

REPORT UPON ARCHAEOLOGICAL RESEARCH IN
THE DEPARTMENT OF LITERATURE. VOL. X.

STUDIES ON THE SITES AND REMAINS OF THE
ANCIENT BEAD-WORKERS IN THE
PROVINCE OF IDZUMO

By

Professor Kosaku Hamada, Sadahiko Shimada

&

Sueji Umehara

with the

Tables of the Specific Gravity of Jade Magatama and
Other Beads found in Japan and in Korea

APPENDIX:

Corpus of the Polished Stone Arrow-Points and
Daggers discovered in Japan



THE KYOTO IMPERIAL UNIVERSITY

1927

PREFACE

This is the result of researches into the sites and remains of the ancient bead-workers in the province of Idzumo, in January, 1925, made by Messrs. S. Shimada, S. Umehara and myself, accompanied by Mr. M. Suzuki, the photographer of our Institute, in the villages of Tamatsukuri, Imbe and Ôba in the above province. Though I was not able to visit the last-mentioned site myself, yet by the hearty endeavours of my collaborators, almost all the materials concerning the subjects were collected, and our knowledge supplemented by a short trip made by Messrs. S. Shimada and S. Komaki just before the completion of the report.

Much to our regret Mr. Umehara was not able to take part in writing this report, owing to his long absence abroad before the manuscripts were prepared, but all his notes and the materials collected by him were freely utilized by Mr. Shimada and myself. Moreover, he has kindly communicated with us on certain points from England.

Our sincere gratitude is due to those who played the cicerone in various places, especially Mr. K. Endô at Tamatsukuri, and Messrs. I. Wada and A. Katsube at Imbe and Ôba, respectively. We are much indebted also to the study of Mr. Y. Tatsuma on the prehistoric and proto-historic beads of Japan, and of Mr. S. Nodzu, on the history of Shimane Prefecture, works which are frequently quoted in the report.

The Corpus of the polished stone arrow-points and daggers discovered in Japan is published in this volume as an appendix, having been chiefly compiled by Mr. Umehara and supplemented by Mr. Shimada.

Finally, I have to seize this occasion to express our acknowledgements to Mr. T. Otaka, the publisher of the Tōkō-shoin, who has willingly agreed to print and publish our Archaeological Reports in future, commencing with this volume, in lieu of Mr. S. Iwanami who formerly very kindly took charge of its distribution. Also I believe it is my happy chance here to repeat our sincere thanks to Mr. R. Murayama and Mr. H. Motoyama, who have ever been very

generous in contributing to the fund for the publication of these Reports, thanks to which fund we have been able to issue our Reports since some years ago.

ARCHAEOLOGICAL INSTITUTE,
IMPERIAL UNIVERSITY OF KYOTO,
MARCH, 1926.

KOSAKU HAMADA.

P. S.—Tables containing the results of the specific gravity determination of jade *magatama* found in Japan and in Korea are added at the end of the Japanese text. For this we are greatly indebted to Mr. S. Shimada and Mr. A. Koidzumi, who carried out all the determination work on those examples in various museums in Japan as well as in Korea, and to Mr. K. Tazawa who kindly helped us in making drawings, &c. We are also grateful for their kindness to the Shrine of Isonokami and to other learned institutes, such as Imperial Museums at Nara and at Tokyo, Anthropological Institute in the Imperial University of Tokyo and Government-General Museums of Korea, granted us the free use of all precious materials in their collections.

CONTENTS

Studies on the Sites and Remains of the Ancient Bead-workers in the Province of Idzumo. (Résumé in English.)

