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a quasi-fetish—its employment as a musical instrument being limited to its *applied* use as an accompaniment to the dance or song.

In reply to Mr. Roberts' suggestion that the drum originated as a signal, Mr. Rowbotham said that a complex system of drum signalling certainly existed throughout a pretty extensive area in the interior of Africa, which he believed Commander Cameron was the first to call attention to before the British Association in 1878 ; but it stopped there, and being limited to specific tribes on one particular continent was scarcely sufficient to warrant the general induction that the drum originated all the world over as a signal, if, indeed, it was correct to assume that, even in the signalling district, it so originated. Signalling looked much more like a practical afterthought than an original use, and certainly presupposed a much higher degree of intelligence than is attained by those tribes that are as yet in the drum stage. Besides Africa there was only one other instance of the signalling use that he knew of, and that was among the Yucunas of the Yapura.

In reply to some objections taken to the description of the lyre in his paper as "ushering in harmony," Mr. Rowbotham remarked that he used the word harmony in its simplest sense, understanding by it Aristotle's *ἀρμονία*, simple unison or octave between a voice and an instrument. Harmony is merely accompaniment, and was impossible in the pipe stage, for the pipe bound the mouth. But the lyre set it at liberty, and enabled the player to sing and play at the same time. Accompanying the voice by the drum was not melodic accompaniment, and need not be taken into consideration.

In conclusion, the author pointed out the bearings of the theory, if it were ultimately accepted, on the Cave Period. Whistles had been discovered in the caves, and if it were a necessity for the drum to precede the pipe, the cave men must have been acquainted with the drum.

A communication was read by the Assistant Secretary from Prince Paul Poutiatine, "On Neolithic Implements in Russia." An abstract will appear in the *Miscellanea*.

THE STONE AGE IN JAPAN ; *with Notes on RECENT GEOLOGICAL CHANGES WHICH HAVE TAKEN PLACE.* By JOHN MILNE, F.G.S., &c., &c., of the Imperial College of Engineering, Yedo, Japan.

[Read 25th May, 1880.]

PART I.

INTRODUCTION.

SINCE early times when Marco Polo journeyed across Central Asia and brought back news about the gold and pearls of a distant

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country called "Chipangu" European interest in Japan has been continually growing greater.

Twenty years ago a lacquer box from Japan was a valuable "curio," and a note about the customs of its inhabitants a literary prize. Since then, although the period is so short, Japanese curios have been shipped to all quarters of the globe, and so many observers have been in the field transcribing books and noting customs, that now neither the productions, the customs, nor the history of Japan are sought after with the same eagerness as formerly.

Interest in that which is easily attainable seems to have reached a climax, and instead of being content with filling up the details of the sketch of historical Japan, enquirers are already in the field endeavouring to dispel the gloom which like a curtain hides that which is beyond the pale of written history, from the present in Japan, as it does in other countries.

As I have had unusual opportunities during my residence in Japan for travelling through the greater number of its provinces, my chief object in the following paper is to add the few gleanings about the archæology of Japan which I have gathered together during these journeys to the mass of information which has already been collected about this interesting subject.

For the purpose of connecting together the notes and placing them before my readers so that it is possible for them to be reasoned upon, I will now and then supplement what I have to say with information drawn from museums, from Japanese books, and from notes in local newspapers.

Sources of Information.

Many facts relating to the early history of Japan are to be drawn from its *shell heaps* or "kitchen middens," of which in some portions of the country there seems to be no lack. As the Japanese fishermen of the present day also make shell heaps, in many cases it may be difficult to distinguish between those which are modern, and those which are really ancient.

Tumuli afford another source of information. These exist in many parts of the country, but thus far only a few of them have been explored.

Natural and artificial *caves* have yielded valuable evidence about the early inhabitants of Japan.

Besides evidence derived from sources such as these, a study of the language, the names of places, the types of people which are met with, their customs, religions, and traditions, the geographical positions of the several islands which form Japan, &c., all have an important bearing upon the early inhabitants of

this country, and form valuable material to sift for information.

*Kitchen Middens.**—These are scattered over the country in various parts. In the neighbourhood of Yedo there are many, and I have seen them in Hakodate, and as far north as the extreme north-east end of Yezo; that is to say, between latitudes 35° and 44° north, or a distance of 700 miles.†

These middens, so far as I have seen, are all very similar in character. First there is a layer of earth from a few inches to 1 or 2 feet in thickness; beneath this comes a band of shells, all of which have been opened, and many of which are broken. This is generally of a thickness varying between 6 inches and 3 or 4 feet.

The chief features in all these heaps are the shells; in fact, it is by the shells that they are gradually being discovered.

In the heaps I have found the following genera, all of which seem to be similar to the shells living in the neighbouring sea:—

- | | |
|-------------------------|----------------------|
| 1. <i>Mya Arenaria.</i> | 9. <i>Trochus.</i> |
| 2. <i>Cardium.</i> | 10. <i>Pecten.</i> |
| 3. <i>Nerita.</i> | 11. <i>Tellina.</i> |
| 4. <i>Ostrea.</i> | 12. <i>Pyrula.</i> |
| 5. <i>Arca.</i> | 13. <i>Artemis.</i> |
| 6. <i>Cerithium.</i> | 14. <i>Murex.</i> |
| 7. <i>Turbo.</i> | 15. <i>Cytherea.</i> |
| 8. <i>Buccinum.</i> | |

From the two first of these shells we can infer that the taste of the present Japanese and that of their predecessors was very similar.

Bones.—In addition to the shells, it is very common to find fragments of bones. So far as I have seen, these seem to have been chiefly broken transversely, and if I except the heaps at Omori and Suyeyoshi, it is only in a few cases that I have observed bones which have been split longitudinally, as if it had been the intention to extract marrow from them.

The bulk of the bones which I have obtained are those of deer, bear, birds, and fish.

Some of the tusks of boar are remarkable for their large size, that is, as compared with those of their modern repre-

* The only kitchen midden which has yet been described is, I believe, that discovered at Omori by Professor Morse (see "The Popular Science Monthly," January 1879, p. 257).

† Since writing the above I have been told by Mr. Lyman, who has been travelling in Kiushiu, that he there met with kitchen middens. Details of these I do not know. But this occurrence in Kiushiu indicates to us that we may expect to find kitchen middens throughout the whole of Japan.

sentatives. This diminution in size, it has been suggested, may be explained by supposing that in olden times these animals lived in the plains where good food might be easily obtained, whilst now through the advancement of civilisation, and the populating of the low fertile ground, they have been gradually forced back into the wilder and more mountainous regions, where life is altogether harder, and food more difficult to obtain.

The most singular discovery which has been made, is at the Omori shell-heap near Yedo by Prof. Morse, who there found a large number of human bones, all of which are broken in the same manner as the other bones. Amongst these there are fragments of the humerus, radius, ulna, lower jaw, and parietal bones.

Prof. Morse says : “ Of 16 long bones of the arm and leg, 9 are destitute of both extremities, and of the remaining 7, 3 are destitute of the lower extremity, 2 of the upper extremity, and in 2 the articular surfaces of both ends are gone.”

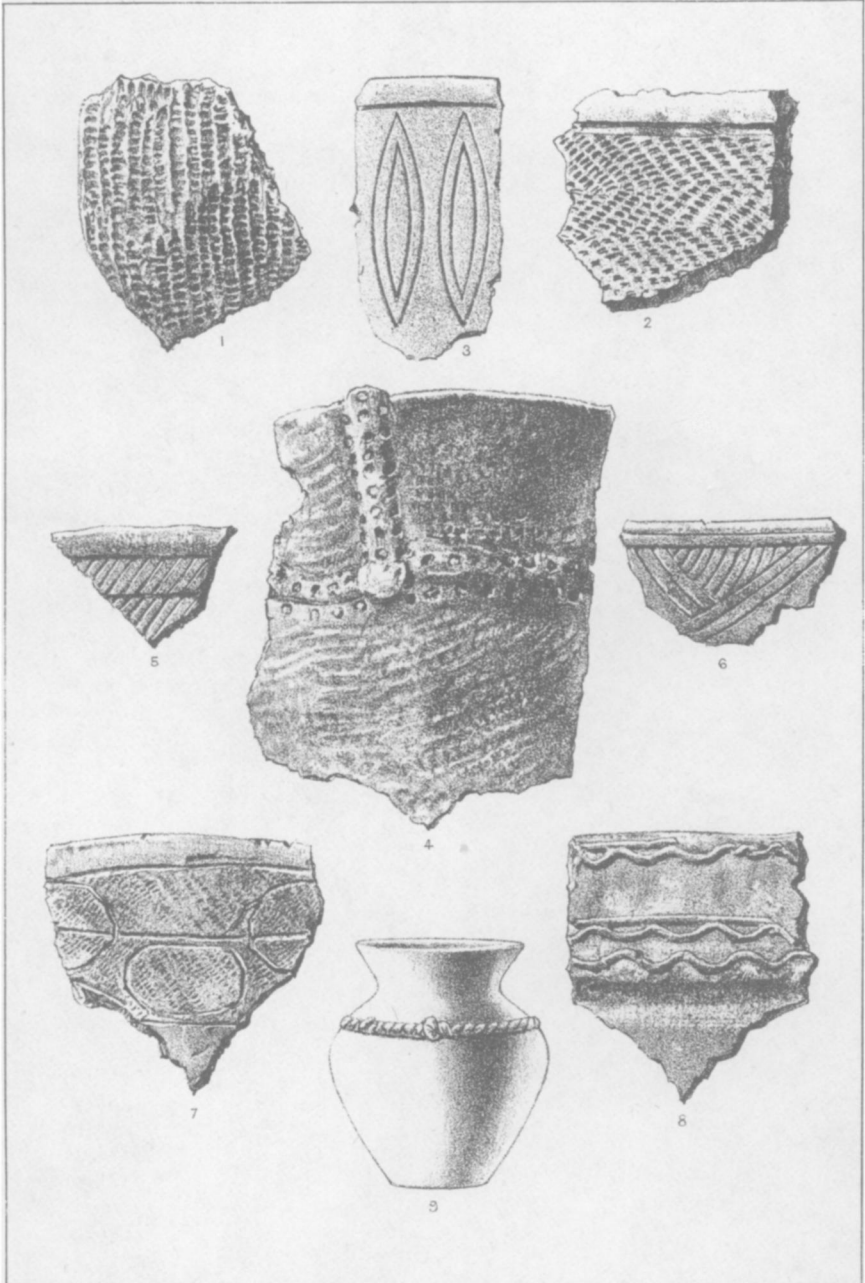
Only one tibia was found. Taking the antero-posterior diameter as 100, the transverse diameter is 62, and it “ may be looked upon as a fair platycnemic tibia.” (*Tokio Times*, January 18th, 1879.)

