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Quest for the Origin of Incest Taboo

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1. Introduction

The method of discussing the norms of human society through comparison with animals has been forbidden for a long time in the world of Western science. It originates from Darwinian Theory of evolution.

Charles Darwin, who proposed the concept of 'Origin of Species' in 1859 and advocated the concept that different species evolved from common ancestors in the past, avoided mentioning the evolution of mankind. In the "Descent of man" written in 1871, he explained that continuity between animals and humans can be found not only to morphological features but also to intellectual ability and moral character. And since the gorillas and chimpanzees that are most morphologically similar to humans live only in the African continent, we foretold that fossils of the oldest human ancestors can be found there. However, the majority of anthropologists at that time believed that humans had evolved in Europe and Asia, and they had continued to discover old human fossils in Europe (ex. *Homo neanderthalensis*) and Asia (ex. *Homo erectus* in Java and Beijing). Such belief led to a large misunderstandings of human evolution. In 1909, old human fossil was discovered in Britain and anthropologists named it Piltdown man. However it was a false fossil that skillfully shaped the mandible of the orangutans with those of modern humans. For 40 years until 1949, people believed that human evolved in Britain by the false evidence. In 1964, the discovery of *Homo habilis* in the Olduvai Gorge, Tanzania finally proved the Darwin's forecast.

On the other hand, the study of human society using evolutionary theory blossomed in "Ancient Society" of Lewis Morgan in 1977. He noted that marriage forms around the world are reflected in differences in relatives 'names, trying to locate the form of marriage and relatives of prehistoric times by following the change in relatives' names. Based on the results, Morgan described the evolutionary pathway from the era of primordial

marriage in which sexual intercourse was prohibited between parents and brothers and sisters, by the appearance of the insect taboo, collective marriage, Punarua marriage which shares each other's spouse with same- Daughter marriage tolerate sexual intercourse outside marriage, depicted a pathway evolved into the current single marriage. However, this theory was criticized as a wrong method of dividing the modern family form into advanced one and late one, and arranging it temporally along the axis of evolution. In addition, because the greater risks of the idea leading to racial discrimination and colonial rule, and leading to Eugenic thought appeared using evolution theory were pointed out, the opinion that it is dangerous to apply evolutionary theory easily to human society spread rapidly. In the first half of the 20th century, rather than exploring the evolution of human society, the focus was on finding universal features in human society, evolutionary theory was applied only to nonhuman animals. There was a trend that society and culture should not be talked about in terms of evolution.

Anthropologists argued that families are common and most basic societal features of humans, while avoiding mentioning its origin. However, as a condition for the family to be established, any scholar raised the presence of the insect taboo., Claude Lévi-Strauss who wrote "The Elementary Structures of Kinship" in 1949, asserted that exchange or reciprocity is a fundamental principle behind the human society, and suggested that incest taboo may lead to the lack of women to marry within relatives and facilitate marriage by exchange of women between them.

In the course of these Western academic societies, suddenly, scientific disciplines to apply evolutionary theory to human society and to discuss the evolution of society appeared. It was Japan that was a frontier in the academic world led by Europe and the United States, and it was academic called animal sociology. The fact that monkeys not inhabited in Europe and the United States lived in various places of Japan worked advantageously, and primatology to learn the continuity between human and animal society was fostered. Among them, the family and the incest taboo were regarded as an important theme from the beginning.

2. Evolution of human family and incest taboo

Kinji Imanishi, the founder of Japanese primatology, declared that society can be recognized for all creatures in his book "The World of Living Things" in the midst of World War II in 1941. He hypothesized that all living things constitute a "species society" unique to each species, by living in a society without prejudice to language and consciousness, and by having a proto identity that reacts with the same species

individually. And by interacting with other species in the place where the species lives, we can assume a "holistic society" consisting of several species, he insisted. This is the hypothesis before James Watson and Francis Crick found out the replication mechanism of the DNA, which is the universal structure of genes in all living things. Since then all organisms have been programmed by DNA, making it of common origin was recognized as a universal fact. Imanishi stated the idea that all the creatures should have differentiated from a common ancestor and could react each other to shape a society or community. Imanishi dissertation was the theme of the "habitat segregation" phenomenon of aquatic insects named Hirata mayfly (Schistonota), but during the Second World War he had a strong interest in mammalian society through the observation of Przewalski's Wild Horse (*Equus ferus przewalskii*) in Inner Mongolia. He started the study on animal society with his students after the war. Their challenge was to confirm the existence of society and culture in non-human animals.

