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ON THE STRATIGRAPHICAL POSITION OF THE STONE IMPLEMENTS OF PRE-JOMON CULTURE NEWLY FOUND AT TARUKISHI AND VICINITY, SOUTHWESTERN HOKKAIDO

By

Masao MINATO

(Contribution from the Department of Geology and Mineralogy,
Faculty of Science, Hokkaido University. No. 636)

1. Introduction

Since many years ago the oldest stone implements found in Hokkaido have been believed, from the associated pottery objects, to date back to early Jomon* in age. The Jomon age in Hokkaido has been regarded usually to have begun some 7000 years ago. Until a short time ago nobody was aware that any kind of races had inhabited in this island as long ago as the Pre-Jomon age.

Very recently, however new facts have been brought to light by the earnest investigations of such archaeologists as Messrs. HIROMICHI KONO, SOSUKE SUGIHARA, CHOSUKE SERIZAWA, TOSHIO OBA and especially of MASAKAZU YOSHIKAWA. They have shown that there are actually existing stone implements of very old type in various districts of Hokkaido, which should be regarded as dating back as far as Pre-Jomon in age.

Such implements are found in many localities of Shirataki and Aino-nai district in Kitami Province, northeastern Hokkaido, and also in various localities of Shiribeshi Province, southwestern Hokkaido, such as Tarukishi, Kaributo, Oshamanbe, Rankoshi and Konbu.

Recently, in cooperation with the above-named archaeologists, the present writer as a geologist was engaged in a field survey concerned with the stratigraphical horizon of these stone implements. The purpose of the survey was to ascertain the age of the culture beds.

It is expected that the true characteristics of the cultures and in-

*) This means the rope pattern pottery (Jomon-doki) culture. The phrase "Pre-Jomon culture" is now employed by the Japanese archaeologists as synonymous with the non-ceramic culture. (see bibliography)



Fig. 1. Site C at Nishitomi. A point where three men are standing is the site yielding microlithic tools.

dustries of the Pre-Jomon age in Hokkaido will be reported in the near future by the archaeologists. In the present paper it is proposed briefly to record only the writer's field observations concerning the culture layers at Tarukishi and its vicinity, where there were found a few different layers yielding characteristic implements which show probably different culture stages.

As before mentioned, sites yielding such comparatively older types of implements have been known already at several localities in Hokkaido; even in Kitami Province alone, the sites number as many as twenty.

Therefore the present writer wishes to deal with all of them in a series of forthcoming papers. This is the first report on the stratigraphy of those artifact-yielding layer.

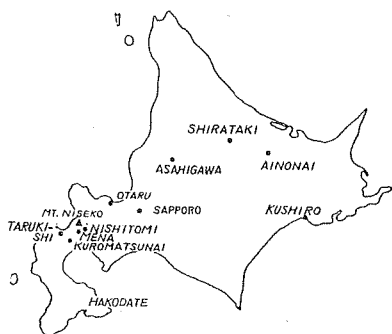


Fig. 2.

Before going further, the writer wishes here to express his indebtedness to the archaeologists, Dr. H. KONO, Dr. S. SUGIHARA, Dr. C. SERIZAWA, Dr. T. OBA, and Mr. M. YOSHIZAKI who have given valuable suggestions throughout the course of the present study. He wishes also to offer sincere thanks to the director and curators of the Hakodate Municipal Museum, Messrs. S. TAKEUCHI, M. ISHIKAWA, H. HIMENO, Y. NISHIDA, H. CHIYO

for their financial support and cooperation in the field survey at Tarukishi. Also he is much indebted to Messrs. K. KANETA, S. IWAMA and I. MURAKAMI for their kindness in guiding him to the sites where stone implements could be found in the neighborhood of Nishitomi. For preparing illustrations of this paper, the writer greatly owes to Mr. S. KUMANO and Mr. M. MAEJIMA (Kutchan Higher School), for which he wishes to express his thanks.

2. Tarukishi

Tarukishi is a small village situated near Kuromatsunai-Machi (town) along the railway line from Hakodate to Sapporo. In the region of Tarukishi, most of the area is in the configuration of elevated hills which are almost flat at their tops and then gently slope in some directions. The marginal part of these hills is generally dissected by small rivers and their tributaries.

The stone implements which have recently attracted attention were found on one of these hills. The actual site is shown in text-fig. 3; it is about 100 m above sea level. The area around that site was recently brought under cultivation for the first time, and the implements were found under the surface soil, when the owner-farmer was ploughing. That was in June, 1953.

