Origins and Affinities of the Stone Age Inhabitants of Japan

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WU Xinzhi

Institute of Vertebrate Paleontology and Paleoanthropology
Academia Sinica

Beijing, China

ABSTRACT

The comparison of the stature of Paleolithic man of Japan main land (unearthed from Ushikawa, Mikkabi and Hamakita sites) and Ryukyu archipelago (from Minatogawa) on one side with those of Paleolithic China on other side, suggests that the affinity between the Japanese ones and the south China Liujiang man is closer than that between the Japanese ones and the north China Upper Cave man.

The comparison of coefficient of divergence supports the notion that the Minatogawa man is much closer to Liujiang man than to Upper Cave man and that the morphological distance between Minatogawa man and Liujiang man is so short that it may correspond to the usual intrapopulation difference. In addition to the closeness between Minatogawa and Liujiang skulls the difference between them has also been indicated in this paper.

A bilateral small triangular bone at the tip of Miyako Pleistocene occipital bone may help to hint at certain degree of affinity between Miyako man and the early humankind of China among which four out of seven *Homo erectus* skulls and four out of six early *Homo sapiens* skulls probably possess a small bone of such kind. This triangular bone is usually absent in the Pleistocene human skulls of other part of the world.

The comparison of coefficient of divergence between various pairs of human fossil skulls unearthed from East and Southeast Asia show that Minatogawa man is closer to Liujiang man than to Niah Cave man. Wajak man is very much diverged from Minatogawa, Liujiang and Niah Cave ones.

All of these indicate that it is more probable that the Minatogawa man and the Pleistocene man of mainland of Japan originated in south China instead of in north China or in Southeast Asia.

According to the cranial morphology, Jomon age man was closer to Minatogawa man and Liujiang man than to Wajak man. He was closer to south Neolithic Chinese than to north one. He is closest to Ainu among all living human populations.

The prevalence of the custom of knocking and extracting teeth during young age in Jomonese, Neolithic populations of east and south coastal regions of China as well as Minatogawa man hint at special relation among them. But the dipersal of this cultural phenomenon does not necessarily imply signigicant gene flow.

The Jomonese was most probably derived from the Paleolithic man of Japan which again originated in the south part of China. The low frequencies of certain secondary dental traits in Jomon age man could be explained by genetic drift instead of deriving from island Southeast Asia, the modern populations in which area show low frequencies too. The low frequency of these features in the latter populations is more reasonably to be explained as a result of interbreeding between the southward migrating proto-Mongoloids and the indigenous or northward migrating proto-Australo-Melanesoid.

Ⅰ. Pleistocene man

Many authors have discussed the origin of the inhabitants of upper Paleolithic Japan. Suzuki has written that "it is possible to suppose that the Minatogawa man descended from a generalized Pleistocene proto-Mongoloid of the Asian continent, which makes him a common

ancestor of the Liujiang man and the Upper Cave man. Most likely, insofar as the available materials are concerned, about 18000 years or more ago, an offspring of the South China branch of this proto-Mongoloid stock, who had deep racial ties with the Paleolithic Liujiang man and the Neolithic Lang-Cuom and Phobinghia man, migrated eastward to Okinawa on the one hand to the western part of the mainland of Japan on the other hand over the land bridge that existed at that time between the Asian continent, Okinawa and the mainland of Japan. The Minatogawa man from Okinawa and the Pleistocene man from the mainland of Japan i. e. the Ushikawa man, the Mikkabi man, and the Hamakita man are probably the immigrants themselves or their descendants"(Suzuki and Hanihara 1982). On the basis of the different frequencies of some non-metric secondary traits of human teeth in different populations living in the circum-Pacific region, Turner (1989) wrote that "it seems likely that Sundadonty developed between 30000 and 17000 years ago (when it is observed in the Minatogawans of Okinawa ". So he put the Minatogawa man together with the population of Malay-Java and Thailand as well as Polynesia and Micronesia which are Sundadonty according to his study. He thought that they have a same immediate ancestry in island South-east Asia.

The Pleistocene human bones found in the main land of Japan are very fragmentary. The affinity between them and other specimens could hardly be judged by cranial morphology. On the basis of the reconstructed stature (Suzuki 1982, Suzuki and Hanihara 1982, Weidenreich 1933, Wu et al 1984, Yamaguchi 1982) (Table 1) they are probably closer to the representative of Paleolithic man of south China (Liujiang man) than to that of north China (Upper Cave man).