All these bones were mixed in an indiscriminate manner with the other remains. Finding bones in this way is regarded by Prof. Morse as being undoubted evidence of cannibalism.

Pottery.—In all these ancient middens, the feature most prominent, after the shells, is the abundance of fragments of pottery, all of which have apparently belonged to vessels of the vase type. At some of the heaps like that of Omori in a short afternoon you may collect a large basket full.* From the large quantity which are found at Omori, Prof. Morse is led to believe that in ancient times it may have been a famous place for its manufacture. In this belief I should hardly be inclined to join with Prof. Morse, partly because, as he himself says, that no unfinished specimens were found, and partly because at many other heaps, as, for instance, those near Yatsingashira, at Hakodate, fragments appear to be equally abundant. On the accompanying Plate XVII some typical forms of this pottery are shown.

As the nature of the patterns which are worked upon this pottery form such important evidence as to the people who made them, I will here state the few characters which appear to me to be the most observable.

* These fragments are unglazed and only partially baked. They vary in thickness from $\frac{3}{8}$ th to $\frac{1}{4}$ of an inch in thickness, and are very similar in their general character to the pottery obtained from other heaps.



Theo^s Nail & Son, Lith. London.

ANCIENT POTTERY FROM JAPAN.

Impressed Markings.—The greater number of pots are covered with minute irregular punctations. These are about one-eighth of an inch in length, and are ranged in lines (Fig. 1, Pl. XVII). Other punctations are irregularly oval in shape. These are not arranged in such continuous lines as the smaller markings. Usually they are about one-eighth of an inch long, but sometimes they reach half an inch. These little impressions at times give a hatched appearance to the surface of the pots. In some cases it would seem that they might have been formed by pressing the clay whilst in a soft state upon a coarse cloth. At other times when this hatching occupies a peculiar position, or is worked into a pattern, it would be suggested that a milling tool of some description has been used.

Besides punctated impressions which entirely cover the surface of a vessel and give to it a peculiar grain, larger punctations are put on in lines. These are evidently for the purpose of ornament. It is common to find them in single or double lines round the neck of a vessel. Sometimes they are roughly triangular, at other times they are either rectangular or circular.

In one specimen of pottery which I have, the impressions are deep and are arranged to form a pattern like Fig. 2. This piece has evidently formed the upper portion of a vase.

Incised Lines.—These are narrow lines which look as if they might have been made with a piece of stick or the edge of a sharp flint, whilst the clay was soft.

Often they run in lines round the neck of a vessel, sometimes singly and sometimes two or three together to form a series of parallel rings. At other times they are like irregularly formed deep scratches. Occasionally not only do they run round a vessel but they are arranged obliquely to each other to form a pattern, as, for instance, in Fig. 6.

The spaces between two such rings are occasionally filled in with diagonal lines (*see* Fig. 5).

A zigzag pattern made of scratches arranged in series which have different directions are common.

The general figure they produce is like Fig. 2.

Sometimes these incised lines form a series of vertically placed elliptical forms down the sides of vessels, each elliptical figure being formed of two, three, or more lines (Fig. 3).

Roughly drawn ellipses are also cut round the vessel, as in Fig. 7. Rough scrolls are now and then met with, and various other patterns are also to be found. Besides, straight wavy lines running down the sides of vessels are to be met with.

Markings in Relief.—Those markings which are in relief consist of small knobs, occasional scrolls, and what are called

cordmarks. These latter are so called from their resemblance to fine pieces of cord. From what I have collected they appear to be of two kinds, the simple cord and the twisted cord. These generally run in single or double lines round the neck or the upper part of vessels. Sometimes two are laid on like two pieces of string loosely twisted together. At other times they form wavy lines, and the straight cords and the waved cords may be arranged to form various patterns, as in Fig. 8.

Here and there along the twisted cord markings little excrescences stand up as if they were intended to indicate a knot. The rarest form of these markings appear to be the scrolls. Those which I have seen are arranged either in circular shapes, or else in forms like the letter S or the figure 8.

Out of all these various markings and their variations, the dotted impressions and roughly incised lines are the most common, and of the patterns those formed of series of parallel oblique lines like the zigzags.

I may mention that the cord-marked pottery appears to me to be more common in the Yezo heaps than in those near Yedo, and also that in all cases the markings are extremely irregular and indicate a carelessness in their production.

General form of Vessels.—Judging from the shape of the fragments of pottery which I have gathered together they seem all to have formed portions of vase-like vessels.

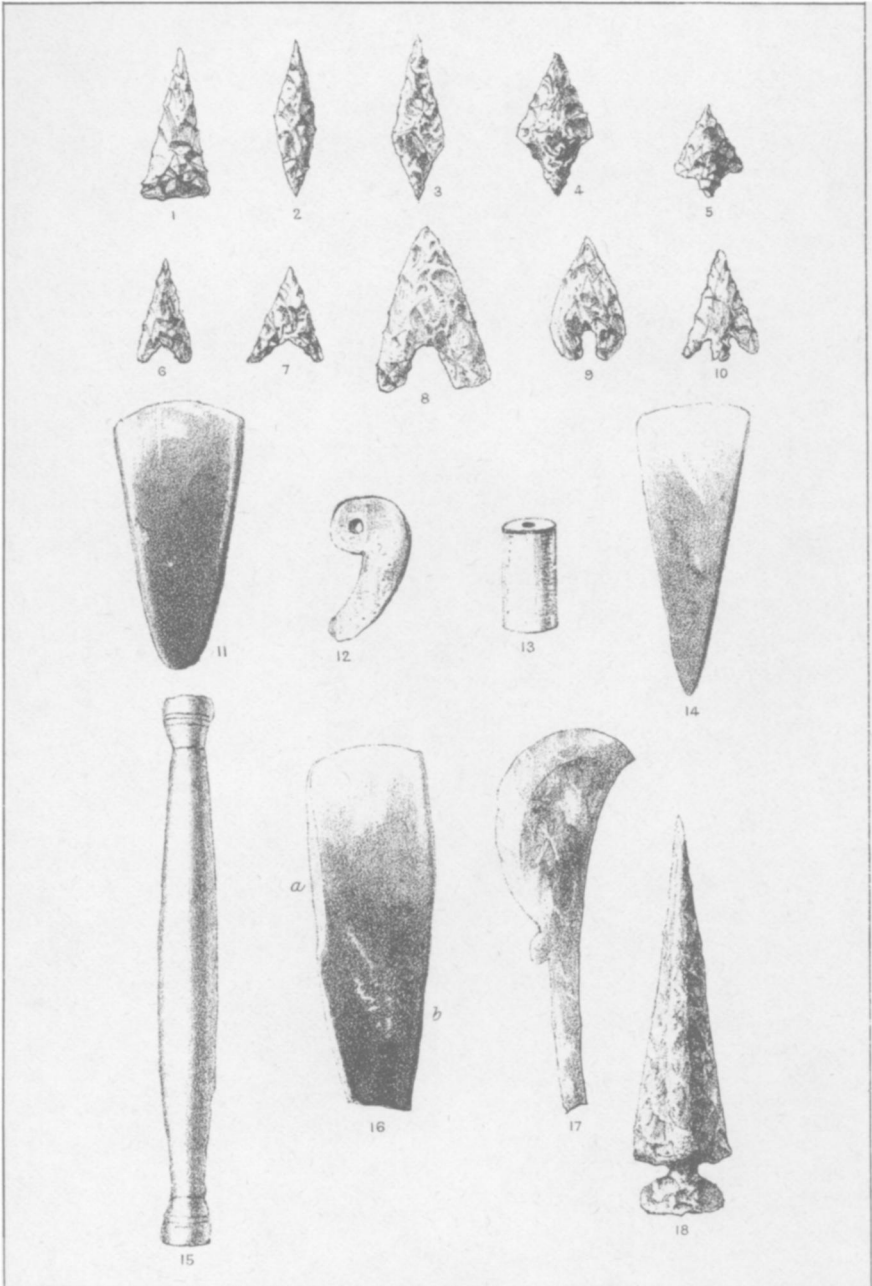
A complete vase which I had the good fortune to exhume when in Nemoro was shaped like Fig. 9. It is 130 mm. high, 85 mm. broad at the mouth, and 55 mm. broad at the base. It has a single cord mark round it, just below the neck.

From the Otaru heap a vase with two necks was dug up.

In some cases pieces of pottery have been perforated. These perforations are conical from two sides, indicating that a rhymer had been used first from one side and then from the other, very suggestive of holes which might have been bored with a flint flake. Amongst the many hundreds of fragments which I have collected, none of them show any trace of having been formed on a wheel, but from the irregularities, their shape, the finger marks, and the internal vertical scraping, they seem to have been moulded by hand.

Most of the vessels are of a dirty yellow colour, and do not show any signs of ever having been exposed to fire. Others are blackened as if by burning. This blackening in many specimens is only on the inner side, whilst the outer surface does not show any such indications.

From many rounded stones, some of which from their bleached appearance seem to have suffered from the action of fire, it would seem that we have indications of processes of cooking or



Theo. Kall & Son, Lith. London.