The farmer, Mr. JUNSUKE TAKAHASHI, sent a few of the im-

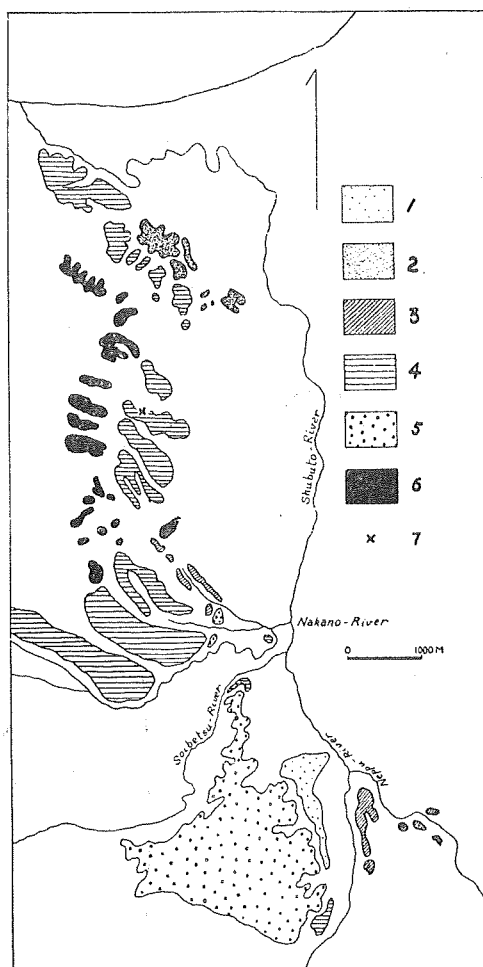


Fig. 3. Distribution of terraces in the region of Tarukishi.

- 1: Nakanogawa terrace
- 2: Yubetsu terrace
- 3: Neppugawa terrace
- 4: Tarukishi terrace
- 5: Warabino terrace
- 6: Igarashi terrace
- 7: Site of stone implements

plements found in association with chips to the Municipal Museum of Hakodate. So singular were the forms of the stone implements as seen at first glance, that the director and curators of the museum considered them probably to belong to the Pre-Jomon culture. This view was later substantiated by the investigation of such archaeologists as Messrs. H. KONO, S. SUGIHARA, T. OBA and M. YOSHIZAKI.

In July, 1954, the curators of the Hakodate Municipal Museum (Messrs. M. ISHIKAWA, H. HIMENO and H. CHIYO) went to Tarukishi and made some preliminary excavation under the leadership of the director of the museum (Mr. S. TAKEUCHI) at the site where the farmer found the implements for the first time.

Upon that occasion the excavators were successful in collecting further material. It was definitely and clearly ascertained that the stone

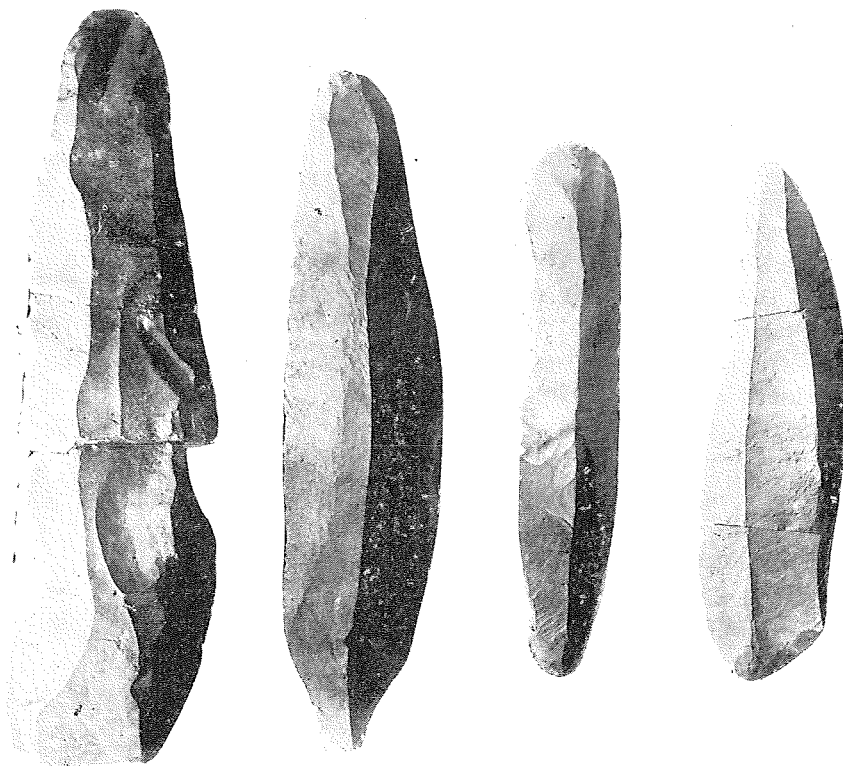


Fig. 4. Blades found at Tarukishi; collection of the Hakodate Municipal Museum. The left sided large toll is about 23 cm in length. Material: shale.

Photo by ISHIKAWA

implements were derived from within the clay layer under the surface soil and that the implements together with chips did not co-exist with any sort of pottery. Not a single fragment of pottery was found either at that site or in the immediate vicinity.

