

The Stone Age of Japan

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1. GENERAL OUTLINE OF THE JAPANESE STONE AGE

UNTIL 1949 in Japan, the term Stone Age referred to the time when Jōmon pottery was being made; the Stone Age and the Jōmon Age were used synonymously. Following the discovery of the Iwajuku site in Gunma Prefecture, one piece of evidence after another was turned up that man had been present in Japan during the Pleistocene long before the Jōmon Age, and the study of the Palaeolithic culture has now become one of the important parts of the archaeology of Japan. Therefore the term Stone Age, as used here, includes both the Palaeolithic and the Neolithic ages. Moreover, it is becoming apparent that there was another age, the Mesolithic Age, so to speak, between these two.

At about the same time, a number of geologists made studies of layers of volcanic ashes, such as the Kanto Loam formation, which contained relics of the Palaeolithic Age. The results of such studies have presented some very important archaeological problems and insights.

After World War II, the radiocarbon dating method, developed by physicists, was applied not only to relics of the Jōmon period but also to Palaeolithic sites and even to natural organic materials buried in the strata of the Pleistocene. Thus, time spans that archaeologists had not dealt with before in Japan also became an important ingredient for determining the chronological sequences of archaeological remains. That the beginning of cord-marked Jōmon pottery went back about 9000 years and even before the Jōmon Age, since pottery was already beginning to be made about 12,000 years ago, was also a surprising result which was made clear by the application of radiocarbon dating.

Until recently, the beginning of the Jōmon Age was thought to be about 5000 to 6000 years ago. Pieces of charcoal and oyster shell which were unearthed from the Natsushima shell mound were sent to the University of Michigan, where age determinations by the radiocarbon method of 9240 and 9450 years were made.

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These results were hard to believe since they greatly exceeded our predictions. Then, charcoal pieces found with pottery with raised relief decoration, unearthed from the third horizon of Fukui Cave in Nagasaki Prefecture, were radiocarbon dated at 12,000 years B.P. The pottery of Fukui Cave with raised relief decoration was 3000 years older than that of the Natsushima site with linear cord-markings (Yoriito-mon). Also, the Fukui Cave pottery was accompanied not by arrowpoints, which are characteristic of the Jōmon Age, but by a number of microblades which are the remains of a strong Palaeolithic tradition. The pottery we found in the Fukui third horizon suggests a close link with the Jōmon culture, but the stone implements are closer to those of Palaeolithic cultures (Plates I and II). Therefore, we could consider these as the products of a separate period between the Jōmon or Neolithic and Palaeolithic ages, and exactly corresponding to the Mesolithic period in the European chronology, if we may borrow the term.

At Fukui Cave, pottery was found in the first, second, and third horizons, but from the fourth down there were only stone implements and no pottery sherds (Fig. 1). The third and fourth horizons both contain microblades which are essentially similar, but in the third horizon an important development, the production of the pottery, begins. This development dates back about 12,000 years. The seventh horizon is similar to the fourth horizon, but produced small blades (Plate III) and a radiocarbon date of $13,600 \pm 600$ B.P. The characteristic finds from the ninth horizon are large flakes and prepared cores made of Sanukite. In the fifteenth horizon, bifaces and flake-blades of Sanukite are typical (Plate IV). In addition, from the fifteenth horizon, several charcoal pieces about the size of fingertips were gathered and radiocarbon dated at older than 31,900 years. The Fukui Cave was first lived in by paleolithic man and subsequently was used repeatedly, so that there are seven stratified cultural horizons the latest of which dates from the Initial Jōmon Age. There is no other site like this anywhere in East Asia where the continuity of the stone age culture can be observed so vividly.

Most of the prehistoric sites discovered so far date from the period 13,000 to 30,000 years ago. Geologically, this span of years corresponds to the end of the Kanto Loam formation. This period compares with the Upper Palaeolithic of mainland Asia, when *Homo sapiens* occupied most of the Old World and displayed their magnificent skills on sculpture, bone and ivory carvings, and cave paintings.

Sites associated with the Tachikawa loam stage of the late Wurm period have been found at more than a thousand locations in Japan. However, the existence of sites over 30,000 years old was not certain until recent years due to the lack of solid evidence. Stone tools found in the Horizon 15 of Fukui Cave, mentioned above, were rare examples which could be firmly dated at more than 30,000 years.

In the past few years some sites have been discovered which seemed to be quite different from the ones of the Tachikawa loam. They are distinctive in terms of stoneworking techniques, raw materials, artifact types, and assemblages. In these sites are found artifacts made of materials such as veined quartz, chert, and quartz rhyolite, and consisting largely of pebble-tools such as choppers and chopping-tools. At the same time, they also possess the Levallois technique in some form, a clear indication of their strong similarity to lower paleolithic artifacts from mainland Asia. Since these were found in layers below the Tachikawa loam, we can safely assume that they would date back much farther than 30,000 years. Typical examples



Plate I *top and middle rows*, nail-stamped pottery from Fukui Cave Horizon 2; *bottom row*, linear-relief pottery from Fukui Cave Horizon 3 ($12,400 \pm 350$ B.P.; $12,700 \pm 300$ B.P.).



Plate II Fukui Cave Horizon 3 ($12,400 \pm 350$ B.P.; $12,700 \pm 300$ B.P.).



Plate III Fukui Cave Horizon 7 ($13,600 \pm 600$ B.P.).

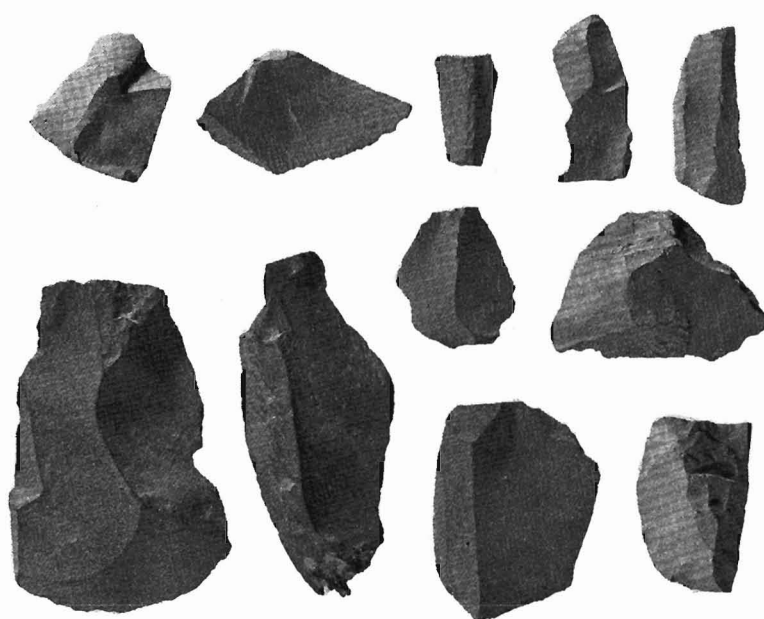


Plate IV Fukui Cave Horizon 15 ($> 31,900$ B.P.).