STONE IMPLEMENTS FROM JAPAN.

of heating the contents of vessels, not by placing them on the fire, but by dropping heated stones into the interior. Whilst the blacked interior of the vessels would suggest that this method of cooking had been adopted, the thinness of the vessels would in many cases forbid the supposition that they had been subjected to such rough usage.

Stone Implements.

The weapons which have been used by the civilised inhabitants of almost every country have a striking resemblance, and in this respect Japan does not offer any exception. If we were to place the arrow-heads and stone chisels or axes found in Japan side by side with many of those which have been dug out in European countries it would be difficult to draw any marked distinction between them.

Comparing the roughly chipped implements with those which are more finely polished it would seem that two periods are indicated, a conclusion which is further strengthened by the fact that these two classes of implements are found in separate deposits.

Baron von Siebold tells me that from the result of his collections the more finely finished implements are more characteristic of the southern parts of Japan, whilst the coarser are found more in the north. Judging from the few implements which I have been fortunate enough to pick up myself, the reverse would appear to be the case. As illustrations I will mention the coarsely chipped celts I found near Macpherson Hill, Yokohama, and the coarsely chipped arrows or spear-heads found at Hakodate as compared with the delicately formed arrow tips which I gathered at Nimeru, in the extreme north-east of Yezo.

Taken as a whole, the arrow-heads found in Japan appear to me to be coarsely made, and specimens which could be regarded as having been carefully and finely chipped are comparatively very scarce.

Arrow-Heads.—The different forms of arrow-heads which I have observed are given in Pl. XVIII. Amongst these there are, first, the *simple points* (Fig. 1). Many of these I suspect are points which have been broken off larger arrows. Secondly, we have the *lancet form* (Fig 2). These are often so tapered that it must have been a matter of indifference as to which end should be chosen for the point. It is probable that this may have been intentional on the part of the maker, who intended that after one end had been damaged, instead of the head being useless, it might be inverted.

These merge through *lancet diamond* forms like Fig. 3, into the *diamond* shape shown in Fig. 4, which in turn merges into the triangular form with a single *tang* as shown in Fig. 5.

These five forms I regard as being variations of a single type which is characteristic of the north. My reason for so doing is because these shapes (in the specimens which I have collected in Yezo) form a graduating series; and although the form of Fig. 2 is vastly different from Fig. 5, yet between the two there are so many connecting forms that it is impossible to tell where to divide the series. Also I may add that at Nimeru I dug up specimens representing the whole of this series lying side by side. The probability is that the explanation of the different shapes is that the maker followed the general form which he obtained from his first flake.

My reason for considering these forms characteristic of the north is because I have only found forms like these in the north, whilst the few specimens which I have gathered or seen from localities farther south are nearly all like those shown in Figs. 6 to 10.

These are of two types. 1st. Those with two barbs formed by the base being hollowed out to form a crescent-shaped opening. Sometimes the entrance to this opening is very wide, as in Fig. 7, whilst at other times, as in specimens from Sado, it is contracted (Fig. 9).

As I have not seen specimens of arrows with these two classes of openings from the same locality it is possible that they represent local varieties.

2nd. There are the varieties with the central tang and two barbs (Fig. 10).

Baron von Siebold tells me that he has found a third type of arrow. This has a rounded blunt top, and he thinks it probable that it may have been used for stunning animals, like the arrows which are used when hunting the sable in Kamschatka.

Of course it is possible that the different types which I have described represent different stages of advancement, but for my own part I should be inclined to think, as I have already expressed, that they represent local varieties, those with a hollow base being found more in the south whilst the others occur in the north.

In order to give some idea of the relative sizes of these arrow-heads and of the nature of the material from which they are formed and the localities where they occur, I give the following as samples from my collection. The length and breadth of the specimens are given by fractions; the numerator representing the length in millimetres and the denominator

the breadth. The shape is given by reference to the figures in the plate.

Yezo, Nemuro.—Types Figs. 1, 2, 3, 4, and 5; Fig. 1, $\frac{3}{8} \times \frac{2}{3}$; Fig. 2, $\frac{3}{8} \times \frac{3}{8}$; Fig. 4, $\frac{2}{4} \times \frac{3}{4}$; Fig. 5, $\frac{1}{1} \times \frac{8}{1}$.

Hard grey slate. Other specimens are of yellow or red jasper, whilst others are of obsidian. Similar types have been collected near Cape Yerimo, near Otaru, and near Hakodate. The thickness of these is about 3mm.

Nipon, Owari, Kasugai-gori.—Types Fig. 7, $\frac{2}{2} \times \frac{5}{0}$; Fig. 9, $\frac{2}{2} \times \frac{5}{0}$. Material: chert, chalcedony, and agate. It will be seen that some of these are short and broad whilst others are long and thin.

Ise. Asakagori. Type Fig. 7. $\frac{1}{1} \times \frac{8}{2}$; material, obsidian.

Ise. Kuwanagori. Type Fig. 11, $\frac{4}{8} \times \frac{0}{0}$; material, black flint.

These are very rough and somewhat lancet-shaped.

Noto. Hagni-gori. Type Fig. 7, $\frac{2}{1} \times \frac{1}{5}$; material, chert. The opening below is very flat.

Mino. Kamogori. Type Fig. 11, $\frac{5}{2} \times \frac{2}{0}$; material, pitch-stone. These are thick and rough.

Omi. Sakatagori. Type Fig. 11, $\frac{8}{8} \times \frac{0}{0}$; material, black flint. These are very roughly chipped.

Omi. Inngamigori. Type Fig 7, $\frac{4}{1} \times \frac{5}{5}$ and $\frac{2}{2} \times \frac{2}{0}$; material, chert. The latter are almost triangular.

Sado, Kamogori. Types Figs. 8 and 9, $\frac{4}{2} \times \frac{0}{0}$ and $\frac{2}{1} \times \frac{8}{8}$; material, agate and chalcedony. These are broad, flat, and thin.

Other provinces in which arrow-heads are found, as given by Dr. Geerts, are Yamato, Mikawa, Totomi, Hitachi, Hida, Shimotsuke, Mutsu, Ugo, Yechigo, Hoki, Idsumo, Sanuki, Hizen, and Higo.

From this it will be seen that flint implements are to be found over the greater part of Japan.

Besides the small arrows which I have described, larger ones, like Fig. 18, are found. It is possible that these larger forms were used for spear-heads or knives: the larger portion of them to prevent their being broken was buried in a wooden shaft or handle.

I may remark that where the arrow-heads are found large numbers of flint flakes and chips are often met with.

Axes.—These are chiefly polished and rounded in outline. The material of which they are formed is a greenish stone, which in the specimens I have examined appears to be a partly decomposed trachytic porphyry or andesite. From this decomposition hornblende or augite has been partially converted into chlorite, and thus the greenish characteristic colour. I have seen specimens from Otaru in form like Fig. 14. Fig. 16 represents an axe which was dug up at Hakodate, and which

is now in the possession of Captain Blakiston. It is 373 mm. long, 83 mm. broad at the sharp edge, which is curved, and 38 mm. broad ; at the opposite end the face is flat, and the other slightly curved. It is about 35 mm. thick. For several inches along its edges it has been slightly hollowed, these hollows being placed at points marked *a* and *b* in the figure, and not exactly opposite to each other.

On one of those faces there is a ridge looking as if it had been cut from a larger block by sawing a certain distance, and then splitting it off as a slab. This runs from the butt 243 mm. along one face. The cutting edge is rounded and sharp. The stone of which it is made is of a green colour, and is probably a chloritic metamorphic slate.

I mention this axe because it appears to be remarkable for its size. The largest axe mentioned by Sir John Lubbock in his "Prehistoric Times" is 13 inches long and $3\frac{1}{2}$ in breadth, whilst this one is $14\frac{3}{4}$ inches long.

Nearly all these axes have a curved cutting edge ; some of the cutting tools which I have classed amongst these axes were only three pieces of stone or slate sharpened to an edge from one side like a carpenter's plane. In other cases the edges are sharpened from two sides.

Scrapers, &c.—The commonest relics of the stone age of Japan are the axes and arrow-heads which I have described. Other implements which probably belonged to this period are various types of scrapers. These have usually a convex scraping or cutting edge. In some cases, however, this edge is straight, whilst in others it is concave. These two latter forms are, however, rude. The writer of the "Unkonshi," a book in which many of these implements are figured, regards these especial forms as having been fashioned to serve as arrow-heads.

These are from 3 to 6 inches in length, and from 2 to 3 inches in breadth.

It is very possible that some of these may have been used as axes. They are, however, exceedingly rough.

Others may have been used as weights for nets. To say definitely the purpose for which these stones have been employed is, however, a difficult matter.

All the weapons and implements which I have thus far mentioned are probably as old as the kitchen middens, many of them being found in them.

Stone Ornaments, &c., of more recent origin.

Besides the stone implements and weapons which I have described, a vast number of stone curios are to be found in the

archæological collections of Japan. As these would seem to be comparatively more recent, and in many cases to belong distinctly to periods which are historical, I will say but little about them.

Fig. 12 represents a small stone known amongst the Japanese by the name of *Magatama*. In shape they are somewhat like the curved canine teeth of many large animals. The end corresponding to the root of the tooth is rounded and usually perforated. In some cases these perforations seem to have been made from the two sides by means of a rhymer with a triangular point. Such a one I have in my possession.

These curiously shaped stones, which are generally about half an inch in length, are occasionally dug up, and examples of them are to be seen in almost every museum in Japan. From their appearance they are probably used as ornaments, and Baron von Siebold tells me that he has in his possession a chinese head-dress covered with similar ornaments.

I have not seen anything of this kind either amongst the Japanese or amongst the Ainos. Amongst the Kuriles I have seen small bone ornaments decorating the end of tassels of similar form.

These *magatama*, so far as I am aware, have not been found in the shell-heaps.

They have often been found in the interior of vases which have been dug up. They are made from various materials such as jade, serpentine, jasper, agate, steatite, &c.