Imonishi, Junichiro Itani, and Shunnzo Kawamura, who met Japanese monkeys at Toi Peninsula in Miyazaki prefecture in 1948, had a strong impression in their stunning movements as a group, and they decided to study on a society of monkeys. By obtaining phylogenetically close subjects to humans as monkeys, the center of research was directed towards the evolution of society, leading to human beings. In 1951, Imanishi wrote "Society before Human Beings", in which, through an overview of the society of insects and birds, he emphasized the necessity of logic to unite two conflicting social organizations such as pair bonds between sexes and a larger group consisting of both sexes, in order to consider the evolutionary pathway from an animal society to a human society. For the first time there emerged human families as a universal unit in a human society for the main theme of Japanese primatology.

Primate researchers who succeeded in provisioning Japanese monkeys at Koshima in Miyazaki prefecture and Takasakiyama in Oita prefecture to observe Japanese monkeys at close proximity, soon found that the social structure of Japanese monkeys were characterized by linear dominance ranks, leaderships, alliance formation within kin groups, and the pre-cultural ability to propagate newly acquired behavior such as washing potatoes with water and collected wheat grains by dropping them with sand into sea water. However, Japanese monkeys were phylogenetically too far away from humans. Imanishi and others started investigating great apes trying to find clues to social evolution leading to human beings. They conducted three surveys of gorillas in Africa held in 1958-60. Its main purpose was to find the original type of the human family in the gorilla society.

Unfortunately, gorillas were not provisioned like Japanese monkeys, and in 1960 the gorilla survey was forced to be interrupted due to outbreaks of independent wars

everywhere in the habitat of gorillas. Based on the results of these insufficient surveys, Imanishi published a paper entitled "the Origin of Human Families - from the standpoint of primatology" on Ethnology Studies (Imanishi, 1961). The gorilla society was depicted as a "pre-family" in which male enters from outside to gain a young daughter as a spouse, becoming an interceding son and becoming independent. He proposed four conditions for the establishment of a human family, 1) the marriage system, 2) incest taboo, 3) division of labor between sexes, 4) close neighboring relationship, among which he considered that the three conditions excluding the division of labor have been sproutly established in the ape society. Actually, before the survey of gorillas, Kisaburo Tokuda and Itani reported that mothers and their sons tend to avoid copulation in macaque groups including Japanese monkeys even in estrus (Tokuda & Itani, 1953). Imanishi thought that nonhuman primates had already a tendency to avoid sexual intercourse among close relatives, although this tendency was not established by institution like humans. Masao Kawai and Hiroki Mizuhara also reported from their survey on mountain gorillas in the Virunga Volcanoes that gorillas groups extensively overlapped their range with neighboring groups without territoriality (Kawai & Mizuhara, 1959). Imanishi therefore imagined that "pre-family" of gorillas organize a neighborhood community like human society, with keeping close relationships among families having non-territoriality.

This hypothesis became invalid later, because male gorillas unlikely join groups after emigration from their natal groups (Harcourt et al., 1976). Avoiding wars, Japanese primatologists led by Imanishi started to study chimpanzees in Tanzania, succeeded in provisioning chimpanzees in Mahale Mountains and established a long-term research site at the eastern shore of Lake Tanganyika. Junichiro Itani, who took charge in the surveys of chimpanzees and hunter gatherers, focused on the similarity of the community called Pygmy's band and the group of chimpanzees. He proposed "Preband Theory", that the establishment of a community preceded the establishment of a family in the evolution of mankind (Itani, 1966). He also pointed out that the group-living primate societies have two contrasted extremes of male transfer or female transfer from their natal groups to other groups, and hypothesized the evolutionary pathway of primate societies from elemental society of nocturnal monkeys with solitary nature and territoriality, monogamous pairs with territoriality, polygynous or polyandrous groups with partly overlapping home ranges, multi-male and multi-female groups, and finally to differentiate into matrilineal (female-bonded) or patrilineal (female-transfer) societies (Itani, 1972). In his theory, incest avoidance constitutes the major role in the evolution of primate social structures.