In September of the same year the archaeologists (KONO, OBA and SUGIHARA) again engaged in excavation at the same point in cooperation with members of the staff of the Hakodate Municipal Museum.

The total number of implements and chips collected from the first find of Mr. TAKAHASHI through the last excavation comes to as many as 73, of which 33 are tools in almost perfect form, one is a core and the others are chips.

Of the tools, blades are most numerous, with a few fabricators and scrapers following. In this regard Messrs. KONO and OBA have already made a preliminary report in Japanese.

The writer also cooperated with these archaeologists, working from the stratigraphical point of view, upon the occasion of the last excavation, September, 1954. Since that time he has made occasion field surveys in the neighborhood of Tarukishi.

At the site from which the stone implements now in problem, were derived, andesitic agglomerate in Pliocene age, widely develops to form

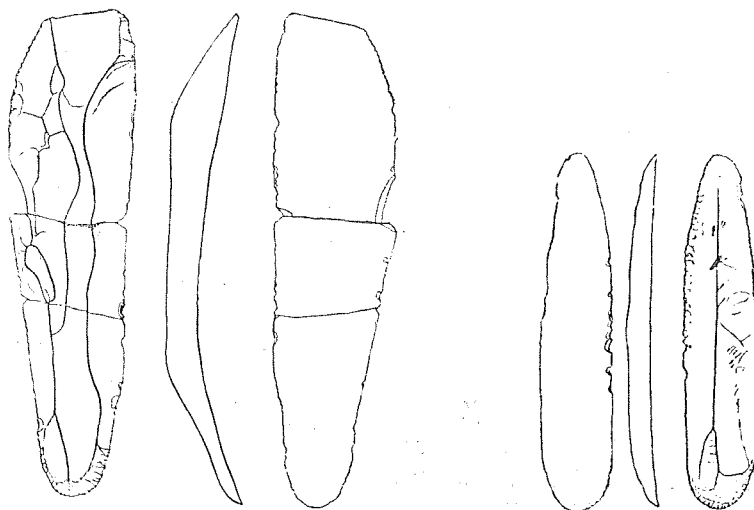


Fig. 5. Blades found at Tarukishi

The three text figures on the left show the same tool figured in the left side of fig. 4, while the right three figures show the same tool figured at the second position from the right side in fig. 4.

the basement of the area. These agglomerates are observed to be gradually decomposed upwards everywhere, and a horizon ranging from the surface to the mean depth 2 m shows that there is a tendency to transform into a clay layer.

The clay in this layer is brown or orange in colour, and includes a fairly large number of various-sized breccias of andesite which are also quite decomposed.

The minerals included in the clay, besides the clay minerals and natural glass are the same sort as in the matrix of the underlying agglomerate.

Between the agglomerate and the clay layer no sharp boundary line is noticeable, as before mentioned. The matrix of the agglomerate in its upper portions becomes softened and altered to clay, while as for the breccias of the agglomerate, they also in higher portions are much decomposed.

Such being the case, the stratigraphical relation between the agglomeratic complexes and its covering clay layer shows a blended unconformity; the latter should without doubt be regarded as the weathering product of the former.

All the stone implements together with the chips were found at this site to be buried in the upper part of the clay layer, which is covered by black surface soil, 10 cm in thickness.

To state it in slightly more detail, the stone implements and chips are contained in the clay layer and were distributed within a definite horizon, ranging from its top to the depth of ca 50 cm below the surface. Horizontally they were scattered in a sub-elliptical area, 7×10 m in size.

Therefore, the stone implements and chips are surely older than the surface soil, but they may be contemporaneous with, or date from a short

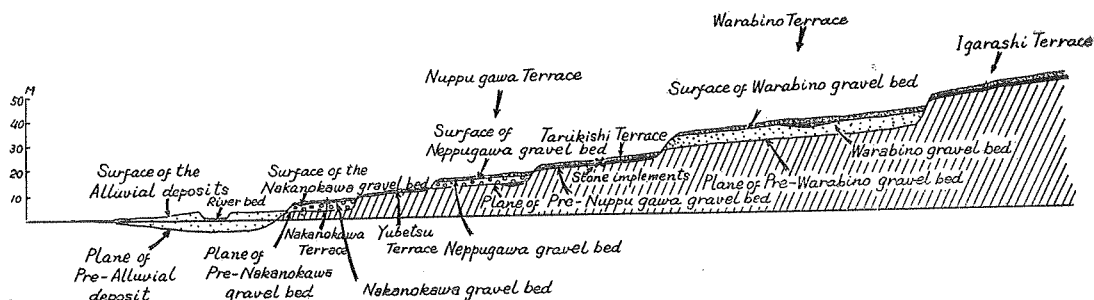


Fig. 6. A diagrammatic profile to show the stratigraphical relation between various terraces in variable height in the region of Tarukishi.

time after the formation of the clay layer.