The belief of several Japanese authors is that they were introduced from China, and that they were used as decorations for the gods. They are referred to several times in Japanese history. (See "The Micado's Empire," pp. 46, 53, 93, where references are made to them being used as decorations for the gods, and as being shown in ancient pictures as the decorations of noblemen, one of which is given.)

From these facts, together with the fact that many of them are made of jade, a mineral which is I believe as yet unknown in Japan, we must regard the *magatama* as being an ornament probably derived from China, and certainly historical. This being the case we need not be surprised that the stones have not been found in any of the kitchen middens associated with the stone implements which were used by people from whom we do not seem to have any written records.

Fig. 13 shows a cylindrical bead or *kudatama*. Such beads are from 1 to 7 centimetres in length, and pierced vertically.

It may be remarked that in order to drill the holes through stones like these, those who made them were probably acquainted with the use of metals. The mode of occurrence of these stones

is similar to that of the *magatama*. Some of them, instead of being cylindrical, are in shape like double pyramids.

Fig. 15 represents a cylindrical stone staff or club. At each end there is a knob which is often ornamented. The length of these vary from one to several feet. They were probably used as signs of authority.

It is possible that these may have been used by the Ainos, and may therefore be classed as being relics of the true stone age. I advocate this view because stones like these have been dug up in Yezo in the old camping ground of the Ainos.

In an elaborate manuscript work upon the Ainos written in the year 1800, which has been kindly lent to me by my friend Mr. James Bescett, of Yokohama, one of these stone clubs is figured.

The writer says it was dug up at Nemuro, and was in the possession of an Aino chief named Shokayo, who lived at Riururi, a mountain about 10 miles west of Shibetsu, in Kütapu. He then goes on to say that the Ainos of the present day have in their houses a stick, which in shape is very like this, called "Ukari," and he expresses his belief that this wooden Ukari represents a more ancient form of stone.

Fig. 17 represents a stone implement, measuring from 300 to 400 mm. in length.

As all of these compared with the implements before described are probably of recent date, and so far as I am aware have never been found in the kitchen middens or associated with materials which we know to have belonged to people who inhabited Japan before the present Japanese, I will pass them over. In several native books they have been described, and much of what may be said about them is to be found in "Les Produits de la nature Japonaise et Chinoise," by Dr. A. J. C. Geerts.

The following are some of the deposits with which I am specially acquainted.

The shell-heaps at Hakodate, Nemuro, Omori, and several near Yokohama and Yedo I have personally examined and collected from.

Hakodate.—From the vast number of flint chips and implements which are to be found at and near Hakodate it would seem that this locality must have been a favourite residence of these prehistoric people.

In the roads and lanes leading along and up the face of the south-east side of the mountain, on the face of which Hakodate is built, many obsidian and flint chips, together with a few roughly chipped arrow-heads, are to be picked up. These are best found after heavy rains.

Besides fragments like these near to Yatsugashira, at a height of about 20 feet above the marsh from which the sides of Hakodate mountain slope upwards, I dug out a number of roughly formed arrows, flint chips, and specimens of pottery. Covering the surface of the mountain at this place there is first a covering of grass and bramble.

Beneath this there is a black earth which as you descend becomes lighter and lighter in colour until at last, at the depth of about 10 feet, it is quite yellow. From the fragments of trachyte which this latter contains, it is evidently the result of the decomposition of volcanic ejectments.

In some places the black earth, the colour of which is evidently due to vegetable matter, instead of merging into this yellow subsoil, is interstratified with it, apparently indicating that there had been a series of volcanic eruptions; but between each there had been a sufficient lapse of time for vegetation to grow and form a soil. Imbedded in a series of layers like these, at about 8 feet from the surface, I found a band of shells about 1 foot in thickness. Mingled with these, which were soft and pliable, there was a large quantity of pottery and a few bones.

The pottery which is found in this heap when looked at generally is apparently undistinguishable from that found at Omori and many other places in the south of Japan. It is about a quarter of an inch in thickness, unglazed, and if baked, only very slightly. It represents fragments of vessels of different sizes and shapes. An interesting piece is represented in Fig. 4, Pl. XVII.

The chief markings on the vessels are cord marks, whilst the markings on the Omori pottery are chiefly incised lines.

The stone fragments are chiefly chips of flint with here and there an imperfectly worked arrow. All of these are very roughly formed.

From a number of excavations which were being made in the outskirts of Hakodate whilst building houses, laying out gardens, digging ponds, &c., I also picked up fragments of pottery similar to that which I have described.

In one of these excavations the large polished axe already described was found.

Several smaller axes about 4 inches in length have also been found. The faces of these are generally smooth and convex.

Temiya muru, near Otaru.—At this place, on the ground of Mr. Okumura Hiosuke, a large number of flint implements, arrows, and chisels, together with broken fragments of pottery are to be found in large quantity. Amongst these, two vases were found, one being of the form shown in Fig. 9, Pl. XVII.

One obsidian arrow-head was like Fig. 2, Pl. XVIII.

All were very roughly worked.

Murata.—At this place roughly chipped arrow-heads are found.

Horizima, near Cape Yerimo.—At the back of the town in the small paths, after a shower of rain, many arrows may be found, and in the cliff on the N.E. side of the bay there are bands of shells, and with them fragments of chipped flints.

Nimoro.—This is a recently established settlement at the north-east extremity of Yezo. It is situated on flat ground at an elevation of about 20 or 30 feet above sea level. Opposite to the settlement there is a small island about a quarter of a mile in length and 100 to 150 yards in breadth. At its highest point it is perhaps 30 feet above sea level. This guards the entrance to the open bay along the shore of which the present settlement is built.

On the top of this island, at a depth of from 1 foot to 1 foot 6 inches from the surface, I found a band of shells. This, where it was cut across by the face of a scarp, was 2 or 3 yards in length, and 1 foot in thickness.

Mixed with the shells there were many fragments of pottery, in appearance like that from Hakodate.

Amongst the fragments I dug up a perfect vase.

There were also many fragments of stone and arrow-heads. In most cases these arrows had been chipped from both sides, but in one or two examples the chipping was only upon one of their faces. These arrows were apparently made to suit the flake from which they had been cut.

There were also many stone chippings and also a few irregularly broken stones about the size of a man's fist on opposite sides of which there were two notches which may perhaps have been used as sinkers for nets.

The material of which they were formed was flint. In one or two cases obsidian had been used. Rolled specimens of obsidian were to be found upon the beach.

On the mainland upon the west side of the settlement I picked up one or two similar specimens.

Other persons have made similar collections here, and in the house of Mr. Yamieda, at Nimoro, I saw many specimens.

In conclusion, with regard to Yezo, I may say that it would seem as if it were strewn from north to south with the remains of stone implements. There is, in fact, an abundance which would seem to indicate that the stone age has not long been dead.

Omori, near Yedo.—The shell-heaps at this place are situated on and round the edges of somewhat ellipsoidal mound, which forms a rise overlooking flat rice-ground between it and the sea.

On one side this mound is cut through by the railway to show a section 2 or 3 feet in thickness, which is white with shells.

On another side the mound which is, perhaps, 100 yards in length, forms the side of a small hollow down which, at a distance of from 50 to 100 yards, there is a small stream.

I may here mention that these old kitchen middens or bands of shell, of which I have seen several beyond the bluff at Yokohama, are almost always situated near a small stream or rivulet which probably was the source from which these early people obtained their drinking water.

On the opposite side the upper part of the mound is almost on a level with cultivated ground which rises a little higher to form a small plateau.

The shells cover a great portion of this mound, and in some places they may attain a thickness of 5 feet.

The chief character in this heap is the shells (of which specimens of nearly all those which I have mentioned have been found), the pottery, which is chiefly marked with incised lines, and the split bones.

Suyeyoshi.—There are a number of deposits chiefly situated on the top of the bluffs overlooking the village of Suyeyoshi about $2\frac{1}{2}$ miles distant from the Tsurumi railway station.

On the top of one of these bluffs or ridges, for a length of from 50 to 100 yards, there are vast accumulations of shells, some of which are from 3 to 4 feet in thickness. From the number and extent of these heaps I should be inclined to think that the Suyeyoshi deposits represent the remains of a village. The greater number of these deposits are situated quite on the edge of the hill which has here a sharp descent into a deep narrow valley, the bottom of which is at about the same level as the plain which extends from Suyeyoshi to Omori.

The pottery in these deposits carries more ornamentation than any I have met with in any other deposits. In one of the heaps I found a roughly chipped stone axe. The species of shells were similar to those found at Omori.

Mori, Mississippi Bay.—A heap which I visited at this place, in company with Messrs. Biscett and Pryor, was not carefully examined. It is situated on the bank of a small stream which runs into the sea at this place, and is almost wholly made up of shells.

Many other heaps or irregular bands of similar character are to be observed between this place and Yokohama.

Tumuli.—In many parts of Japan large tumuli, which from their shape and position are evidently of artificial origin, are to be met with.

With many of these traditions are associated, as, for example, the tumulus called "Yezo Mori," at Morioka. This mound is supposed to contain the bones of Ainos slaughtered by the General Tamuramaru.* Others are said to be the graves of chieftains.

On the summits of some of these trees have been planted.

Other tumuli again seem to be even without tradition, as, for example, Macpherson's Hill, near Yokohama.

This is 20 or 30 feet in height, and perhaps 50 or 60 yards in diameter. Whilst digging out the side of it my companions met with one or two roughly-chipped celts.

Along many of the country roads as, for instance, the Nakasendo, large tumuli are to be seen. So far as I could learn by enquiry, when travelling on that road in 1878, these appear to be either marks indicating the boundary between various villages or else they were indications of distance like our mile-stones.

The exploration of tumuli like these would probably be unprofitable, but others of which there are so many might yield valuable results.

Caves.—In many portions of Japan there are caves, especially in the limestone districts. Several of these near Jadotsu, in Shikoku, I explored. They were long and narrow. I did not find anything which told of their having been ever tenanted either by man or beast.