3. Incest avoidance in primates

Avoidance of incest is attained by two different features of non-human primates. One is a propensity to leave natal groups by one sex, to transfer into other groups without close relatives, and to breed there. This prevents them to copulate with close relatives in the groups into which they transfer. Moreover, they do not stay in the new groups for a prolonged period and leave them before their offspring mature, so that the transferred individuals may not have the opportunity to copulate with their offspring consequently. Only males tend to transfer in Cercopithecus monkeys including Japanese monkeys, while only females transfer in the African great apes (chimpanzees and gorillas). The former is regarded as matrilineal society and the latter as patrilineal society in primatology. The latest ancestral society of humans may have the patrilineal features as the African great apes (Foley & Gamble, 2009; Yamagiwa, 2015).

The other is a behavioral features of primates to avoid copulation with close relatives, even if they coexist with kin related individuals after maturity. In Japanese monkeys, after provisioning, or in isolated conditions without any group nearby to transfer, there observed mature males that had never left their natal groups. Yukio Takahata (1982) investigated Japanese monkeys at Arashiyama Monkey Park in Kyoto and found out that mating is avoided within the fourth degree of kinship relations. Since Japanese monkeys live in a matrilineal society, the degree of kinship relations is based on maternal relations. The first degree is mother-son, the second is brother-sister and grandmother-grandson, the third is aunt-nephew, and the fourth is cousins. Female Japanese monkeys usually form alliance among kin in conflicts, and they have affiliative relationships within the fourth degree of kin relations from birth. Such affiliation relationships may prevent them from sexual interactions. Moreover, Takahata found that a male-female pair formed through sexual interactions during the mating season gradually developed the tendency to avoid copulation in the next mating season. Japanese monkeys have the mating season from autumn to winter in which they form a peculiar proximate relationships through copulation. This relationships with the dominant male enables the subordinate females to access the artificial foods at the provisioning site, and the followership between them continues in the next non-mating and mating seasons. But it consequently leads them to avoidance of copulation irrespective kin relatedness. Based on these observations, Takahata concluded that affiliative relationships may generally prevent Japanese monkeys from copulative interactions.

Mating avoidance with conspecific kin has been observed in other primate species (e.g., red colobus: Starin, 2001; baboons: Alberts & Altmann, 1995; langurs: Sterck et al., 2005), but found that they do not recognize their kin-related conspecifics inherently

(Pusey, 1990). Based on DNA analysis extracting from blood samples in confined troops of Japanese monkeys and Barbary macaques, they did not avoid copulation with paternal relatives (Inoue et al, 1990; Kuester et al, 1994). Not biological relations, but intimate relationships after birth may cause incest avoidance in primates.

Copulation in mother-son pairs is also rare in the great apes (Pusey, 1980; Harcourt & Stewart, 2007; Kano, 1992). In gorillas, copulation tends to be avoided in father-daughter pairs (Stewart & Harcourt, 1987). It is not necessary for these males to be biologically related to daughters; an affinitive relationship between a male and young female may be sufficient for the avoidance of copulation. Alexander (1970) reported that copulation was avoided in a male-female pair in which the male took care of the female during her childhood. Kuester et al. (1994) monitored pairs of Barbary macaques and found that mating avoidance may occur when more than 3% of daytime is allocated to intimate caretaking lasting 6 months, irrespective of biological paternity. This implies that incest avoidance is fostered by intimate social relationships at immaturity, even in nonhuman primates. Human families are not totally based on biological kin relations, but are constructed based on cognitive relationships through caretaking after birth.

4. From incest avoidance to Incest taboo

In fact, it has been known for a long time that intimate contact in early childhood also leads to repelling sexual intercourse in humans. Edward Westermarck (1891) pointed out that men and women in an intimate relationship since childhood have a tendency to avoid sexual intercourse, in "The History of Human Marriage". However, this theory was criticized by Sigmund Freud (1910), who created psychoanalysis in the same era, as it is not necessary to ban as a taboo if suppression of close relatives sexual intercourse is natural procurement. For Freud, the earliest sexual excitations of youthful human beings are invariably of an incestuous character due to the inherent nature of the foundation of the “Oedipus complex”. Even then this theory was criticized and ignored by sociologists and anthropologists.