Accordingly the problem comes down to the period of the formation of the clay material which constitutes the main part of the clay layer. That is to say, the geological age of the stone implements now in question may be regarded to make a correlation with that of the clay layer which rests on the underlying agglomerate complex.

In the neighborhood of Tarukishi, low elevated plateaux or hills occupy the main area as already stated, and the site of the stone implements now in problem, is on one of these hills.

Topographically speaking, all these plateaux in this region belong to the so-called successive terraces in variable height.

Some of these terraces are composed of gravels and coarse sands, while others are free from such deposits, except for the weathering product derived from the underlying rocks.

The sequence of these successive terraces may be enumerated as follows, from younger to older:

.....	Alluvial deposits	
.....	Pre-Alluvial plane	
.....	Nakagawa terrace	{ Surface of the Nakagawa gravel bed Nakagawa gravel bed
.....	Plane of Pre-Nakagawa gravel bed	
.....	Yubetsu terrace	Plane of Yubetsu erosional surface
.....	Neppugawa terrace	{ Surface of the Neppugawa gravel bed Neppugawa gravel bed
.....	Plane of Pre-Neppugawa gravel bed	
.....	Tarukishi terrace	Plane of Tarukishi erosional surface
.....	Warabino terrace	{ Surface of Warabino gravel bed Warabino gravel bed
.....	Plane of Pre-Warabino gravel bed	
.....	Igarashi terrace	Plane of Igarashi erosional surface

Their distribution in the region of Tarukishi is schematically represented in fig. 3; and profile to show the stratigraphical relation of each of them is diagrammatically given in fig. 6. The Igarashi terrace is the oldest one, and then Warabino, Tarukishi, Neppugawa, Yubetsu and Naka-

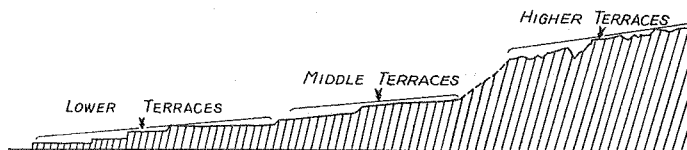


Fig. 7. Three groups of terraces, schematically shown.

gawa follows. Among them, Warabino, Neppugawa, and Nakagawa terraces are composed of gravels and sands of various thickness, while others are free from such deposits, although they are covered generally by clay less than 2 m in thickness.

The stone implements were discovered on the terrace, here defined as the Tarukishi one. They were found, as already stated, to be buried in the upper part of the clay deposits that compose the terrace. Such clay deposits are fairly widely distributed in the neighborhood of Tarukishi and in a few places, excepting the very point where the stone implements were found, similar clay deposits are observed to be covered by the gravel bed which forms more lower terrace, probably corresponding to the Neppugawa terrace. Accordingly the age of the stone implements, now in problem, is to be regarded as more recent than the Warabino terrace but possibly older than the Neppugawa gravel bed.

In Hokkaido marine coastal terraces have been commonly divided into main three groups; higher, middle and lower terraces respectively.

The lower terraces are found at various heights, though they attain a height of less than 50 m above sea-level in the coastal region. Their surfaces are almost flat or slightly inclined, besides this, the marginal cliffs surrounding their flat surfaces are generally very steep.

The marine terraces to be grouped into the so-called middle terraces are at levels of 80 to 100 m above sea-level. Their surfaces are observed to be more inclined than those of the lower terraces; besides this, the marginal cliffs are less steep than those of the latter, being covered generally by thick debris at their feet.

On the other hand, the marine coastal terraces customarily grouped into the higher terraces attain a height of more than 180 m above sea-level; their surfaces are much dissected to present steep reliefs and the marginal cliffs become collapsed to some extent.

All these terraces sometimes exhibit wave cut terraces free from any deposits, but others are usually coated with gravels and coarse sands intercalated by clay layers.

These coastal terraces are traceable landwards where some of them merge into the river terraces along the rivers. The river terraces are also divisible into three main groups, lower, middle and higher respectively; they are correlated in some degree to the coastal terraces above noted. Along the upper course of the Tottabetsu river in Tokachi Province, the gravel deposits of these river terraces have been successfully correlated with the glacial deposits in the high mountains of the Hidaka mountain range, which were brought down from the vanished cirque glaciers in the

Late Pleistocene age. (HASHIMOTO, S. und KUMANO, S., 1955).

As has been reported on several occasions, the glacial moraines in the Hidaka mountain range are divisible into three formations in descending order, namely,

Tottabetsu II Glacial deposit

Tottabetsu I Glacial deposit

and Poroshiri Glacial deposit.

Of them the Poroshiri glacial deposit is correlated to the "Middle terraces". Fossil molars of *Mammonteus primigenius* subsp. *primigenius* (BLUMENBACH) were recently found at the very base of the gravel bed of a terrace belonging to the "Lower terraces", at Ogoshim near Cape Erimo.