Besides natural caves like these, there are in Japan many artificial caves, as, for example, one not far from Totsuka, on the left side of the road leading from Yokohama to Fujisawa. This cave, which contains many passages and chambers, is cut out in a soft grey tuff, the characteristic rock of the neighbourhood. On the walls there are many Japanese inscriptions. This cave is probably very recent.

However, near Kumagaye a number of small caves or chambers have been discovered and partially explored by Baron von Siebold, who, from pottery and other evidence which he found, regards them as being undoubtedly of Corean origin. Similar chambers which may perhaps have been burial places are supposed to exist near Odawara. The names of places in these

* Tamuramaru was a son of Xaritamaru. During the year of Yinriaku (782–806) he was promoted to the rank of Ju-goi, and was made a general of the Imperial guard. After his promotion he proceeded as far as Mutsu or Oshiu where he conquered the tribes (whom the Imperialists of that time called Yebisu or savages) now known as Ainos. After his triumph he was again promoted to the rank of Shō-sammi in the second year of Taidō (808).

In the second year of Konin (812) he died in his 54th year; and was buried in the village Awasumura in the county of Uji. (Odaï-ichiran—Chronological History of Japan up to the present time.)

localities also indicate Corean occupation. That in former times there have here and there been colonies of Coreans settled in various parts of Japan is strengthened by the fact that a remnant of these colonies still exist in Satsuma.

They came over in 1598 as potters and settled in Kagoshima and its neighbourhood, where they may still be seen exercising the old art for which they were so famous.

For their history, see "The Korean Potters in Satsuma," by E. Satow (Trans. Asiatic Soc. of Japan, February 1878), where reference is made to several other colonies of earlier date.

In Japanese history it is stated that (see "Nipon ôdai-ichiran, or Annals of the Emperors of Japan") Kaibara Tokzin, the author of a history of the origin of the Japanese, cites in the place where he speaks of the first human habitation a passage from Souken, another Japanese writer, who says, "After the creation of the world men dwelt first in the open air, but being exposed there to the effects of the wind, the rain, and heat, necessity taught them to hollow out caverns in which they preferred dwelling, in spite of the dampness of the earth which caused them maladies." Souken adds that he has travelled through the whole of the empire, that is Japan, to examine the different localities. It is on the escarpments of the mountains, and above all in places most distant from towns where he found a great number of caverns. The interior of these were furnished with large stones. These caves had their openings from the southern side, and were generally composed of two or three compartments.

The better ones are in the province of Kawachi, near to the banks of the Fatorigawa, the foot of the mountain Ikomagadake, and also in the canton of Yamabenokori, in Yamato. All appeared to have been inhabited. . . . Kaibara Tokzin speaks of having travelled in the province of Chikuzen, and having discovered there many millions of caverns, disposed in groups varying from 6 to 20.

Natives of neighbouring villages explored them, and took the stones to form the foundations of their houses, drains, dams, &c.

All the caves were opened towards the south (therefore probably artificial).

It was first thought that they were used as tombs, but on examination Kaibara Tokzin did not find any bones, therefore he gave up this opinion and says that he is convinced that originally they were inhabited.

Besides the caves which I have mentioned, I may also mention the following:—

Miyazake, between the provinces of Kadsusa and Shimosa;

many of these are used as storehouses by the people. My informant, however, did not remember whether they are natural or artificial.

Shiba Nihonyenoki Borayo Kochô, Yedo, in the grounds of the Zempukuji Temple. Length unknown, but probably 250 yards (to the sea). This cave is said to be natural.

Enoshima Island.—Here there is a natural cave worn by the sea along the line of a fissure. In the interior there is at present a small shrine.

From what I have said about caves in Japan, although so far but little has been obtained from them, it is more than probable that they offer as wide a field for the research of the cave-hunter as caves do in any other country, and from them a rich harvest of facts relating to prehistoric times has yet to be reaped.

In concluding my remarks upon these stone antiquities, I may mention that in Japan many collections of them have been made, and much has been written.

The Japanese, who treasure everything that is antique, are by nature archæologists, and amongst them, if statistics could be made, I think we should find a larger number of persons who have a taste for gathering together that which is old and strange than we should meet with in any other country.

Unfortunately the archæology of Japan seems as yet to hold the same position to the archæology of Europe that modern chemistry does to alchemy, or astronomy to astrology; the science, although deeply studied, and containing in it, even as it stands, much valuable material, seems hardly to be yet aiming in the right direction.

Arrow-heads and celts are collected, wrapped up in silk, and are highly prized as curiosities of great value. The taste for collecting, however, does not end with objects such as these, and the archæologist brings into his collection stalactites, curiously formed concretions, and weathered stones, all of which seem to be ranked as freaks of gods or nature.

Notwithstanding the fact that much valueless material has been collected with that which is truly valuable, to one who had time to ransack the museums, of which both public and private there are a large number, and to gather together and then sift the vast amount of literature which exists upon these subjects, the results obtained would form a valuable prize.

PART II.

Comparison of the Markings on Pottery with the Modern Art of the Ainos.

I am told that a comparison between the modern art of the Ainos and the ornamentation which we see upon the pottery of the kitchen middens has already been made, the conclusion being that the two are very similar. Unfortunately I have lost the reference to the paper in which these comparisons are to be found.

However, as the materials which I have, for the purpose of making such comparisons, are those which I personally collected when amongst the Ainos, or exhumed from the kitchen middens, they are, in every probability, somewhat different from those which have been previously adduced; and I therefore venture to offer them as fragments of original material, in addition to those which have previously been given. First, I may remark that the drawings which I have given are those of fragments which are of common occurrence, and therefore it is very probable that the markings on them are typical of the art practised by those who made them.

Fig. 1, Pl. XVII, shows a characteristic surface which was given to the pots. As this was due to some process in the manufacture which was probably unavoidable, it must not be looked upon as having any connection with markings which were placed upon the porcelain for the purpose of ornamentation.

Looking at the other markings we see that they consist of lines and curves, forming geometrical patterns, a character which at once excludes the originators of these markings from any of the northern tribes like Esquimaux, whose ornamentation usually consists in the representation of animals.

From the general character of the ornamentation we should say it was of Polynesian origin, where geometrical patterns are so characteristic.*

From the markings on sheaths of knives, and various instruments and utensils, together with the embroidery on clothes which are used amongst the modern Ainos, we should say that they also were of a southern type.

Horizontal lines filled in with diagonal lines as shown in

* See "Origin of Civilization and the Primitive Condition of Man." Sir J. Lubbock, chap. ii.

Fig. 5, Pl. XVII, are exceedingly common in the carvings of the Ainos. The tattooing on the hands and wrists of the Ainos also consists of diagonal lines of this description.

The pattern shown in Fig. 6—that is, series of parallel lines either straight or curve, arranged in groups to slope in various directions, and used to fill up spaces between horizontal lines or corners—is also exceedingly common.

In modern Aino art there are many traces of their connection with the Japanese to be observed ; thus you meet with the “Kiku-nomon” or chrysanthemum crest of the Mikado, also the “Tomoyemon,” a crest composed of three coma-like figures.

In Fig. 2 a zig-zag pattern is shown. This is met with either in lines or dots. Patterns similar to these are also to be met with, as, for instance, in the carvings which are sometimes fixed upon the prow of their boats.

In addition to the patterns of pottery which I have given, a diamond form is not uncommon, an exact repetition of which is sometimes met with in their embroidery.

Continuous lines of scrolls are common carvings on strips of wood and on the lower edges of their coats. Lines of loops are often repeated, as are also the elliptical forms of Fig. 7.*

Another common series of figures amongst their designs are variations of the key pattern. These are to be seen as carvings, and also on the upper back parts of their coats. This class of pattern I have not yet met with in the pottery.

From these few examples which I have given, it would seem that the common patterns found upon the pottery are still common designs amongst the modern Ainos.

It may, of course, be argued that the style of ornament which has been here spoken about is common to the primitive art of many nations, and a key pattern is as characteristic of archaic art as it is of Aino. Nevertheless, if these fragments point to anything at all, it is likely that they point more towards the Ainos than they do to any other source, and this more especially when we remember that they are found on ground which we know to have been inhabited by the Ainos.

Historical and other evidence of Japan having been inhabited by the Ainos.

Before forming conclusions on the variety of archæological material which has been exhumed in Japan, it would be well to look to the history of the country. If we do this, we shall find

* Many combinations of these curved forms as, for example, the loops shown in Fig. 8, are to be seen on the carvings on the exterior of their wooden coffins.

that the originators of these materials were perhaps not so far outside the pale of historical record as at first sight might have been imagined.

From history we know that during the first century Japan was invaded from Kiushin by Jimmu Tennô, a man who is regarded as the first Emperor of the country. This was about the year B.C. 660.* The people with whom he fought are regarded by the Japanese as being Ainos, or as they were then called Ebisu, or barbarians. This is confirmed by the history of subsequent periods, which narrates how the Japanese warred against the Ainos until the end of the 12th century.

At the 4th year (A.D. 110) of the reign of Keikô-tenno, 12th Emperor, Yamatotake-no-mikoto, formerly called Ousunomikoto the Prince, invaded the eastern barbarians, by order of the Emperor, and made them surrender, and tranquilized the countries. These would probably be the people who lived near modern Yedo.

Previously it has been mentioned how these barbarians (or Ainos) were slaughtered by Tamuramaru in the eighth century.

Traces of this early occupation of the main Island of Japan by the Ainos is to be seen in the faces of some of its inhabitants, in the names of places, and in the language of the people, especially those in the north.†

It would, therefore, seem very probable that Ainos not only lived in Japan in historic times, but also in prehistoric times, and as we cannot compare the relics which are found with anything that is Japanese, it would seem that we should not be acting rashly if we ascribed them to the Ainos.

The chief objections which have been made to this conclusion are—

1st. The Ainos are not essentially pot-makers, and the art of pot-making when once acquired is never lost. This objection, which has been made by Professor Morse, is, I think, without any substantial foundation.