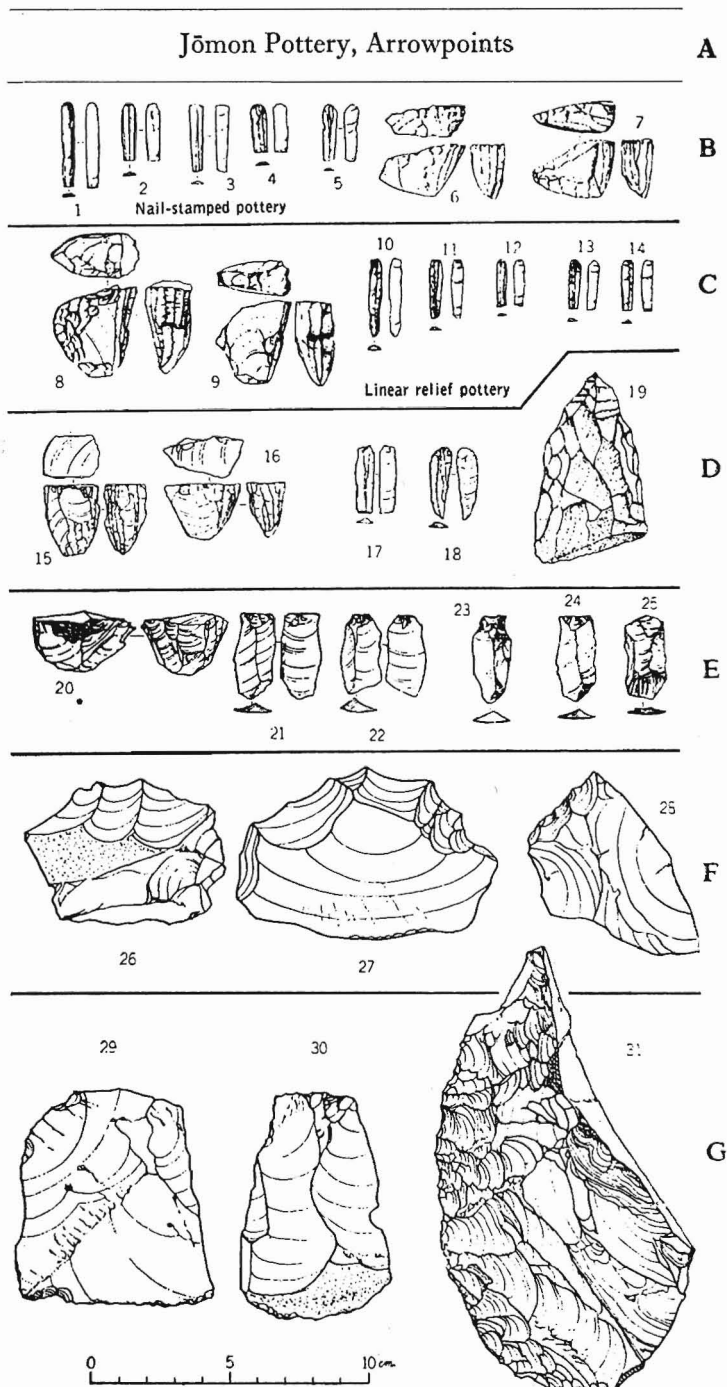


Fig. 1 A schematic profile of the Fukui Cave deposit, Nagasaki Prefecture, with illustrations of characteristic artifact categories. *A*, Horizon 1 (ca. 8000 B.P.); *B*, Horizon 2; *C*, Horizon 3 ($12,400 \pm 350$ B.P., $12,700 \pm 500$ B.P.); *D*, Horizon 4; *E*, Horizon 7 ($13,600 \pm 600$ B.P.); *F*, Horizon 9; *G*, Horizon 15 ($> 31,900$ B.P.).

of such sites are Sōzudai in Oita Prefecture and Hoshino in Tochigi Prefecture.

The Stone Age in Japan, as I have briefly discussed it, can thus be outlined as follows:

Neolithic (Jōmon)	ca. 10,000–2300 B.P.
Mesolithic or Epi-Palaeolithic	ca. 12,000–10,000 B.P.
Late Palaeolithic	ca. 30,000–12,000 B.P.
Early Palaeolithic	ca. 130,000–30,000 B.P.

2. THE JŌMON (NEOLITHIC)

The Neolithic is represented by Jōmon pottery, which is said to be the product of the most creative people in the world of stone age times. It continued for 8000 years, from 10,000 to 2300 years ago.

The people of the Jōmon period made pottery, canoes, bows and arrows, fish-hooks, saws, and other tools for their daily living, and lived in houses built on shallow pits with upright posts and thatched roofs. They lived in hamlets of three or ten houses and depended on gathering, fishing, and hunting of natural resources for the basics of their subsistence. From the Early to the Late Jōmon they left a large number of shell mounds scattered all over Japan.

Whether farming was practiced during this time is not known owing to the absence of firm evidence. In the archaeology of mainland Asia, neolithic cultures proper are those based on food production through farming or stock breeding. By this standard, as long as positive evidence is not available, the Jōmon cultures would be considered a regional variant of the neolithic pattern or a remnant form of the mesolithic lifestyle.