Accordingly the writer is of the opinion, that the so-called "Middle terraces" of Hokkaido, at least the younger group of them, may be correlated to the Poroshiri Ice age. Therefore the group of successive terraces belonging to the "Lower terraces" should be regarded as having been formed during the time after the Poroshiri Ice age and before the end of the Pleistocene.

That is to say, the time of the formation of the "Lower terraces" of Hokkaido may correspond to the time ranging from the Poroshiri-Tottabetsu Inter Ice age, through the Tottabetsu I and II Ice ages and also through the Post Glacial age prior to the Alluvial epoch.

Now the coastal terrace at Ogoshi near Cape Erimo, in which the teeth of *Mammonteus* were collected is 10 m in height near the coast line. It may be correlated to the Neppugawa terrace in the region of Tarukishi; this assumption is supported not only by its height but also by the similarity of the topographical features such as the flatness of surface and the steepness of surrounding cliffs.

The discovery of a *Mammonteus primigenius primigenius* teeth in the lower terrace at Ogoshi is considered to indicate that the gravel bed containing this fossil was deposited under cold climatic condition, and it may perhaps represent the last cold climate period in Hokkaido during the Pleistocene age. Therefore the *Mammonteus* fossil from Ogoshi can with high probability be correlated to Tottabetsu II Ice age.

If that is true, the date of the stone implements at Tarukishis should be placed earlier than Tottabetsu II Ice age but perhaps after (later than) Tottabetsu I Ice age.

At present there is available no positive data in regard to the Ice ages in the Hidaka mountain range to correlate with the foreign glacial stages, but it seems most likely that the two ice ages of Tottabetsu may

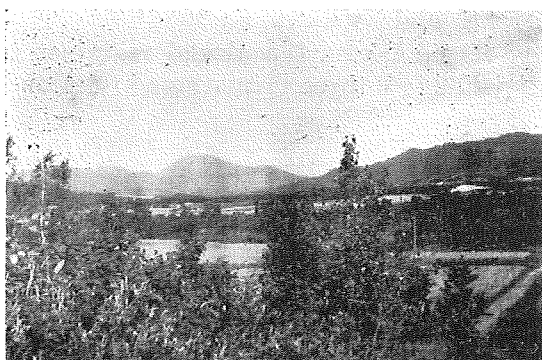


Fig. 8. Newer volcanoes Iwao-nupuri and Niseko-nupuri (Mr. NISEKO) in the left, and low mountainous region composing of Tertiary rocks in the right, with low hills of welded tuff in foreground. The outcrop of the welded tuff is observable as a narrow white band, in this photograph. There, the welded tuff is observed to cover the lower terrace.

correspond to the Würm Ice age in rough estimation, but it is quite difficult problem to determine which stages of the Würm Ice age correspond the Tottabetsu two ice ages. At present two possibilities are to be considered: (1) the Tottabetsu I Ice age is correlated to Würm I, while Tottabetsu II Ice age to Würm II, and (2) the Tottabetsu I Ice age is Würm II, while the Tottabetsu II is Würme III. However, if the latter case is true, the Poroshiri Ice age must be regarded to be correlated to Würm I and

this assumption is, at present not easily believable, although there are no positive data to deny such a possibility.

Accordingly the writer believes at present moment that the age of the culture represented by the stone implements together with chips found at Tarukishi may be probably comparable with the period from Würm I to Würm II Inter Ice Age in Europe.

At any rate, it is a quite difficult matter, in the present status of investigations, to correlate not only the Ice ages in Hokkaido, but also the culture layers of stone implements of Pre-Jomon age to corresponding geological and cultural periods in any foreign countries. Therefore the above statement may very well need corrections in some points in the future, when the archaeological studies in Hokkaido have made further progress.

Nevertheless it is almost certain that the culture layer at Tarukishi may be correlable to the Inter Ice Age, Tottabetsu I and II.

2. Nishitomi

Nishitomi is a place near Konbu station along the railway line from Hakodate to Sapporo, where a different type of stone implements was found, which may be not comparable with those of Tarukishi, although they may be also assigned to the Pre-Jomon age.

In this area, agglomeratic formation, also Pliocene in age, is widely

developed as a fundamental complex, which is dissected by terracing to make a few terraces of variable heights.

The oldest one shows its surface at almost 45 m in height above the surface of the alluvial plane, next is about 35 m, the surface of the third one is about 25 m in height above the alluvial surface, and the fourth one is less than 7 m above the alluvial plane.

The topographical relation of each of them is schematically represented in fig. 9.

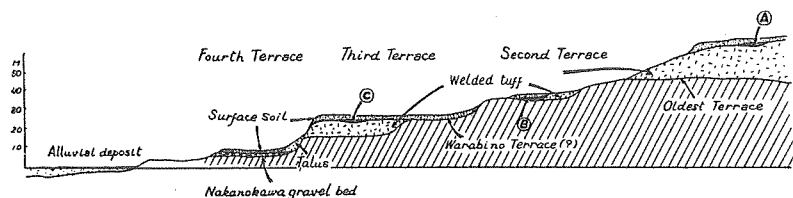


Fig. 9. Three sites of stone implements in the neighborhood of Nishitomi, each site is found on the hills coated by welded tuff.