When I was in Yezo I made many inquiries about pot-making amongst the Ainos. Up the river, which runs into the sea at Nekap, Mr. Maries, a botanist, who has been travelling in that district, told me that at the houses of the Ainos he saw

* In Japanese history this appears to be an accepted fact, but whether it will bear a critical examination is as yet a matter of doubt.

† I am told by Japanese scholars that the change in the names as you travel northwards is particularly observable. For instance, you meet with the Aino words "bori," meaning a mountain, and "bets," a river as in Imabetsu; and what is more, these words terminating in consonants instead of vowels which are so characteristic of the Japanese names, become more numerous the farther you travel northwards. Indications of the former inhabitants are also often to be found in the Japanese names themselves, as, for instance, Ebisuminato, the harbour of the barbarians in Sadc.

clay vessels, which, so far as he could remember, were very similar to the fragments which are now dug up, and also that he believes that in this district the Ainos still manufacture their own pottery.

To this I may add that several books written about the Ainos distinctly state that these people are pot-makers. The following is a translation from one of these books:—

“The iron vessels which are used by the Ainos are chiefly those which come from Japan. But in the interior, vessels which are made by the natives are used. The size of them may be large or small, and they are, on the whole, similar in their shape. One kind of earthen pot which is made by the natives, is about 6 or 7 inches in diameter. As shown in the figure, handles are joined to the inside of the pot on both sides, so that the ropes which are tied on to the handles may not be burned when the pot is suspended above the fire.

“As Rinzo (another writer on the Ainos) has described the making of pots in detail, we omit to say more here.”

From this we see that the Ainos are still pot-makers, but what there is left of this art is only a remaining trace of an industry which was once more extensive. Because the Ainos are diminishing in number the demand for pottery has gradually become less; and, secondly, because the Ainos have daily become more and more connected with the Japanese, from whom they could obtain better and cheaper utensils than those they could manufacture themselves, are sufficient reasons to explain why the art has gradually been waning, and under exceptional circumstances like these, when we remember that the cultivated Venetians have forgotten so much of their art of glass making, and the Romans of their pottery, I see no reason why we should not find, now and then, an example of an art like pottery being entirely forgotten, whilst the evidence of the art, in the shape of broken fragments, remain to attest its former existence.

2nd. That these heaps show evidence of cannibalism, and that there is no record of such a habit amongst the Ainos.

In reply to this, all I can say is that, so far, the only evidences of cannibalism are those found by Professor Morse at one heap at Omori. Although diligent search has been made by several persons interested in these enquiries, amongst whom I may mention Baron von Siebold, Dr. Naumann, and myself, not only in the Omori heap, but in many others, not a trace of similar evidence as has yet been found. Is it not possible that these bones described by Professor Morse have been gathered together by accident in the particular portion of the heap which was examined?

If this is so, we must refrain, for the present, from forming any universal conclusions. Should it be found after further examination that Professor Morse's discoveries repeat themselves, all that we can then do is to conclude that those who fed on the shells also fed on human flesh;* and if the Ainos were the people who fed on these shells, it is probable that the Ainos once were cannibals.

Marco Polo shortly after, speaking about Chipangu (Japan), speaks about the islands in the sea over against Manzi, or the Sea of China, where he says about prisoners who cannot pay a ransom, that the man who has the prisoner, "summons all his friends and relations, and they put the prisoner to death, and then they cook him, and eat him, and they say there is no meat in the world so good" ("Travels of Marco Polo," vol ii., p. 209).

Whether Japan is here meant or not it is difficult to say. The probability, however, is that he refers to some of the islands further south, as, for instance, in Formosa, the inhabitants of which place, we know, are not above suspicion of having now and then displayed a taste for the human species.

If the Japanese were ever cannibals, it is in all probability so very long ago that all record has been lost.

When we consider that races which are sufficiently low to practice cannibalism are usually too low to keep records, it is not astonishing that this blemish on the character of a people, from which some of the most civilized of European natives do not seem to be altogether free, should very often be lost.

Professor Morse says, as the result of repeated enquiries, that not only were the Ainos "not cannibals, but they are reported as being so mild and gentle that murder was never known to have occurred. So monstrous a habit would certainly have been known and recorded, particularly in the painstaking annals of early historians." In reply to this, all that I can say is, that from enquiries made by myself amongst Japanese scholars, it is found that the Ainos, although so gentle at the present day, carry in their history traces of as ferocious a nature as is met with amongst the savage tribes of other countries. What should we think of a race who punished robbers by cutting off their feet at the ankles, and who, as a mild form of punishment, boiled the arms and sliced the noses of their victims?† Pro-

* It may be possible that the makers of the shell-heaps were careless of the bones of their deceased friends, like some of the modern Esquimaux. Parry saw human bones in the middens of these people.

Sir John Lubbock, in his "Prehistoric Times" (p. 410), speaks of the indifference shown by certain of the Esquimaux with regard to the burial of their dead, and he says "they leave the human bones lying about near the huts, among those of animals which have served for food."

† For this information I am indebted to Baron von Siebold, and I may add

fessor Huxley says that in the "early ages of the world, the first impulse of man was not to love his neighbour, but to eat him." When we remember the primitive state in which we find the modern Aino, and then hear of the barbarities which, in times not far remote, he was capable of practising, it seems as if a slight step would be sufficient to carry the modern Aino back to a state of savagery, from which even the early inhabitants of Britain do not seem to have been exempt; and although we have no direct proof of cannibalism to bring against the Ainos, to suppose it possible that cannibalism may have existed amongst them in early times, is not a suggestion without foundation, and this more especially when we remember that the countries of the Pacific represent an area where cannibalism has in latter days been, as compared with other countries, at a maximum.

Coreans and Kamschadales in Japan.

From the undoubted fact that the Ainos were the predecessors of the Japanese in Nipon, it seems highly probable that the remains of which we have been speaking may be regarded as their spoil.

The question next arises as to whether traces are to be found of any other people besides those who have left so many monuments in the form of kitchen middens. This is to be answered in the affirmative.

Already I have given evidence of the existence of colonies of Coreans, a remnant of whom are to be seen plying their old trade, and still capable of speaking their old language in Satsuma.

To these I would also suggest that it is extremely probable that Japan had inhabitants not only coming from the south and west, but also from the north. There were Kamschadales, or Alutes.

that the modern Ainos have still a practice of punishing a man who is guilty of wrong by beating with clubs, which is at times, in an individual who is not strong, sufficient to cause death. This practice is called "Ukari" and in many of their houses I am told that the club, about 3 feet in length, which is used for this purpose, may be seen.

In the 9th volume of the "Hokute Kijiriaku" (an account of the northern savages), a long account is given of the massacre by the Ainos of more than 400 Japanese merchants, most of them being killed whilst sleeping. This savage slaughter, which was committed by a tribe called "Shamushain," appears to have been solely for the sake of plunder. It took place in July 1670.

In the "Yezo-ki" ("Record of Yezo") it says that it is not uncommon for an Aino to have six or seven wives. These wives do not live altogether but in various parts of the country. Should any of these women be violated the punishment inflicted upon the evil doer is to tear the hair from his head until not a single hair remains.

If we look at a map and see the chain of islands which connects Kamschatka with Japan, and then remember how the few inhabitants who yet remain upon them continually migrate from one of these islands to another, we see that the supposition is not beyond the pale of reason.

On the island at Nemoro there are a number of more or less rectangular pits. In most cases the sides of these have fallen in, so that they appear like rounded hollows.

Owing to the long grass which covered these at the time of my visit, I was unable to count their number, but there were perhaps twenty of them.

Groups of similar pits are to be observed at Hochishibets, and also between it and Hamanaka.

These pits were first observed by Captain Blakiston.*

When I visited the Northern Kuriles in 1878, I there had opportunity of examining many of the houses of the Alutes, and of a tribe of Kamschadales, who call themselves Kurilsky. The settlements of these people consisted of groups of half underground houses,—rectangular pits covered with a roof. One of the settlements which I saw in the Island of Shimushi was deserted, and many of the roofs had fallen in.

The similarity of these pits with those seen in Nemuro, suggested the idea that these latter might at one time have served as houses, and it is certain that if the deserted settlement which I saw at Shimushi was visited by some traveller 100 years hence, it would be extremely difficult to distinguish between it and many of the groups of pits which are to be seen in Yezo.

So far as the evidence goes, it therefore does not seem improbable that there was a time when these underground dwellers of the north extended much further south than they do at present.

When these Yezo pits have been carefully explored, further evidence may be adduced to substantiate this surmise.

Position of Shell-Heaps.

All the shell-heaps which I have seen are at a slight elevation above the present sea level. Thus, at Nemuro, although they are close to the shore, they are at a height of 20 or 30 feet above it. At Hakodate they are about the same height above the sea

* In a paper written by this gentleman in the proceedings of the Geographical Society, July 27, 1872, I searched in vain for a reference to these pits. In all probability this interesting and valuable information was struck out in the mutilation which this paper appears to have undergone in order to reduce it to the form in which it now appears.

level, but situated so that they overlook the marshy ground which at this place forms portion of the low peninsula which connects Hakodate Head with the mainland.

At Omori the heap is at about the same elevation, but situated at a distance of about half-a-mile distant from the present shore line. The same remark applies to all the other heaps in this district. As these ancient people who have left these relics behind them subsisted to a great extent on food obtained from the sea, it is very probable that when heaps like those at Hakodate and Omori were formed they were much nearer to the seaboard than they are at present.

This view is confirmed by the fact that all the fishermen of the present day live between these heaps and the sea, and the greater number of the modern kitchen middens of Japan, which are also made up of shells, are to be found near the shore. This being the case, it is probable that since the time when these heaps of which we speak were formed, either elevation or a filling up of the sea by the deposit of materials must have taken place, and of both these actions I think we have substantial geological evidence. As at some future time I hope to speak of both these phenomena more in detail, I will now only state the evidence I have collected in its briefest form.

Evidence of Elevation and Silting up in Yedo Bay.