Table 1

Site	Date	Stature(cm)
Ushikawa	Middle Pleistocene	135
Mikkabi	Late Pleistocene	150
Hamakita	Late Pleistocene	143
Minatogawa	18250±650 BP(C-14)	156.1(male)
		144.5(female)
Liujiang	6700(Uranium)	157±3.59(male)
Upper Cave	10470±360 BP(C-14)	174(male)
		159(female)
Jomon (Tsukumo)		158(male)

The most important Pleistocene human bones found in Japan are those from Minatogawa. The relation between the Minatogawa skull and the upper Paleolithic ones from China has been investigated by calculating the coefficient of divergence (Wu. 1988). The results are listed in Table 2.

Table 2

Liujiang	——	Minatogawa I	0.029
Upper cave 101	——	Minatogawa I	0.054
Liujiang	——	Upper cave 101	0.056
Upper cave 102	——	Upper cave 103	0.030
Minatogawa II	——	Minatogawa IV	0.033

If the coefficient of divergence between two females of Minatogawa and that between two females of Upper Cave man could be considered representing the general intrapopulation difference, the fact that this difference is equal to the difference between the male skulls of Minatogawa and Liujiang reminds of a very close affinity between the latter two sites.

The data of stature of the humankind of these sites also support the notion that the Minatogawa man is closer to the Liujiang man than to the Upper cave man. (Table 1)

These sites form a roughly equilateral triangle. During the glaciation periods of the Pleistocene, Okinawa was connected with the continent of Asia by land bridges. The walking distance between Minatogawa and Upper cave is longer than that between Minatogawa and Liujiang. The time gap between the Minatogawa man and the Upper cave man (10470BP ± 360years according to c-14;19000BP ± 1000years according to uranium series dating, Wu and Wang 1985, Wu, Wu and Zhang 1989) is much narrower than that between the Minatogawa man and the Liujiang man (67000 BP by uranium series dating, Yuan et al 1986). But the Minatogawa man is still much closer to the Liujiang man than to the Upper cave man in morphology.

Indeed, there are some differences between the Minatogawa and the Liujiang skulls. The Minatogawa skull is shorther (182cm/189.3cm), with higher cephalic index (81.3/75.1), narrower forehead (ft-ft:89mm/95.2mm), broader face (144mm/136mm), lower upper facial index (43.8/48.5) and lower nasal height (45.8/49.6). On the other hand, there are some features shared by the Minatogawa man and the Upper cave man such as the pinched nose and strong brow ridges.

The fragment of a small triangular bone at the top of the Miyako Pleistocene occipital bone is reminiscent of the Inca bone which has been mentioned by F. Weidenreich in his famous monograph on the skull of *H. erectus* of Zhoukoudian. It exists in four out of six skull-caps in the *Homo erectus* collection of Zhoukoudian or four out of seven among *Homo erectus* of China. Among the early *Homo sapiens* specimens from China, Dali skull possesses a triangular small bone like this. The contour of the supero-posterior corner of the two parietal bones from Xujiayao and another one from Dingcun indicates such a bone probably existing on the skulls they belonged. Jinniushan and Chaoxian are another two sites which have yielded this part of skull and show no existence of such a bone. Therefore four out of six specimens show the probable presence of a triangular bone between parietals and the occipital bone in the early *Homo sapiens* of China. This small bone of the Miyako man may help to hint at certain degree of affinity between him and the early humankind of China. This small triangular bone is usully absent in this portion of the Pleistocene skulls found in other part of the world.

In island South-east Asia three samples of upper Paleolithic human fossils have been found, namely the Niah Cave, Tabon and Wajak.

The coefficients of divergence between various pairs of human fossil skulls unearthed from East, South east Asia and Australia are shown in Table 3.

Table 3

Niah Cave	——	Liujiang	0.033
Niah Cave	——	Minatogawa I	0.046
Niah Cave	——	Upper Cave 101	0.078
Niah Cave	——	Wajak	0.068
Niah Cave	——	Keilor	0.077

Wajak	——	Keilor	0.028
Wajak	——	Liujiang	0.057
Wajak	——	Minatogawa I	0.071

From Table 2 and 3 we can see that Minatogawa man is closer to Liujiang than to Niah Cave man, Wajak man is very much diverged from Minatogawa, Liujiang and Niah Cave ones but he is very close to Keilor one.