When a piece of string is rolled against the moist surface of pottery, it leaves an impression of "cord-marking" or "Jōmon." "Jōmon" as a kind of ceramic finish was developed in Japan and has rarely been found in adjacent parts of mainland Asia. Jōmon pottery is distributed from Hokkaido to Kyushu and is also present on Izu, Sado, Iki, Tsushima, Goto, Satsunan, and Okinawa, all isolated islands off Japan. It even extends to parts of Sakhalin and the Kurile Islands. There is no doubt that Jōmon man traveled by canoe on rivers and seas. Therefore it might have been possible for Jōmon man to make contacts with the neolithic cultures present on the nearby shores of mainland Asia. So far, however, no strong proof of cultural intercourse has been found in several sites on the east coast of the Korean peninsula. This evidence reflects some kind of cultural exchange between Korea and Kyushu 3000 to 4000 years ago.

If there were farming in Korea at that time, there might have been a chance for Jōmon people in Kyushu to acquire the knowledge and technique of agriculture. Whether people of the Jōmon period had knowledge of farming or even indigenous incipient agriculture is a basic question which remains to be answered.

We do know that starting about 9000 years ago, Jōmon man kept the dog as a domesticated animal and hunted with the bow and arrow. The oldest bones of *Canis familiaris japonica* were discovered in the first shell layer of the Natsushima shell mound, and arrowheads are even older. But it is not clear to us whether the dog and the bow and arrow were introduced from mainland Asia or originated in Japan.

Jōmon people used lacquer as paint and produced vaselike baskets on which lacquer was applied. Though lacquer was believed to be an import from China after the Yayoi Age, if Jōmon man made and used lacquer, then it becomes a question as to whether the lacquer tree, together with the technique of using lacquer, originated in Japan or was an import from elsewhere. This is, again, an interesting problem which remains to be answered in the future.

Around the middle of the Meiji period, there was a great argument among scholars as to whether or not Jōmon man was the ancestor of the Ainu. Since the middle of the Taisho period, anthropologists have been excavating, measuring, and gathering data of human bones from Jōmon Age shell middens. These bones have been compared to those from Yayoi and Kofun period sites and to those of modern Japanese and Ainu. The conclusion researchers have come to is that there is definitely a genetic continuity in Japan from the Jōmon period to modern times, although there may have been migrations from mainland Asia at one time or another. The future problem for us is to know what kind of relationships there were among Jōmon people and those of the Palaeolithic.

3. THE MESOLITHIC OR EPI-PALAEOLITHIC

This is a transitional time, during which a strong tradition persisted from the Palaeolithic but which also contained the seeds of the coming new period. Since there are many cultural and ecological differences between Kyushu, Shikoku, Honshu, and Hokkaido, these areas should be discussed separately.

Turning first to the Mesolithic of Kyushu, there is the example of Fukui Cave Horizon 3 in the northwestern part of the island. Here microblades, a tradition of the Palaeolithic, and pottery with linear relief decoration, a trait of the Jōmon, coexisted side by side. The pottery-making techniques which eventually gave rise to Jōmon pottery might have been brought here from mainland Asia by way of the Korean peninsula. Due to the slower progress of studies in mainland Asia, the source of these techniques is not yet known. However, I suspect the source to be the northwestern part of China, judging from the recent report of the Djalai-Nor site, which is considered to be the oldest microblade industry in China. Also in Kyushu, in addition to the discoveries from the Fukui Cave, some pottery and microblades were found together at the Uwaba site in Kagoshima Prefecture. We can expect increasing numbers of similar sites to be found in the future.

In Hokkaido, Honshu, and Shikoku immediately after the Palaeolithic, microblades vanished and were replaced by assemblages characterized by tanged points and chipped or ground adzes (Fig. 2). In general these stone implements are not found with pottery, but in the region from Shikoku to the southern Tohoku, such tanged points and adzes occasionally are found with linear relief pottery like that of Fukui Horizon 3. These sites include Kamikuroiwa in Ehime Prefecture, Shachinomi-jurinna in Aichi Prefecture, Kosegasawa Cave in Niigata Prefecture, Tazawa in Niigata Prefecture, Kitsunekubo in Nagano Prefecture, and Hinata in Yamagata Prefecture. Pottery-making technology, which appeared first in northwestern Kyushu and found its way to Shikoku and northern Honshu, must have spread very rapidly.