The upper portion of Yedo Bay is extremely shallow—so shallow, in fact, that if you do not know the direction of the few channels which exist, it is extremely difficult to traverse it for several miles out from the shore, even if you are only in a small rowing-boat. Large ships cannot come up to Yedo, but have to anchor 5 or 6 miles distant from the city, at a distance of about 3 miles out from the nearest land. The general depths as given on a chart of this portion of the bay are from $\frac{1}{4}$ to 4 fathoms.*

The bottom of the bay is made up of silt and mud, identical in appearance with that which we see brought down by the muddy waters of the many rivers which enter it. These are large and,

* From Yedo going in a S.S.E. direction towards the middle of the bay you find the depths as follows :—

| | | |
|-------------------------------------|----------------------------------|-----------|
| For the first $2\frac{3}{4}$ miles, | a depth of from $\frac{1}{4}$ to | 1 fathom. |
| „ next $\frac{3}{4}$ „ | „ „ | 1 to 3 „ |
| „ „ 1 „ | „ „ | 3 to 5 „ |
| „ „ $2\frac{3}{4}$ „ | „ „ | 5 to 10 „ |

At this point you are about half-way across the bay ; the greatest depth is about 12 fathoms.

considering that their lower course is across the Yedo plain, generally appear to be heavily charged with sediment, and it is no doubt to them that we must look in order to find an explanation for the sediment which in places visibly accumulates even in the lifetime of an inhabitant. When measurements of the water which annually is poured into the bay by these rivers and of the vast quantity of mud which they carry in suspension have been made, it will in every probability be found that sediment is accumulating in Yedo Bay at a rate equal to, and may be even greater than, that which has been observed in many great rivers like the Nile or Ganges.

Not only is the bay being in this way silted up, but it is also probably becoming shallower by a rising of the land at several places round Yedo Bay. Pholas borings have been observed at heights considerably above the present watermark.

As one example of these I may mention borings in the cliffs in the eastern side of Mississippi Bay, near Yokohama. Another example I observed in the cliffs beyond Yokoska. These latter are about 10 feet above high water-mark.

These markings very clearly point to the fact that one of the last movements of the land near Yedo was an upward one.

Now, if we put these two agencies together, we ought in Yedo Bay to find evidence of a rapid encroachment of the land upon the sea.

That this is actually the case we need not go further than history and old maps.

Quite recently in the "Nichi Nichi Shinbun" (*The Times of Japan*) a reprint of an old map was given. The date of this was 1459. From this map we see that only 400 years ago the sea reached over many districts which now are land. Asakansa is on the seashore and much of Fukagawa is beneath the water

This encroachment was not only over the lower ground near Yedo, but also over the ground near Kanagawa, near Yokohama.

In history we read that junks came to Asakusa, now one of the most populous districts in the centre of Tokio,* and as a preservation of this fact a seaweed used as food by the Japanese is called Asakusa-nori, from the place where it was originally collected. In the Asakusa Library maps are given of the following dates: 1635, 1661, 1673, 1690, 1717, 1718, 1732, 1752, 1787, 1848, and recent ones. By comparing these together,

* It is said that at the time when many of the deep moats which intersect various parts of Tokio were dug, the material was used to reclaim a portion of the bay. These sections, however, show a truly stratified series and not a deposit which we should expect to find in land which had been artificially formed by the filling in of earth.

and also with the map of 1459, the gradual changes which have taken place may be learnt.

In the map of 1655 many of the chief features which exist in the city are to be recognised.

Thus the Ginza, and the first canal running parallel with it, are shown as being quite close to the bay, whilst at present the distance to the sea is at least 800 yards; that is to say, the land has advanced at this place at the average rate of about 3 yards per year.

In other parts similar changes have taken place, but apparently at a different rate.

That much of the lower portions of Yedo plain were in recent times covered by the sea, or else have been formed like a delta from the accumulation of mud, is seen from its geological character, and also from the numerous loosely stratified beds of shells it contains, all of which, so far as I can judge from a number which I have collected, do not appear to be different from those now living in the bay.

As examples of the structure of the low ground near Tokio, I give the following sections obtained from borings near the Naval College:—

| I. | | | | | | | |
|-------------------------|--|-----|-----|-------------------------|------|-----|-----|
| | | ft. | in. | | | ft. | in. |
| Alluvium | | 7 | 5 | Sand compact | | 25 | 1 |
| Mud.. .. | | 14 | 5 | Compact sand | | 31 | 1 |
| Mud and shells | | 17 | 0 | | III. | | |
| Compact clay | | 25 | 6 | Alluvium | | 7 | 0 |
| Sand.. .. | | 30 | 0 | Mud.. .. | | 10 | 0 |
| Mud and sand | | 39 | 2 | Mud and shells | | 20 | 3 |
| Compact sand | | 44 | 0 | Compact clay | | 25 | 8 |
| Sandy clay | | 46 | 3 | Compact sand clay | | 30 | 6 |
| | | | | Compact sand | | 32 | 6 |
| II. | | | | | | | |
| Alluvium | | 5 | 4 | | IV. | | |
| Mud and shells | | 7 | 4 | Alluvium | | 8 | 2 |
| Mud.. .. | | 12 | 9 | Mud.. .. | | 23 | 3 |
| Sand.. .. | | 14 | 1 | Compact clay | | 28 | 8 |
| Mud and sand | | 16 | 2 | Compact sand | | 30 | 6 |
| Compact sand clay | | 17 | 7 | | | | |
| Compact clay | | 22 | 4 | | | | |

The beds of mud which are mentioned are extremely soft, and altogether like that which forms the bottom of the bay.

Evidence of Elevation in Yezo.

Round the greater portion of the coast of Yezo there are long lines of terraces or old sea cliffs. Many of these have a steeply sloping face. They are usually about 20 feet in height, and are long and very regular.

In many places they are so prominent that they cannot fail to attract the attention of every visitor.

I have chiefly observed them near Hakodate, round Volcano Bay, and on the south part of the west coast, but they exist in many other parts round the island.

The terraces near Hakodate seem to be of marine origin, and Mr. B. S. Lyman suggests that they may have been formed when the sea between Yezo and Nipon was a closed basin in which the water was standing successively at different heights. (*See* Prelim. Report "Geological Survey of Yezo," p. 16, by B. S. Lyman, 1874.)

If the water between Yezo and Nipon ever existed as a closed basin, the sea must either have washed its barriers away, or else subsidence must have taken place. If barriers ever existed, it is probable that traces of them should yet be indicated upon charts.*

If we look at a chart we see that the shortest distance between Nipon and Yezo is about 11 miles, and the greatest depth is 120 fathoms; and no soundings seem to indicate the former existence of a barrier. Nor do I think that any former land connection, such as the closed basin would imply, has been removed by subsidence.

If we compare the flora and fauna which exists in the two sides of these straits we find in the southern portions of Yezo the woods almost wholly composed of hard wood, whilst in Nipon conifers are abundant.

This is a great distinction, but it is so evident that it is remarked by almost every visitor.

In Nipon we find a sheep-faced antelope or goat, a monkey, and a black bear, none of which exist in Yezo.

In looking over the list of birds published by Captain Blakiston and Mr. Pryer (*see* "Ibis," 1878, pp. 209-250), I observe that many distinctions are to be made between the avifauna of the two islands.

For example, the jays and woodpeckers are of different species.

In Yezo there is a birch grouse, which is not to be found in Nipon.

Ptarmigan are only found in Nipon, and the same may also be said about pheasants, which are not to be found in Yezo.

Looking, therefore, first at the depth of the channel between Yezo and Nipon, and, secondly, at the great differences existing between their fauna and flora, it is probable that it is a long time

* At the eastern entrance to the Tsugar Straits, which separate Nipon from Yezo, there is a depth of 102 fathoms; at the western entrance 67 fathoms; and 102 in the middle.

since the two were connected; and, therefore, rather than imposing upon ourselves the difficulty of explaining the existence or the disappearance of a barrier of land, it is easier to imagine the lines of terraces to represent so many old sea cliffs which have been produced during elevation.

If sediments have been deposited, and if elevation has taken place, it is now easy to understand the meaning of the positions which are raised above or lying back from the present water line, in which we find these ancient middens.

Evidence of the encroachment of the land upon the sea during recent years is to be seen in an old map of Niigata. Details of this map, which is in the possession of Mr. Troup, who at the time of my visit to the West Coast was Consul at Niigata, I have not been able to obtain. The encroachments, however, were so great as to attract the attention of the Local Government, who in consequence organised a fresh survey of the ground, in order to regulate the taxation of the farmers who in many cases were paying for a much less area than they actually possessed. In this map a great portion of the ground in which Niigata stands is represented as an island.

Parallel to the coast of Niigata, a line of sand hills seems to mark an old shore.

To a large extent all this encroachment of the land upon the water will be due to accumulation of sediment brought down by the Shinanogawa.

I may also mention that old maps of Osaka, one of which I have now in my possession, show evidence of similar alteration.

Evidence of this sort, which is obtained from all maps of places like Yedo, Niigata, and Osaka, shows that the land has been gaining on the sea. The raised Pholas borings at Yedo indicate to us that this has been partly by elevation. Accumulating sediment has assisted this action. At Niigata and Osaka we have only evidence of accumulating sediment. During this accumulation it is possible that elevation may have been going on, because the increase of land has been so rapid; but under no circumstances could we well suppose that depression had taken place.

Age of the Omori and other Middens.

Already I have given the rate at which the land has been gaining in the sea at one place in Yedo as being three yards per year. If I take a number of other points I obtain a series of results varying from a few inches up to four or five yards per year. Now, if I consider that these shell-heaps at the time of their formation were on the seaboard, and I measure the distance

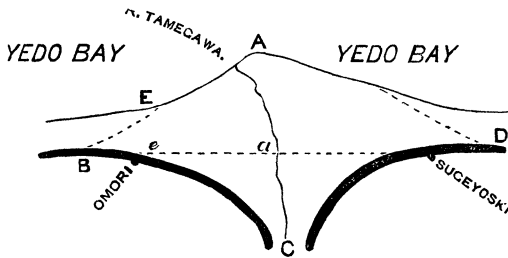
which they are now removed back from it, having a rate at which this material accumulated, I have the means of approximately calculating the number of years which have elapsed since the formation of these heaps.