The Wajak skull from Java is quite different from the Minatogawa one by longer braincase, higher upper facial part, larger and relatively narrower palate, higher braincase and orbit, broader nose and larger cranial capacity etc (Table 4). The sulci above the superior orbital margin of both sides of Wajak skull are connected. While they are separated by a median eminence on Liujiang and Minatogawa skulls. The Wajak skull probably possesses more exaggerated alveolar prognathism. Most of these differences are also true in comparing the Minatogawa skull with the Keilor one of Australia except the nasal index. The Minatogawa man is much closer to Liujiang than to the Wajak man.

Table 4

	Liujiang	Minatogawa	Wajak	Jomon
Cranial index	75.1	81.3	72.5	ca 80
Cranial length	189.3	182	200	181.9
Upper facial index	48.5	43.8	52.1	45.4
Upper facial height	65.9	63	73	66
Nasal index	58.5	53.1	60	54.8
Nasal breadth	26.8	26	30	27.1
Orbital index	68.3	65.2	78.6	76.9
Cranial capacity		1390	1550	

* Measurements in cm

In short, the Minatogawa man originated more probably from the Liujiang man than from the Upper Cave or from Niah Cave and Wajak. Another possibility is that the former two shared a common ancestor not long ago. Although there is no detailed cranial data relevant to judge the origin and the affinities of the Pleistocene man of the mainland of Japan, their short stature, geographical location and the data showing the relations between the faunas of Japan and the continent. Pei (1983) remind us to think that they are most probably to be closer to the Liujiang-Okinawa branch than to the north China branch and to the Pleistocene populations living in island Southeast Asia.

II. The Jomon Age Man

As regard to the origin of the Jomonese, Hasebe has asserted that there were local groups of humans with various types of faces living in Paleolithic China and the region south to it. At

the end of Pleistocene or beginning of the Holocene, some of these people came to Kyushu by land probably from south of the Yantze River in South China and then gradually spread over the Japanese Islands (Mizoguchi 1986). Yamaguchi (1982) has pointed out that "Among the upper Paleolithic fossil remains of Eurasia, particular similar to the Jomon skull is the cranium of Liujiang man from Guangxi, South China." Suzuki (1982) has indicated that the Minatogawa man is the remote ancestor of Jomon age man. He has indicated the aurale exostosis, facial flatness etc as the evidence linking Jomon, Minatogawa and continental Mongoloids.

According to the dental studies of Turner, Jomonese is one of the populations of the Sundadonts from which the Ainu-Jomon originated about 14000 ± 3300 B. P. and migrated northward along the coast of the continent after the inception of the Sundadont pattern (Turner1986). As the data provided by Turner, Sundadonts include modern populations of Thailand, Malay-Java, Polynesia and Ainu as well as the Jomonese. The Euclidean distance dendrogram made by Brace and others (1989, 1990) based on cranial measurements shows that Jomonese and Ainu constitute a cluster with Polynesians and Micronesians, while Thai and Vietnam are in another cluster including the populations of China, the Mongol, the Korean, the Japanese and Yayoi people. The affinity of Thai is different according to Turner and Brace. As a part of the conclusion Brace and his coauthors asserted that "Jomon form is closely allied to that visible in Polynesia and Micronesia, constituting an important part of and perhaps a point of origin for what can be called the Jomon-Pacific cluster." They inferred that Jomonese had migrated southward. Thus the Jomonese was inferred to migrate in different or even reverse directions by different authors based on the analysis of different aspects of morphology.

In Japan the custom of knocking out of teeth had been seen in Minatogawa Pleistocene population and was widely carried out from the Neolithic Jomon age to the Aeneolithic Yayoi age, from the northern to the southern districts. The oldest examples of this kind of extraction so far reported are those of the early and middle Jomon periods and are scattered in the western part of Japan from shell mounds of Okayama, Hiroshima and Kumamoto prefectures. These earliest cases show the knock-out of lower median incisors on both sides just as in the Minatogawa specimen. This pattern of tooth extraction is restricted to the period stated above. In the succeeding period, this extraction pattern disappeared completely, and instead there appeared many complicated patterns of tooth extraction (Suzuki and Hanihara 1982).