Further in this area, welded tuff probably derived from the volcanic region of Niseko, immediately north of Konbu, is observed to cover most of these terraces.

Stone implements from the neighborhood of Nishitomi have been found, at three sites at least up to the present day. All of them were collected on the surface of the terraces covered by welded tuff. Accordingly the age of these implements should certainly be regarded to be later than the deposition of the welded tuff, but before the fourth terracing.

If a correlation be made of the successive terraces in the region of Nishitomi to those of Tarukishi, it is almost indubitable, that the fourth terrace of the former corresponds to the Nakagawa terrace of the latter, while the third may be correlable to the Warabino one, the second may be also to the Warabino or the Igarashi terrace and lastly the oldest terrace at Nishitomi may be probably regarded as contemporaneous with the Igarashi terrace at Tarukishi.

Accordingly the welded tuff in this area may be correlated to the Post-Warabino and Pre-Nakagawa-terraces.

The geological age of this welded tuff can, however fortunately, be settled more accurately. In the region of Mena, about 16 km westward from Nishitomi, the same welded tuff can be seen widely developed, where the writer observed it covering a terrace which can definitely be correlated to the Tarukishi terrace. While the welded tuff at Mena is observed to be covered by a gravel bed forming a more lower terrace, which is probably

contemporaneous with the Neppugawa gravel bed at Tarukishi.

Therefore the age of the welded tuff, is certainly, post Tarukishi but pre Neppugawa-terrace; that is to say, the stone implements found in the neighborhood of Nishitomi are decidedly newer than the Tarukishi ones. This is true because the implements at Nishitomi were found on hills coated by the welded tuff, as already stated. As to these implements, Dr. OBA and others are now investigating from the view point of archaeology. Their views are expected to be published before long.

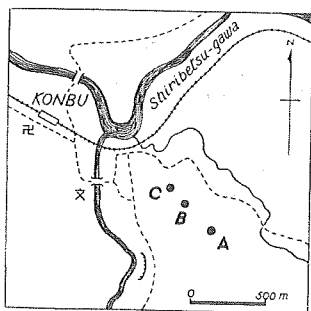


Fig. 10. Site of the stone implements in the neighborhood of Nishitomi.

In this region as Nishitomi, the implements were found at three sites, as already stated. The exact points are shown in fig. 10. From the site A were found flakes fairly large in size, although they are different types from those of Tarukishi; from site B, microlithic tools (see fig. 13), while at site C were found two types of implements, one microlithic tools like those from site B, and the other blades and flakes of different type either from Tarukishi tools or from site A. They are far larger in size than the mentioned microlithic tools, but smaller than the Tarukishi ones.

As all these implements were found on the earth by farmers when they were ploughing, the exact horizons are unknown, but at any rate they were originally not very deeply situated below the surface.

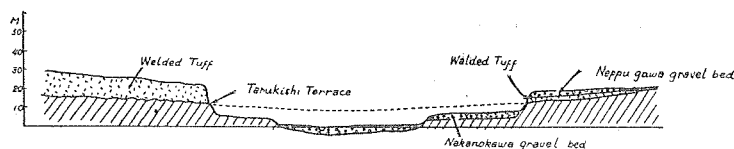


Fig. 11. Showing the stratigraphical position of the welded tuff in the region of Mena.

According to the verbal information of a farmer, named MIURA, now living near site C in Nishitomi, the stone implements at that site were observed to be buried in the earth, about 15 to 30 cm below the surface. Horizontally they were observed to be scattered in a narrow area, 5 × 5 m in width.

Also from the verbal information of Dr. OBA, who himself engaged once in excavating at site C, it was definitely ascertained that such stone