We need to concern ourselves with the question of why pottery was needed and

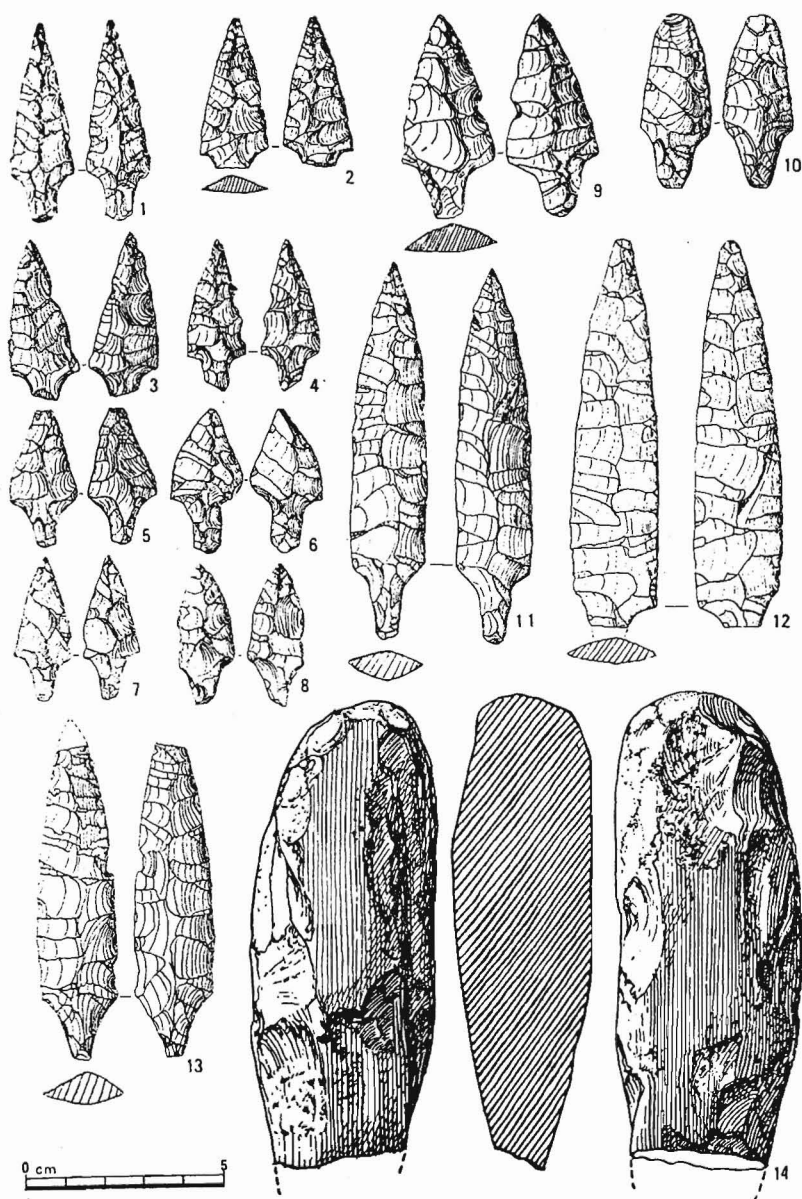


Fig. 2 Tanged points and other artifacts excavated from the Tachikaru-shinai site, locality A, Hokkaido (after Yoshizaki).

for what reasons it was made. Until only a few years ago pottery was believed to have originated in the neolithic farming villages of western Asia where it was developed in order to store grain. Now it appears that pottery was not closely associated with farming, for there was no evidence of use of the pottery in the oldest farming village. Rather, pottery must have been of use to people who depended only on hunting and gathering. It was, for example, used by nonagricul-

tural groups at the Khartum sites in Sudan and at Fukui Horizon 3 in the Mesolithic of Japan.

The advantage of pottery was that it did not burn when placed on a fire, so that in it food could be cooked together with liquid. Men of the Palaeolithic might have roasted meat to be eaten, but more often they must have eaten it raw. After the clay pot was developed, it was possible for man to consume food that was not only warm but also succulent. Moreover, the materials put in the pot—meat, fish, shellfish, and even ground plant seeds and roots—could be made into a fine dish, and the range of foodstuffs was widened considerably. As the late Gordon Childe pointed out, pot-making is perhaps the earliest conscious utilization by man of a chemical change. I would like to believe that pottery appeared in man's life as an important tool that allowed utilization of otherwise useless plant foods. At the beginning of the post-glacial period, corresponding to the Mesolithic, groups of large animals that mankind had previously hunted disappeared. At such a time seeds and grass roots were gaining importance as a new source of food. It is interesting to note that the invention of pottery was incidental to these changes in the environment.

4. THE LATE PALAEOLITHIC

The Late Palaeolithic corresponds to the end of the Pleistocene from about 30,000 down to 12,000 years ago. Sites where stone implements of this period have been found extend from Hokkaido to Kyushu and number well over 1000. In the Kanto region the layer which produced implements of this age is the Tachikawa loam. Unfortunately, as yet no artifacts or carvings of bone or antler have been discovered.

The stone tools left in the Tachikawa loam stage can be further divided into four chronological categories. The first category, dating back to the period 30,000 to 25,000 years, is a group of stone tools that are contained in the lowest part of the Tachikawa loam. This group is known from the Mukoyama site in Tochigi Prefecture. The assemblage of tools consists of coarse knives, burins, and marginally trimmed points.

The second period goes back 25,000 to 20,000 years and is marked by a group of stone tools contained in the lower black band of the Tachikawa loam. It is known from several sites such as Iwajuku I in Gunma Prefecture, Isayama in Tochigi Prefecture, Suzuki in Tokyo, and others. The assemblage of tools of this stage consists of flake-blades, coarse knives, burins, drills, scrapers, Levallois-like cores, and ovate axes with partially ground cutting edges. Flake-blades are mainly long flakes with pointed ends which were struck from semiconical cores.

The third period dates between about 20,000 and 15,000 years B.P. This period is characterized by the appearance of a true blade technique and the side-blow or "Setouchi" technique as well as sophisticated tools made on blades, such as backed blades and various kinds of burins. Fine examples of well-made blades are concentrated in the area from the northeastern Chubu region of Honshu to Hokkaido. In northern Japan this blade technique was facilitated by the use of obsidian and hard shale. With these fine raw materials it was possible to create sharp blades, slender backed blades, and various types of burins including the Kamiyama burins. Willow leaf Sugikubo knives and Kamiyama burins are always found together in these assemblages, which are limited in distribution to northern Honshu.

At approximately the same time another technique flourished in the area around the Inland Sea. This was a specialized and skillful side-blow technique, which consisted of striking off rectangular flakes continuously from a prepared flat core made of a flat angular Sanukite cobble or large flake, almost like cutting flat pieces from a flattened roll of dough. Such a flaking method is called the "Setouchi" technique, and the resulting side-blow flakes are "Tsubasa-jo" or "winglike" flakes. From these winglike flakes were made exquisite backed knives which are named "Kō" knives. Based on the technology and the typology of backed blades, there is an assemblage marked by the Setouchi technique and Kō knives in southwestern Japan and still another characterized by the blade technique and the Sugikubo knife in northeastern Honshu. Each, of course, has its own local characteristics. Although the blade technique is certainly foreign, these two assemblages seem to have developed independently within the Japanese islands. Continuing from the previous period, partially edge-ground stone axes were also being made, and good specimens of such artifacts have been found from about ten sites of this period from Hokkaido to Kyushu.