According to Inoue *et al* (1981) in the later Jomon period, 64.2% (or 43 out of 67) cases of skeletal remains have been shown extraction of teeth. More canines are involved in maxilla, more incisors in mandible.

In China, this kind of custom has been seen on Neolithic skeletons from many sites of the coastal region and central part. The earliest site showing this custom in China is about 6500 yrs BP. In almost all of the sites the extraction of two upper incisors has been observed. The extraction could be seen in both sexes except a few sites where it is shown in only male or female skeleton.

The coexistence of this custom suggests a realistic tie among Minatogawa, Jomon and Neolithic populations of China. According to the cluster analysis based on cranial measurement, the Jomon is closer to the Neolithic populations of southern China than to that of northern part especially due to the difference in heights of face, nose and orbit (Wang 1987).

The occurence of tooth extraction in the Shangdong Province (in eastern part of North China), Henan and Hubei Provinces (central part of China) implies that the spread of a cultural phenomenon is not necessarily accompanied with singnificant gene flow because according to the cluster analysis based on cranial measurements the Neolithic skeletons of these provinces are lumped together with that of Shaanxi Province in which no evidence of tooth extraction has been observed.

Comparing with Wajak upper Pleistocene fossils, we find that Jomon skull is shorter, its upper face is lower, nose narrower. The cranial, upper facial and nasal indices of Jomonese are closer to those of Liujiang than to those of Wajak. This fossil evidence suggests a continental origin of Jomonese (via Minatogawa) instead of an origin in island Southeast Asia.

The shortness of the stature of the early Jomonese is favorable to the inference of Jomon's origin in the Paleolithic people of Honshu, Okinawa and Liujiang (Table 1).

On the basis of the evidence available a more reasonable explanation may be as following. In late Pleistocene, Upper Cave, Liujiang and Wajak represented different populations. The former two were proto-Mongoloid. The Wajak was or closed to proto-Australo-Melanesoid. The Liujiang branch of proto-Mongoloid dispersed southward and interbred with the immigrants from the proto-Australo-Melanesoid producing the populations living in Indochina, Southeast Asian islands, Micronesia and Polynesia. The hybrids possess also Mongoloid features such as certain dental nonmetrical ones, but less frequent than those of the ancestral Asian continental populations.

In addition to dispersing southward, the Liujiang branch of proto-Mongoloid stock also dispersed eastward to produce the Minatogawa population and then the Jomonese. Genetic drift made the Jomonese possessing lower frequency of certain dental features than the ancestral population.

Thus the closeness in frequencies of certain dental features between Jomonese and remote Pacific populations is caused by different factors and does not necessarily imply descending from same immediate ancestry.

Simply put, it is more reasonable to suppose that the Jomon age man was the descendant of the Upper Paleolithic man who distributed in the area including south China, mainland of Japan and Ryukyu archipelago. He shared common cranial and cultural features with the neighbors in southern China, and dental features with Southeast Asia Island populations.

Among the modern populations, the Jomon series is closest to the Ainu. In the next place is Okinawans. They are followed by various other series from the islands of Honshu and Kyushu.

References

Brace, C.L., Brace, M.L. and Leonard, W. R. 1989. Reflections on the face of Japan:A multivariate craniofacial and odontometric perspective. *Am. J. Phys. Anthrop.* Vol.78, pp. 93-113.

Brace, C.L. , Tracer, D.P. and Hunt, K.D. 1990. Human craniofacial form and the evidence for the peopling of the Pacific. Paper presented at *The Congress of the Indo-Pacific Prehistory Association, Yogyakarta, Indonesia.*

Brothwell, D. R., 1960. Upper Pleistocene human skull from Niah Cave. *Sarawak Museum Journal.* Vol.9, pp. 323-349.

Inoue, N., Kou, C. H., Ito, G. and Kamegai, T. 1981. Dental diseases in Japanese skeletal remains II. Later Jomon period. *J. Anthrop. Soc. Nippon* Vol. 89, pp. 363- 378.

Pei, W. 1983. The Communication between the Chinese mainland and the Japanese Islands. *Memoirs of Beijing Natural History Museum* no. 21.