However, in the latter half of the 20th century, as the researches on the community of Kibbutz in Israel progressed, some reports came to support Westermarck's hypothesis. Kibbutz is an organization that separates children from their families and raises them in a community, but it became clear that men and women, who grew up in the same Kibbutz, did not get married as expected and that they tended to marry other Kibbutz origin (Shepher, 1971). In addition, Arthur Wolf (1970), who investigated household registration records from Taiwan, found that intimate childhood association promotes

sexual aversion. Women who are forced to marry a childhood associate bear fewer children than those who marry a stranger. They are also more likely to divorce or avoid their husbands in favor of other men. Based on this case, Wolf (1995) concludes that human beings, like other primates, have intimate relationships during early childhood avoiding sexual intercourse. As a result of these reports in succession, the theory of Westermarck revived and is now called "Westermarck effect".

Why the Westermarck effect on primates had to be normalized to taboo in humans. It should have been caused by growing population size with forming a community including several families. In nonhuman primates, the mean group size is positively correlated with the ratio of the neocortex size to other parts of the brain. This is called the "social brain hypothesis," which proposes that social complexity is the driving force for increases in brain size (Dunbar, 1996). Considering that the human brain has also evolved as such a "social brain", since the brain has started to grow two million years ago, the brain capacity increases about three times, the brain of modern human fits 150 people for the suitable group size. This agrees with the average size of bands in contemporary hunter gatherers. In other words, human beings have rapidly increased the population since farming and livestock began 12,000 years ago, but they had lived for as long as 150 population groups at the most for many years during the life of hunting and gathering.

The number of 150 people is a community including 10 to 20 families. The society with this multi-level structure has never been recognized even by the great apes. That is because the principles of families and communities have conflicts sometimes. Within families kin-related people do not demand return, while in communities members usually have duties according to roles for cooperation. Due to these conflicts, gorillas form a small family group, and chimpanzees form a large community without segregation of family groups. An exceptional example is Hamadryas baboons living in grasslands within a multi-level society, in which small polygynous groups aggregate to form a large band or troop and females transfer within bands. The lack of competitive food resources in grasslands may prevent females from forming kin-based coalitions, and the high predation pressure may lead to frequent association and alliance formation among males of different polygynous groups (Barton et al., 1996). Adding to these ecological factors, sexual coercion including infanticide may have promoted cooperation among kin-related leader males of different groups and facilitated modular society (Grueter et al., 2012). When early hominids extended their range into open land, they may have faced the same problems as papionins in promoting a multi-level social system (Yamagiwa, 2015).

The first possible human family in the Homo clade is assumed to be a community in which several monogamous and polygynous groups associate loosely. Females

transferred between groups within or between communities, and males dispersed from their natal groups but remained in a community to cooperate with kin-related males. A community with substructures of various compositions had a tendency of fission-fusion for different daily tasks (Aureli et al., 2008). Increased animal foods in their diet facilitated encephalization, and early weaning and subsequent delayed maturation promoted cooperative breeding and division of labor for provisioning their offspring. These changes in life history and feeding technology led to a multi-level community structure in which several families cooperated with each other in diverse tasks of subsistence (Yamagiwa, 2018). This formation might have been resilient against severe conditions in arid areas and enabled Homo erectus to expand their distribution out of Africa.

However, in order to maintain a breeding group called families and to organize the communities they gathered, it is necessary to weaken the repulsion among small family groups like gorillas, or to establish regulations on promiscuous sexual interactions such as chimpanzees. When families and communities become unit of marriage, accepting bride or son-in from outside, opportunities for unrelated men and women to live together may increase. It is necessary to set norms on sexual interactions to keep autonomy of the family as a breeding group. If a wife wishes to have sexual relations with her husband's father or brothers, or a husband does in the same way, the couple will not be able to form a sustainable bond.

Our ancestors should have used the tendency of incest avoidance called "Westermarck effect" inherited from nonhuman primates for making these norms. Kin-related members tend to avoid sexual intercourse due to affinity relations formed in early childhood. Both parents-in-law and in-law daughter or son were also regarded in such relationships, during which they created a norm to prohibit sexual intercourse in the extended family through marriage. The norm that intimate relationships among kin do not lead to sexual relationships opened the way for couples to coexist with other family members without having sexual trouble. Without these norms, our ancestors could not create a community including multiple families.

However, as the community expands in size and the movement of people between community increases, independence of families as breeding groups is hardly maintained only by prohibition of incest. Therefore, it seems likely that cultures and customs developed to hide sexual intercourse from the public place and to restrict sexual expression to private places. Nevertheless, people suffer from sexual troubles including violence in modern society. Human society is not yet able to control the sexual interactions, in which sociality and creativity unique to humans may be embedded.

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