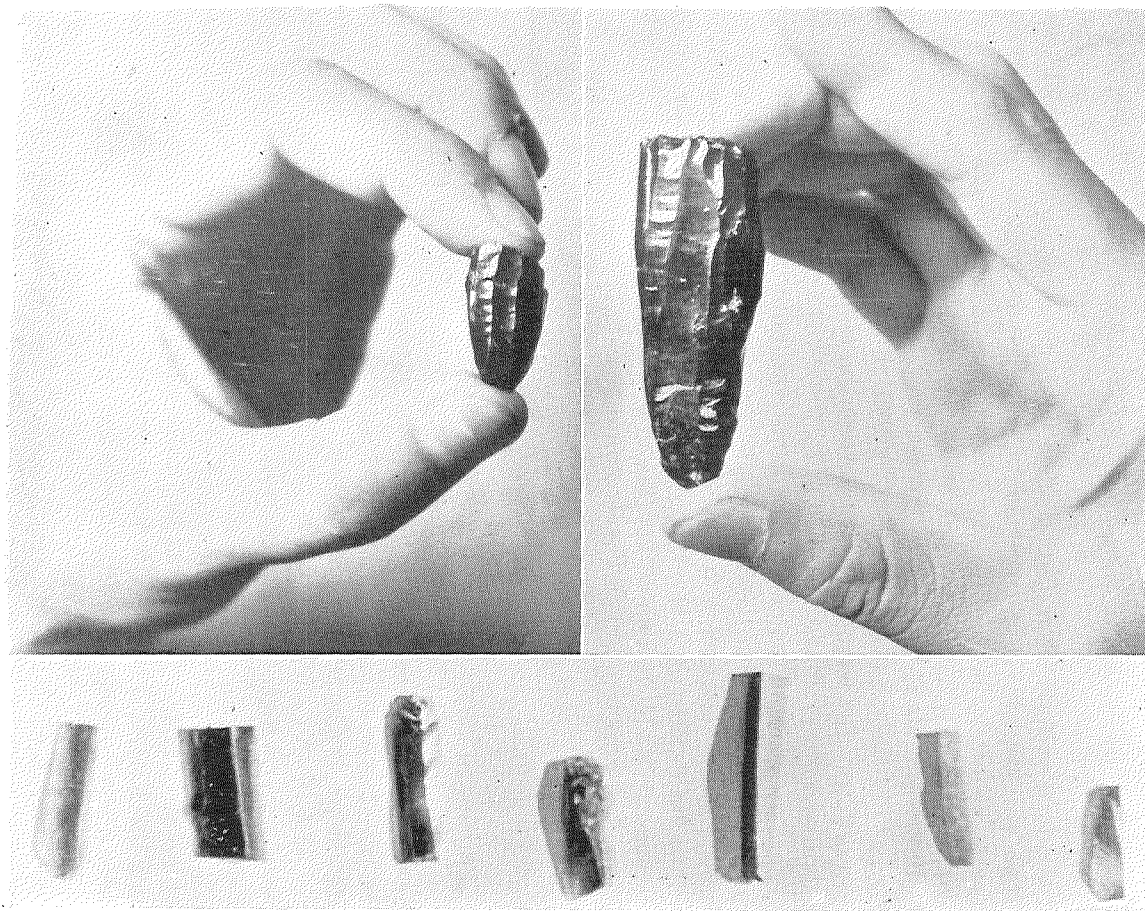


Fig. 12. Microlithic tools found at site C, Nishitomi; collection of Mr. MIURA; slightly reduced (52/60). Material: Obsidian. Photo by M. MAEZIMA; Cores found at the same time; collection of Mr. YOSHIZAKI; Slightly reduced. Material: Obsidian. Photo by M. YOSHIZAKI.

implements as blades and flakes, a little large in size, were situated in a horizon a little lower than the microlithic tools.

Beyond what has been stated above nothing more can now be said with certainty on the stratigraphical relation of each culture layer, but it may be that the layer at site A is the oldest, the layer containing blade and flake follows this, while the layer of the microlithic tools is most new.

Besides this, all these implements, either old or new, are regarded to have been left by some folk far later than the time when the welded tuff was brought to cover the terraces in variable heights, because the artifacts are contained in the clay, which may be a product of the decomposition of the underlying welded tuff, although it may be not surface soil.

Accordingly the time interval between the stone implements found at Tarukishi and those around Nishitomi is, the writer believes, rather great.

The older culture layer at Nishitomi including site A may perhaps be contemporaneous with the terraces being correlated to the Neppugawa or even Yubetsu terrace, and the culture layer yielding the microlithic tools may be dated far after them. Anyhow the layers of these microlithic tools at Nishitomi show the highest culture bed known at present in Hokkaido belonging to the Pre-Jomon age.

4. Conclusion

The culture layers containing such old type of stone implements that they can be regarded by the archaeologists to correlate to the Pre-Jomon in age are now ascertained from the stratigraphical side to belong to the Upper Pleistocene in age. To speak more in detail, the culture layer containing stone implements at Tarukishi is now correlated to the Tottabetsu I and II Inter Ice age, while the others are considered to be stratigraphically more high than this; one of them at Nishitomi contains microlithic tools.

In Hokkaido, stone implements of Pre-Jomon in age have been described already by YOSHIZAKI in preliminary form from Toyoda, near Ainonai in Kitami Province, however the site of these implements has not been fully investigated from the view point of stratigraphy.

The tools at Toyoda, according to YOSHIZAKI, are believed to be much similar to those of Tarukishi. At Toyoda the stone implements were collected at a depth of about 1 to 1.2 m below the surface. Probably the stratigraphical horizon of the culture layer at Toyoda may be similar to the one at Tarukishi.