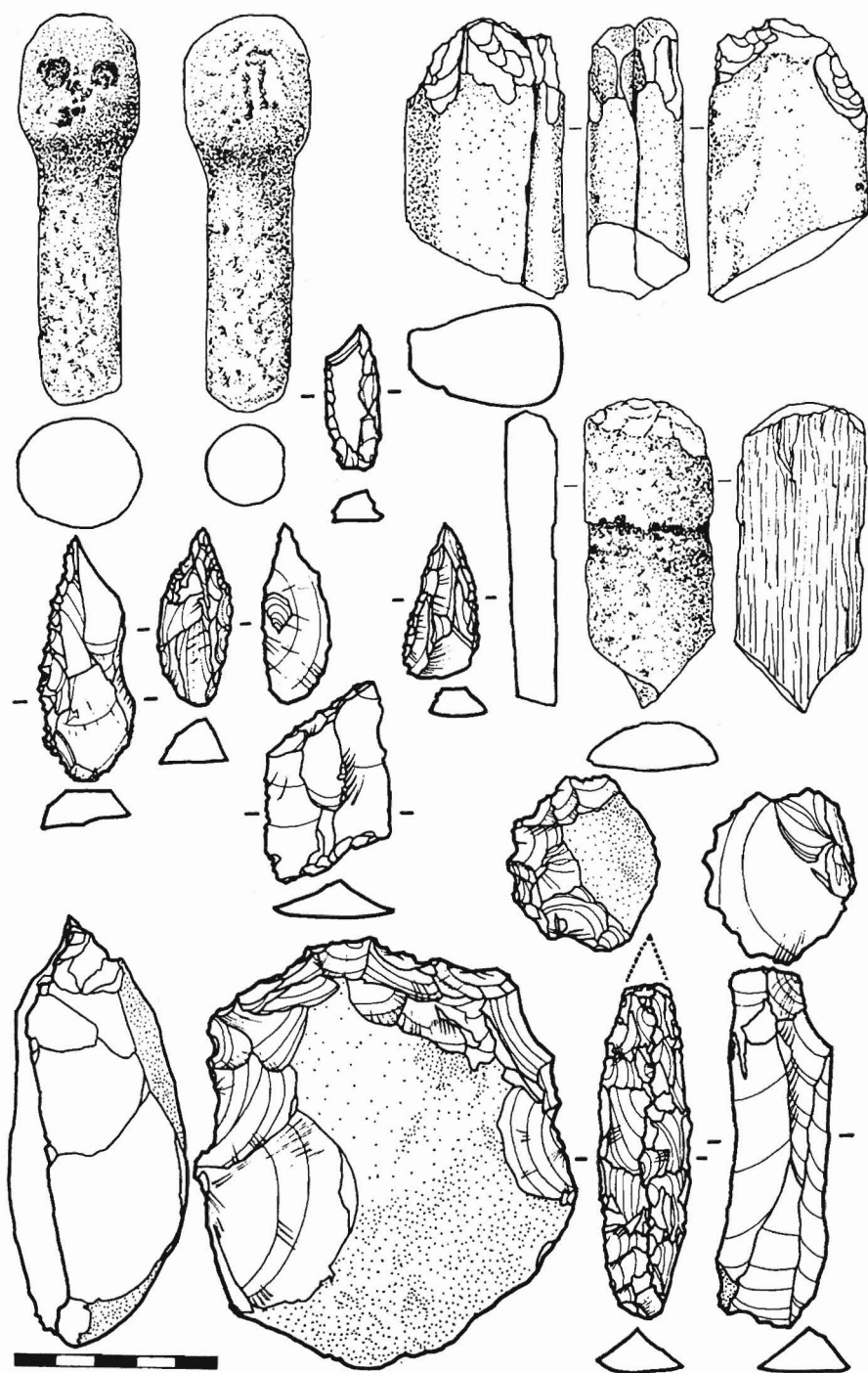
In addition to a typical third period assemblage of backed blades, scrapers, trifaced points, choppers, side-blow flakes, blades, and cores from the first cultural horizon of the Iwato site in Oita Prefecture, Kyushu, a stylized stone figurine pecked and ground from schist was excavated (Fig. 3). A couple of similar unfinished specimens also were unearthed. These are very interesting objects which may be related to the famous Venus figurines from Malta and other late Palaeolithic Siberian sites.

The fourth period is dated between 15,000 and 12,000 B.P. at the very end of the Pleistocene. This period is characterized by widespread development of microblade industries from Hokkaido to Kyushu.

From southern Tohoku to Hokkaido, the earliest sign of a microblade technology is the Yubetsu technique. With this technique a well-prepared biface was trimmed with long narrow removals termed "ski-spalls." The flat surface left by such removals was used as a platform for pressing off microblades (Fig. 4). The distribution of this technique exactly parallels that of the Arraya burin. These burins are marginally retouched flakes with a single laterally oblique burin facet (almost invariably from the right to left side of the dorsal surface). Outside of Japan, the Yubetsu technique and the Arraya burin are known from sites in the Angara River valley and Kamchatka, but no identical specimens have as yet been reported from Alaska.

In western Japan, this same time period is marked by semiconical microcores. Sites yielding these distinctive artifacts are Yadegawa in Nagano, Nodaka in Nagasaki, and Fukui Horizon 7.

In the fourth horizon of Fukui Cave there appeared a distinctively different microblade technique. So far this technique is known only from the Fukui site. It is generally similar to the Yubetsu technique except that the striking platform is formed not by a single horizontal removal, but rather by a series of small lateral flakes. The very early pottery found in Level 3 of the Fukui deposit occurred together with this same microblade technique.