Sakura, H. 1985. Pleistocene human fossil remains from Pinza-Abu (Goat Cave), Miyako Island, Okinawa, Japan. Reports on Excavation of the Pinza-Abu Cave. pp.161-176. Naha: Department of Education, Okinawa Prefectural Government. (in Japanese)

Suzuki, H. 1982. Pleistocene man in Japan. *J. Anthrop. Soc. Nippon* Vol. 90, (Suppl.) pp. 11-26.

Suzuki, H. and Hanihara, K. (Editors). 1982. *The Minatogawa Man:The Upper Pleistocene Man from the Island of Okinawa. University Museum University of Tokyo Bull.* no. 19.

Turner, C. G., 1986. Dentochronological separation estimates for Pacific Rim populations. *Science* Vol.232, pp. 1140-1142.

Turner, C. G. 1989. Teeth and prehistory in Asia. *Science.* Vol.260, pp. 89-96.

Wang, L. 1987. Racial relationships between Chinese and Japanese : A statistical study of cranial measurements. *Acta Anthrop. Sinica* Vol. 6, pp. 10-18. (in Chinese with English abstract)

Wu, R. , Wu, X. and Zhang, S., (Editors) 1989. *Early Humankind in China.* Beijing : Science Press. (in Chinese).

Wu, X. 1988. The relationship between upper Paleolithic human fossils of China and Japan. *Acta Anthrop. Sinica* Vol. 7, pp. 235-238. (in Chinese with English abstract)

Wu, X. and Wang, L. 1985. Chronology in Chinese Paleoanthropology. In *Palaeoanthropology and Palaeolithic Archaeology in the People's Repiblic of China,* edited by R. Wu and J. W. Olsen, pp. 29-52. Orlando, Academic Press.

Wu, X.; Zhang, Z. and Zhang, J. 1984. Estimation of the stature of Liujiang Paleolithic Man. *Acta Anthrop. Sinica* Vol. 3, pp. 210-211. (in Chinese with English abstract)

Yamaguchi, B. 1982. A review of the osteological characteristics of the Jomon population in prehistoric Japan. *J. Anthrop. Soc. Nippon* Vol.90 (Suppl.), pp. 77-90.

Yuan, S, ; Chen, T. and Gao, S. 1986 Uranium series chronological sequence of some paleolithic sites in south China. *Acta. Anthrop. Sinica* Vol. 5, pp. 189-19. (in Chinese with English abstract)

日本人の起源と類縁性－時代別考察

呉新智

本州（牛川、三ヶ日、浜北遺跡）および沖縄（港川遺跡）出土の旧石器時代人と中国旧石器時代人の身長を比較すると、前者は中国北部の上洞人より南部の柳江人に近い。

形態距離による分析でも同じ結果がえられる。とくに港川人と柳江人との距離はきわめて近く、一般的な集団内変異の範囲に入る。

宮古の洪積世人にみられるインカ骨も中国の古人類との近縁性を示すと考えられる。すなわち、中国の Home erectus（原人）では 7 例中 3 例に、また洪積世の *Homo sapiens*では 6 例中

に4例のインカ骨が存在する。

東アジアおよび東南アジアで発見された頭骨を含めて距離分析を行うと、港川人はニア洞窟人より柳江人に近く、ワジャク人は港川人、柳江人、ニア洞窟人のいずれとも遠い。

これらの事実からみると、港川および本州の旧石器時代人は中国北部ではなく、中国南部または東南アジアに起源をもつと考えられる。

頭骨の形態からみると、縄文人はワジャク人より港川人や柳江人に近く、中国北部より南部の新石器時代人に近く、また現代人の中ではアイヌにもっとも近い。

抜歯の風習が縄文人、中国東南海岸部の新石器時代人、および港川人にみられることは、これらの集団が密接な関係をもつことを示唆する。しかしこのような文化的類似性は必ずしも遺伝子の移動を意味するものではない。

おそらく縄文人は日本の旧石器時代人に由来し、さらに後者は中国南部に起源をもつと思われる。縄文人の歯の形質は東南アジアの島嶼地域に由来するというより、遺伝子浮動によると考えられる。東南アジア島嶼地域の歯の特徴は、南方へ移動した原モンゴロイドと、その地域にすでに住んでいた、または北上したオーストラリア·メラネシア人との混血によって生じたという可能性が強い。

(Translated by K.Hanihara)