The chief source of error in this calculation will lie in the manner in which the rate of increase is reckoned.

It would seem that the rate of increase must either be observed or else calculated for the line between each shell-heap and the sea. On every delta it is probable that the rate of increase along similar lines will follow the same rule, but the rule for any particular delta will depend upon special circumstances.

This I will illustrate by the Omori deposit, which lies on the edge of a delta formation at the mouth of the River Tamagawa.

Here the delta has the general form A, B, C, D . The thick curved lines BC and DC represent bluffs or scarp, which apparently mark the old shore line.



Since the delta reached the dotted line BD , the point A has advanced at a greater rate than any such point as E .

In fact the rate of advance along eE is to the rate of advance on aA as $\frac{eE}{aA}$ or $\frac{Be}{Ba}$ or $\frac{BE}{BA}$.

In other words, in all probability eE took as long to deposit as aA .

Now assume that aA was deposited at the lowest rate which I can with any accuracy determine for advance under similar conditions in Yedo Bay. This rate is two yards per year, and it is measured on the delta of the Sumidagawa.

As measured from a chart, $Aa = 6,160$ yards, and to form it at the rate of two yards per year, gives a period of 3,080 years.*

If I had been able to determine the rate of advance on the Tamagawa itself, which is a large river bringing down vast

* At rates of three, four, and five yards per year, the periods become respectively 2,053, 1,540, and 1,232 years.

quantities of sediment, the result would probably have been even less.

The period would also have been less if I had taken an average rate of advance, or in fact any higher rate of advance than the one which has been used.*

CONCLUSIONS.

From the facts which I have collected together in the preceding pages I am inclined to ascribe the origin of the greater number of the older relics, more especially those exhumed from the kitchen middens, to the Ainos.

My reasons for doing this are, first, we have historical evidence showing that in olden times, when the present Japanese came to Nipon, they found it tenanted by Ebisu or barbarians, whom they recognise as the ancestors of the modern Ainos.

Year by year the aborigines were driven step by step towards the north. About the year 800 they were struggling near Morioka, and by the year 1200 they seem to have been practically exterminated from Nipon, and those which remained or had taken refuge further to the north in Yezo were completely subjugated.

In early times, that is a thousand years ago or so, Ainos lived in the districts where the kitchen middens are found, and they still live where similar middens are found in Yezo.

It is therefore probable that the Ainos are the people who have left these traces behind them. This is confirmed by the nature of these traces. The pottery which is found in the middens is such as could be made by a barbarous people.

It does not seem possible, so far as I am aware, to identify it with anything which is Japanese, whilst its ornamentation is very like that of the modern Aino.

Then there are the stone implements. These also may have been Aino, stone implements having been used amongst the Ainos up to a period which is quite recent.† In confirmation

* From this we see that geological reasoning brings us to the conclusion that at a period—at the greatest estimate 3,000 years ago, and at the least estimate 1,500 years ago—the Omori deposit was on the seaboard. History tells us that about 2,500 years ago Jimmu Tenno came to Japan and fought against the Ainos. It is therefore very probable that the Omori deposit was formed about the period when we know from history that Japan was inhabited by the Ainos.

† In going through the museums in Yedo, amongst the flint arrows, the chisels, the *nagatamas*, some of which are 6 inches in length, the circular stones with central depressions like “chipping stones,” and other ornaments and implements, I have seen many old articles of bronze, as, for instance, spear heads. What the history of these is I do not know, but they probably indicate a period perhaps corresponding to our bronze age.

of this I may quote the following passage taken from a Japanese MS. book written in the year 1800. The writer, whose name is omitted, is describing the stone implements which have been found in Yezo. The subject of the book, of which there are many volumes, is the Ainos.

He says: "A chief called Shongo, of Nemuro, told me that in old times, when there were no cutting tools of metal, the people used stone tools. The stone they employed was called 'aji.' It is of a black colour. There is a sort of hard stone called 'ironstone,' which is also used. Even now tools of this description are used by those who dwell far in the interior."

Secondly, we observe that where heaps of shells like those forming the kitchen middens were formed, they must have been near to the sea, just as the modern heaps are; and if we turn to geological evidence, we see that, less than 3,000 years ago, heaps like those at Omori were in all probability on the seaboard, and that previous to such a period such spots like these, unless we imagine discontinuity in the working of the geological agencies, which we see at present, could not have been inhabited because they would have been more or less submerged.

Therefore the probability is that these middens were not formed either before or after the time when the place where they exist was inhabited by Ainos.

History and geology support each other, and we are brought by them to the same conclusion, namely, that in every probability the kitchen middens of Japan are of Aino origin.

Beside the remains of Ainos, in the extreme north we find a number of pit dwellings, indicating a people who may have been Kamschadales or Alutes.

In the south, dotted about here and there, there are traces of Coreans, examples of whom still survive. The coming of the Coreans seems to have been in historical times, and subsequent to that of the people who are the ancestors of the modern Japanese.

Altogether, therefore, if we omit the Coreans, there seems to have been since the year 600 a migration northwards, brought on by the invasion of the Japanese advancing from the south.

This retreat towards the north seems to be similar to that which has been traced in so many parts of the northern hemisphere subsequent to the glacial period.

In Japan, so far as I am aware, there are no traces of glaciers even on the highest mountains. But from an examination of a large collection of shells taken from the alluvial deposits of Musashi made by Dr. Hilgendorf (formerly of Yedo), it would seem that there is an indication of its once having been colder in the neighbourhood of Yedo than it is at present, certain

species which he identified being now only found in the vicinity of Yezo.

To this I may add that I have seen jaws and teeth of fossil elephants obtained from the alluvium near Yokosuka.

These also may indicate a more southerly extension of the Siberian mammoths, and also a colder climate.

The northward migration of the Ainos and Alutes or Kamschadales is, however, far too recent to be ascribed to that of variation in climate.

In Europe it would seem from what Mr. Boyd Dawkins tells us in his "Cave Hunting" that the flint implements and other spoor we find in caves and gravels were left by a race which travelled northward over the moraines of retreating glaciers. Long after this we had again migrations, as, for example, in the fifth century, when the Gaelic-Celts were driven northwards by the advancing Danes and Saxons, and it is here, I think, we find a parallel both in time and manner of the migrations in Japan, which left behind them the spoor of which I have been writing.*

At some future time when more evidence has been collected our inquiries may, perhaps, go still farther, and we may, perhaps, discover the origin of the Ainos.†

These connecting channels are also frozen over. From this we see that there would be no difficulty for Japan becoming populated from Asia.

In order to learn something about the origin of the Ainos, we must study them as we have studied other nations. To an ordinary observer, from a physiological point of view, they do not appear to be connected with any of their neighbours. By some it is said that the Aino tongue holds an intimate relation with the Japanese, whilst others totally deny the assertion.

* If the Japanese come from the west it is, of course, quite possible that a portion of the early inhabitants which were formed in Kiushiu and the southern portions of the country may gradually have gone southwards, but of the exodus in this direction proofs have yet to be adduced.

I myself, however, should be inclined to think that the Japanese came from the south and east, in fact that they were of Polynesian origin. I venture this remark on account of the many similarities which are so very observable between the inhabitants of many of the Pacific Islands and Japan. It is needless to say that the origin of the Japanese is a subject which yet remains to be investigated, and what I have said is as yet only a suggestion.

If we look at a map we see that at the northern extremity of Yezo, the distance across to Sagahlin is only about 22 miles. Between Sagahlin and the mainland the distance is again very short (only 5 or 6 miles) and is so shallow that at low tide after certain winds you can walk dry shod into Asia.

† In Japanese history we are told the story about an Asiatic princess who, fleeing from her father, took refuge in a canoe, and in company with a dog was drifted to Japan. The result of this union were the hairy Ainos. Originally the Ainos were called Ebisu or barbarians, and the word Aino is by some said to be derived from the circumstance of the above story,—“Inu,” which became corrupted into Aino, meaning a dog.

Subjects like these, together with those relating to customs, tradition, folk-lore, and the like, have yet to be investigated, before we can pronounce any verdict about the origin of the Ainos.

In conclusion, I beg to remind my readers that the foregoing paper by no means purports to be an exhaustive treatise of the subject embraced beneath its title.

Whilst giving a general outline of some of the more important facts connected with the early inhabitants of Japan, I write chiefly for the purpose of adding a few facts to the general store which I feel will very shortly be harvested.

From the vast amount of material, geological, archæological, and literary which remains to be exhumed, I see that it would be easy to spend years in continuing to examine new mounds, and in extracting from manuscripts and histories. However, from the little which I have so far gathered, and which I have now given, I think there is sufficient in it to connect together in an intelligible manner the outline of the history which has been given.

Several explorers are now in the field who have already collected together a vast quantity of material. When this is published it may modify many of my conclusions, but I trust my materials have been sufficient to maintain the general outline of the geological and ethnological changes which have taken place during the more recent periods in this interesting country of the "Rising Sun."

NOVEMBER 23RD, 1880.

ALLEN THOMSON, Esq., M.D., F.R.S., *Vice-President, in the chair.*

The Minutes of the last meeting were read and confirmed.

The following list of presents was read, and thanks voted to the respective donors:—

FOR THE LIBRARY.

From Prof. F. V. HAYDEN.—History of North American Pinnepeds.

By Joel Asaph Allen.

From the AUTHOR.—Les Nécropoles du premier âge du fer des Alpes Françaises. Par M. Ernest Chantre.

— Recent Discoveries in the Parishes of Chagford and Manaton, Devonshire. By W. Pengelly, F.R.S.

— Notes on recent notices of the Geology and Palæontology of Devonshire. Part 7. By W. Pengelly, F.R.S.

From the ACADEMY.—Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg, T. XXVI, No. 3.