Beyond this, the writer does not wish at present to make any further

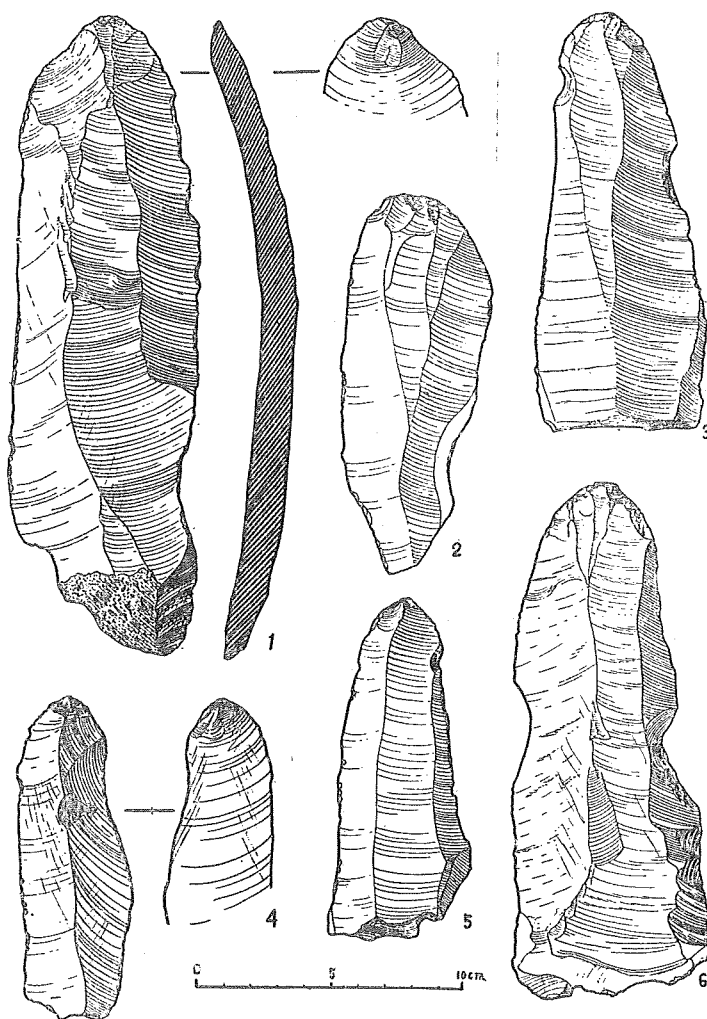


Fig. 13. Stone implements found at Toyoda, near Ainonai in Kitami Province. After M. YOSHIKAWA.

statements, although he has already made a stratigraphical survey on most sites of these beds, not only in southwestern Hokkaido but also in the Kitami Province. It is proposed to report fully on them in a series of following papers.

In concluding, the writer wishes to annex a correlation table concerning the culture layers, dealt with in the present paper only.

CORRELATION TABLE

GEOLOGICAL AGE	ICE AGES	CLIMATE	TERRACES & DEPOSITS		VOLCANIC ACTIVITIES NEAR NISEKO	CULTURES & INDUSTRIES
HOLOCENE		Temperate Warm			NEWER VOLCANOES as, Iwaonupuri, Niseko etc.	{ JOMON-CULTURE B.C. 5000
UPPER PLEISTO- CENE	?	Cool?	Nakagawa terrace and its gravel bed	{ Fourth terrace at Nishitomi		{ Microlithic tools at Nishitomi Blades & flakes at Nishitomi
			Yubetsu terrace			
	TOTTABETSU II ICE AGE	Cold	Neppugawa terrace and its gravel bed	{ "LOWER TERRACES"	Ogoshi gravel bed near Cape Erimo <i>Mammontens primi- genius primi- genus</i>	
		Warm	Tarukishi terrace		◆ Eruption of welded tuff, and calderal sinking in the region of Niseko*)	{ Blades, core, scrapers, at Tarukishi & Toyoda
	TOTTABETSU I ICE AGE	Cold	Warabino terrace and its gravel bed		{ Third terrace at Nishitomi Second terrace at Nishitomi	
			Igarashi terrace	{ "MIDDLE TERRACES"	Oldest terrace at Nishitomo	
	POROSHIRI ICE AGE	Temperate Very cold			◆ Shikotsu Welded tuff	

*) Note: In Hokkaido welded tuffs have been known to distribute in several districts besides the region of Niseko here mentioned. All of them are observed to develop in a wide area surrounding calderas, some of which are now collapsed or buried by the products of the Newer volcanoes. The age of such characteristic volcanic products as these is quite worthy of note. It is now believed that the age of most of them with a few exceptions, is Upper Pleistocene, as already reported by Ishikawa and the present writer himself. Nevertheless, to speak strictly, all these welded tuffs brought in the Upper Pleistocene age are not product of one definite age, e.g., the welded tuff surrounding the Shikotsu Caldera is now regarded to be slightly older than that in the region of Niseko, that is to say, the Shikotsu welded tuff correlates with the post Middle terraces with certainty but is before the Tarukishi age showing the stone implements here stated or even pre Tottabetsu I Ice age.

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