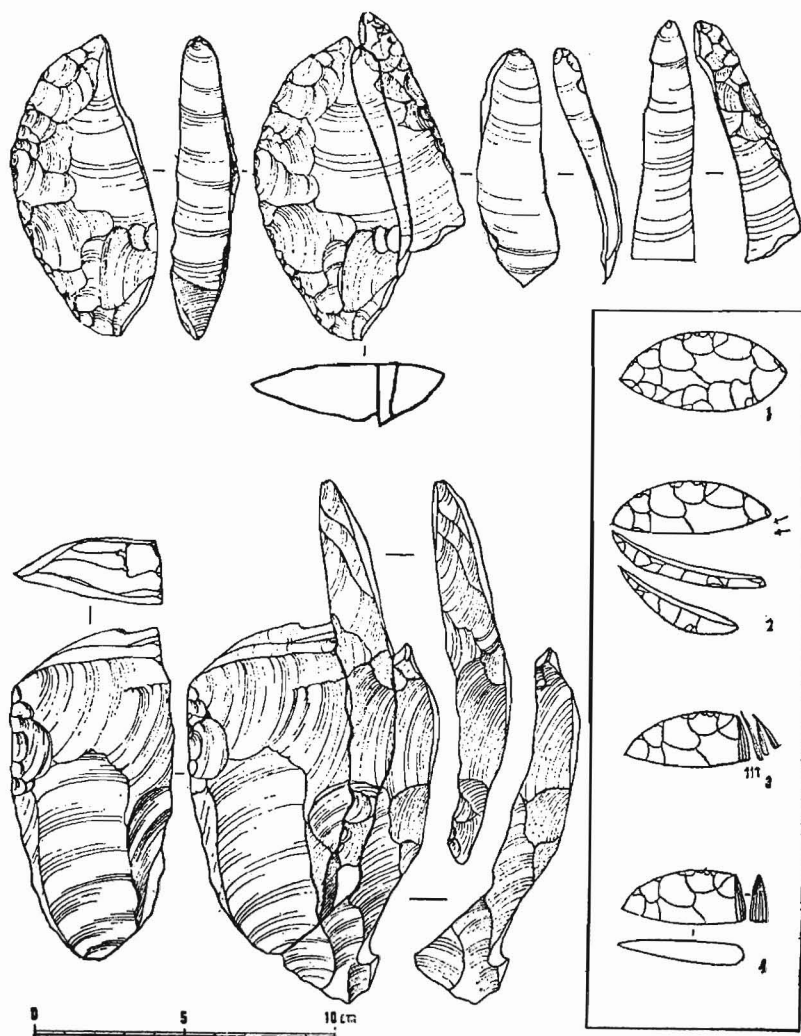


Fig. 4 Schematic summary of the Yubetsu technique and artifacts from the Shirataki site, locality 32, Hokkaido (after Yoshizaki).

5. THE EARLY PALAEO LITHIC

Is there any chance of finding evidence of men that lived in Japan before 30,000 years ago? The question of whether or not there are remains of early human cultures in Japan is still answered negatively by some of my colleagues. But according to my own research and that of others, the evidence of lithic tools dating from prior to 30,000 years ago is so strong that I am sure it will be only a matter of time until we discover the bones of the early men who made the artifacts.

In 1964 we excavated the Sōzudai site at Hiji Town, Hayami County, Oita Prefecture. Here about 3 m below the modern surface, directly upon the base rock of andesite tuff breccia, a large number of roughly flaked stone tools of quartz vein and quartz rhyolite were found. The tools include proto-hand axes, pointed flakes,

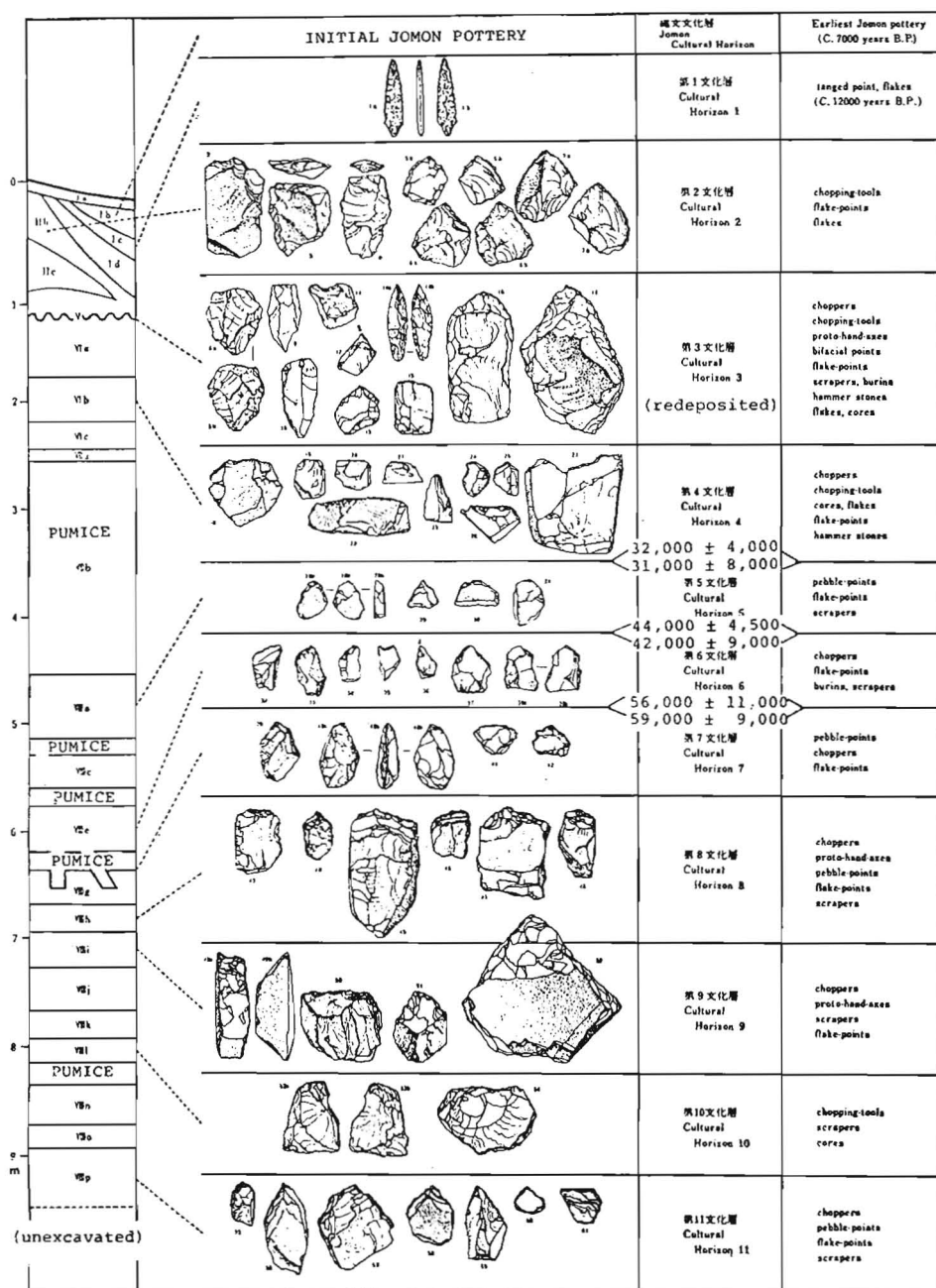


Fig. 5 Columnar section of the Hoshino strata and industries.

pointed pebbles, choppers, chopping tools, burins, flakes, and cores. The Sōzudai site is located on the Shimosueyoshi terrace. It is covered by the Shimosueyoshi loam, which has recently been dated to the period from 130,000 to 70,000 years B.P. by the fission-track method. Therefore we can firmly date the Sōzudai industry to the same period of 130,000 to 70,000 B.P.

