wage system based on seniority, the relatively complicated,

inefficient distribution systems, high living cost and others. The Japanese tend to tolerate high price of service and commodities if it (high price) would help others (i.e., offer employment opportunities for others). This system/notion is losing ground, though, thanks to the Western, particularly American pressure.

The Cultural background - again

What was described in this essay about the pre-modern or pre-industrial Japan may also be found in many pre-industrial indigenous societies. Most of those indigenous societies were of hunter-gatherer, though some of them had developed fairly advanced agriculture. They had sustained their ways of life for a long time, creating their own cultures, until the Western powers destroyed them. It is a striking fact that most souvenir shops at most of the modern international airports carry the arts and crafts created by the indigenous people, but not much artwork created by the invaders, though it may be that only those indigenous artworks are exotic enough to be bought by travelers from the modern societies.

Some reports told abundant natural lives when the Westerners reached the shores of the new world (American continent): e.g., “Cods are so thick by the shore that we hardly have been able to row a boat through them”, or “...so great abundance of all kinds of seabirds so that all my crew and myself, having cut clubs for ourselves, killed so great a number...that we were unable to carry them away. And aside from these the number of those which were spared and which rose into the air made a cloud so thick that the rays of the sun could scarcely penetrate it”.

No census data are available, but the indigenous populations on the American continent or Australia may not have been overwhelmingly large. If not large, it is very likely that their living styles (i.e., hunter-gatherers, with some agriculture) were such that they would not endanger their environments, though some people did so indeed when the ecology was rather fragile (Diamond, 2005). On the other hands, many of the great ancient civilizations in the middle East, India, Greece and meso-America are believed to have declined due to the over-exploitation of their environments among other reasons (Ponting 1993; Diamond 2005).

The Japanese experience is different from both of these examples. It was a fairly developed agrarian society with a number of large urban areas and had high enough a population density. Its geographical location in mid latitude is one advantage, but that may not have been sufficient, if the Japanese did not maintain their characteristic notions toward Nature and other people mentioned earlier (a-c). The gigantic monuments such as pyramids and others found in the ancient Middle Eastern and the Mesoamerican civilization suggest their attitude, i.e., dominance over the Nature and the nature of their political systems. These notions are foreign to the Japanese.

It is now obvious that the current industrial civilization based on the global market economy is not sustainable, particularly so in terms of the use of non-renewable energy resources. In exploring the ways to establish sustainable human civilization, it will be well to reassess the social science and the cultural/ethical/religious basis of our way of life.

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Note 1: An incident that indicated that even farmers were quite literate and cultured was unraveled by a Japanese historian, Irokawa in recent decades. He discovered in a storehouse in a farming village 70 km northwest of Tokyo a collection of books, both Japanese and Western including such books as those by J. Lock and H. Rousseau. Besides, it contained a document that was written by young farmers at the juncture of Meiji revolution (1860s) that they intended to be a constitution for the new Japan. Many such examples have been uncovered all over Japan since then.

Note 2: Contemporary big cities in the West, for example, Paris, had an extensive sewage system. However, the sewage system did not have treatment facilities and hence polluted the river, Seine, extensively. In Paris, people obtained water, that is, the polluted water for drinking, cooking and washing from the same river. “*Les Miserables*” uses the sewage system of Paris as a major scene, and, very interestingly, the author Victor Hugo was keenly aware of this problem.