Continually from 1965 to 1967 and again in 1974 we excavated at the Hoshino site, which is located at the end of the Ashio Mountains in Tochigi Prefecture. Figure 5 shows the sequence of eleven artifact-bearing horizons excavated at the site. Between cultural horizons 4 and 5 was a thick sterile pumice layer which dates from 32,000 to 31,000 B.P. Thus the artifacts from cultural horizon 5 and other lower

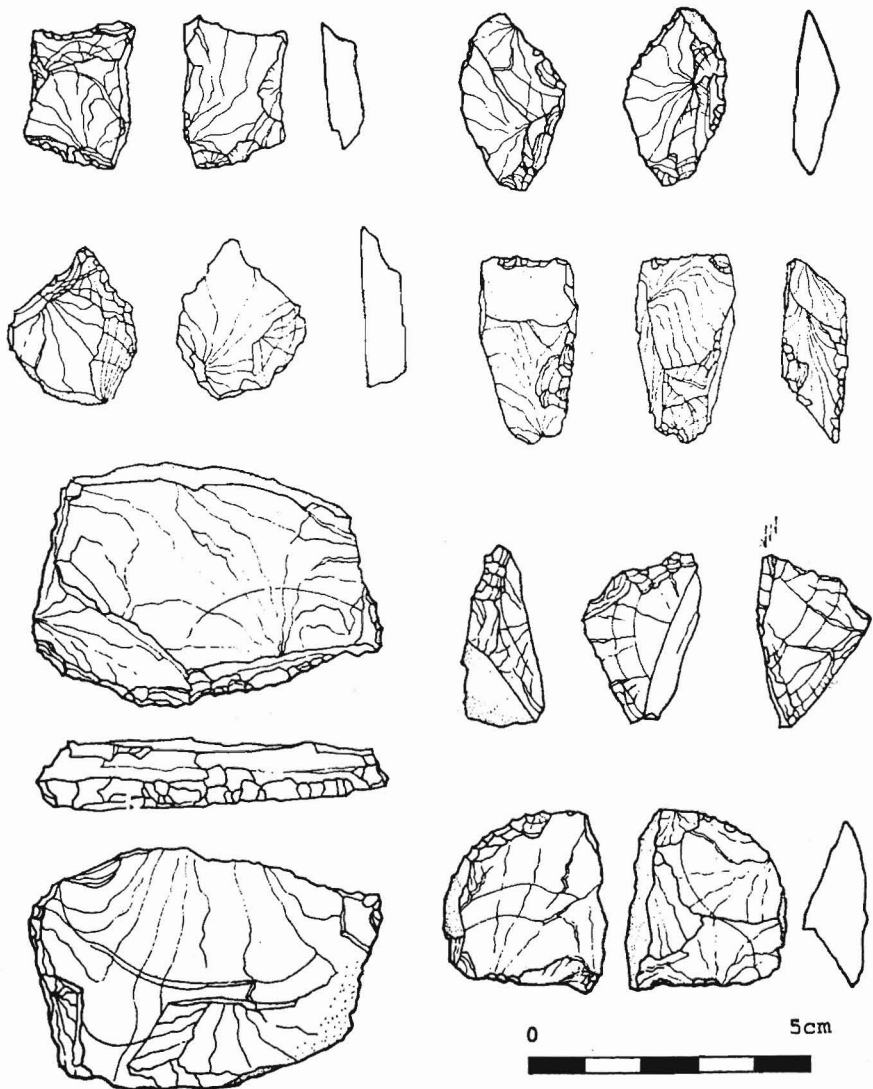


Fig. 6 Stone artifacts from Layer 7 and Layer 8 of the Hoshino site, Tochigi Prefecture.

horizons are more than 31,000 years old. Moreover, a pumice layer between cultural horizons 5 and 6 was dated at 44,000 to 42,000 B.P., and another between cultural horizons 6 and 7 was dated at 59,000 to 56,000 B.P. Consequently we can place the age of cultural horizons 7 through 11 as in excess of 59,000 years.

In the 1974 excavation at Hoshino, many fine specimens were collected from cultural horizons 7 and 8 of the site. The Hoshino 7 and 8 industry includes choppers, scrapers, burins, proto-knives, marginally retouched points, drills, retouched tabular flakes, and cores (Fig. 6). These tools are usually small and are made on tabular flakes or pebbles of chert.

In 1970 and 1971 I reexcavated the Iwajuku site, Gunma Prefecture, in order to clarify the Iwajuku "0" industry. This industry is contained in the strata below the Hassaki pumice, which has been dated at 44,000 B.P. by the fission-track method. A great many stone tools made of chert were excavated from these lower levels. These include choppers, pointed flakes, burins, flakes, and cores (Fig. 7).

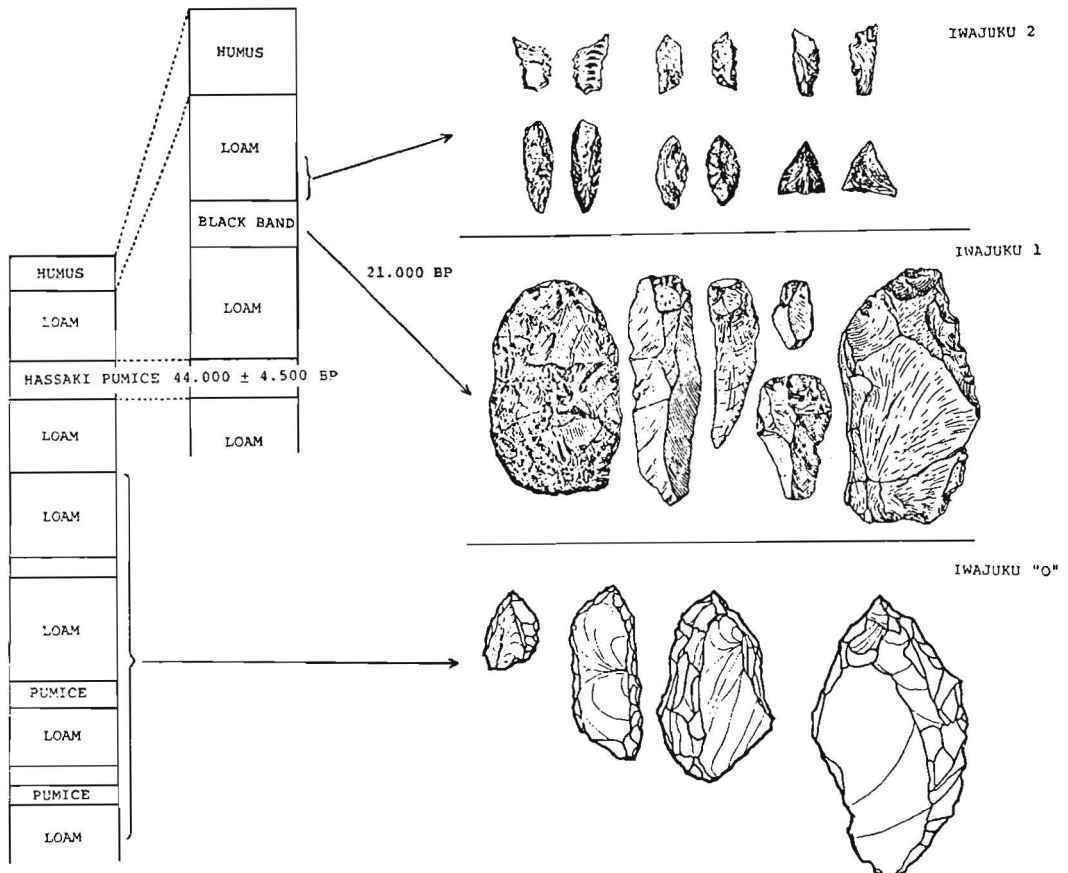


Fig. 7 Schematic profile of the Iwajuku site, Gunma Prefecture, with illustrations of characteristic artifact categories.

It might be said that the study of the Japanese Early Palaeolithic has only just taken the first step. In recent years, not only in Japan but also in Korea and far-eastern Siberia, investigations of early palaeolithic sites have been and are being regularly undertaken. The study of early cultures, which once had appeared to be limited only to China, has expanded to include the area surrounding the Sea of Japan. Distribution of the known early palaeolithic sites is shown in Figure 8. Research on accurate dating or age determination, the sequence of industries, fossils of the toolmakers, fauna, flora, and the natural environments of these early periods must be continued. We are pursuing our own work and setting as our first goals the clarifying and strengthening of evidence of the Early Palaeolithic in Japan and the understanding of the chronology of the early stone tool industries discovered up to now.

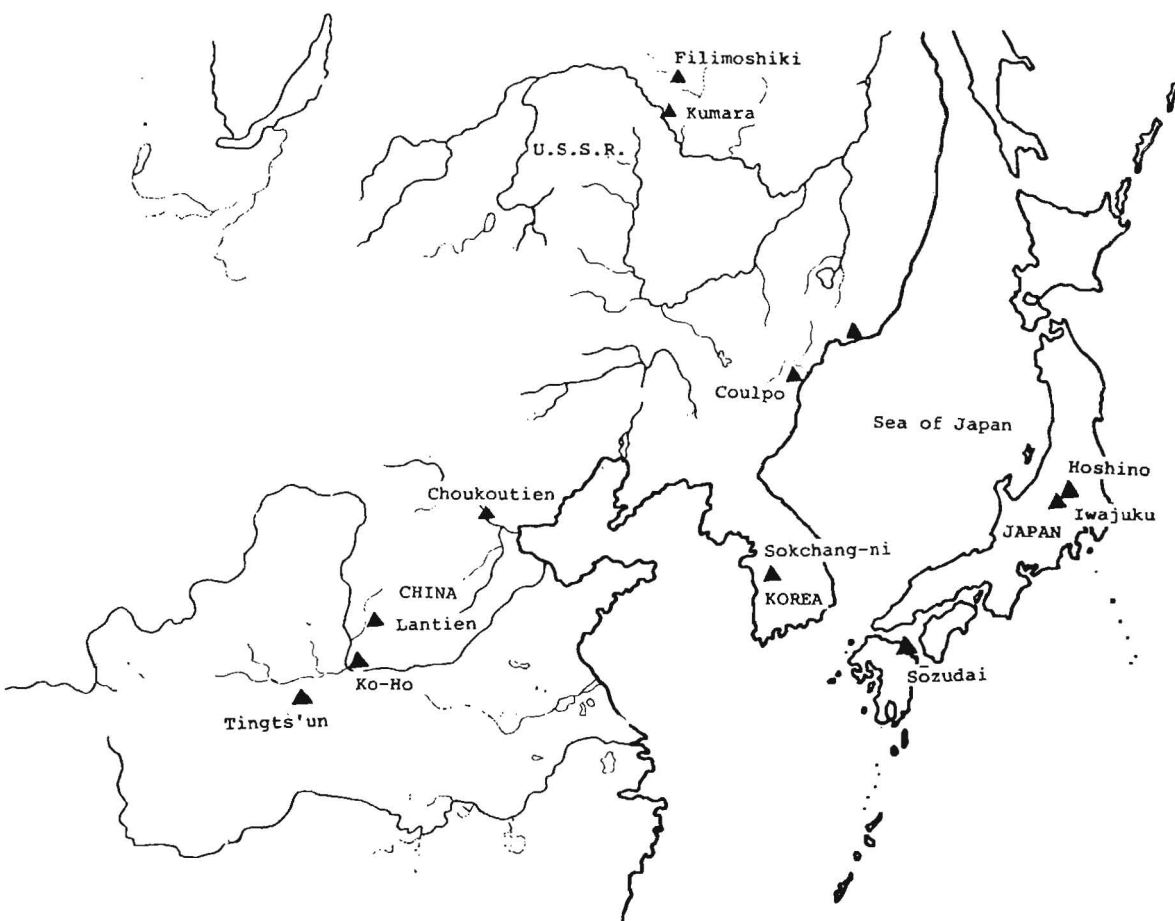


Fig. 8 Early Palaeolithic sites known from Northeast Asia.