	Page
I. Introduction.	1
II. Sites of Ancient Bead-Workers.	2
1. Tamatsukuri and its Shrine.	3
2. Site of Tamatsukuri.	3
3. Sites of Imbe and of Ôba.	4
III. Remains of the Ancient Bead-Workers.	6
1. Grinding and Polishing Stones.	6
2. Remains of Beads, Unfinished and Broken.	7
IV. Technical Methods of Bead-Working.	9
1. Methods used by Modern Bead-Workers.	9
2. Methods used by the Ancient Bead-Workers. (I).	12
3. Methods used by the Ancient Bead-Workers. (II).	13
V. Concluding Remarks: The Jade Question in Japan.	15

Tables of the Specific Gravity of Jade Magatama and other Beads found in Japan and in Korea. (Japanese text only.)

	Page in Japanese text
1. Jade <i>magatama</i> , &c., found in the Neolithic Sites in Japan.	77
2. Jade <i>magatama</i> , &c., found in the Burial-Mounds in Japan.	79
3. Jade <i>magatama</i> found in the Old Shiragi Burial-Mounds in Korea.	90

Appendix: Corpus of the Polished Stone Arrow-Points and Daggers found in Japan. (Japanese text only.)

1. Polished Stone Arrow-Points found in Japan.	99
2. Polished Stone Daggers found in Japan.	105

LIST OF PLATES

- I. General View of the Village of Tamatsukuri.
- II. The Shrine of Tamatsukuri-yu-no-Jinsha, Front View (1) and the Façade of the Shrine (2), Tamatsukuri.
- III. The Shrine of Tamatsukuri-yu-no-Jinsha, Tamatsukuri.
- IV. Bessho-dani Valley (1) and the Mound called Dairen-tsuka (2), Tamatsukuri.
- V. Distant Views of Tamanomiya (1) and Bessho Valley (2), Tamatsukuri.
- VI. Sites of the Shrines Tamanomiya in the Bessho Valley (1) and of the Shrine Kogarashi at Miyagaki (2), Tamatsukuri.
- VII. Quarries of Jasper, &c., on the Mt. Kasen (1) and One of the Pits of the Quarries (2), Tamatsukuri.
- VIII. Distant View of Lake Shinji from Tamatsukuri.
- IX. Stone Sarcophagus and Chambers of the Ancient Burial-Mounds at Tokurenba (1) and at Karasuba (2), Tamatsukuri.
- X. Distant View of the Ancient Burial-Mound at Komaruyama at Miyagaki (1) and its Stone Chamber, Tamatsukuri.
- XI. Stone Sarcophagus of the Ancient Burial-Mound at Tsukiyama (1) and Rock-cut Tomb at Iwaya-dera, Tamatsukuri.
- XII. Bronze Mirror of the Han Style found in the Ancient Burial-Mound at Tsukiyama (1) and Clay Figurines found from Minamisako, Tamatsukuri.
- XIII. Views of the Imbe Shrine (1) and of the Vicinity of Hiramatsu (2), Imbe.
- XIV. Views of the Rokusho Shrine (1) and its Vicinity (2), Ôba.
- XV. Unfinished and Broken *Magatama* Beads found at Tamatsukuri. (I)
- XVI. Unfinished and Broken *Magatama* Beads found at Tamatsukuri. (II)
- XVII. Unfinished and Broken *Magatama* Beads found at Tamatsukuri. (III)
- XVIII. Unfinished and Broken *Magatama* Beads found at Tamatsukuri. (IV)
- XIX. Finished *Magatama* Beads found at Tamatsukuri.
- XX. Finished and Unfinished *Kudatama* Beads found at Tamatsukuri.
- XXI. Finished and Unfinished *Hiradama* and *Marudama* Beads found at Tamatsukuri.

- XXII. Finished and Unfinished Rock-crystal *Magatama* and *Kirikodama* Beads found at Tamatsukuri.
- XXIII. Unfinished *Magatama*, *Kirikodama* Beads, &c., and Grindstones found at Imbe.
- XXIV. Grindstones with Parallel Grooves found at Tamatsukuri. (I)
- XXV. Grindstones with Parallel Grooves found at Tamatsukuri. (II)
- XXVI. Grindstones with Parallel Grooves found at Tamatsukuri. (III)
- XXVII. Grindstones with Large Hollow found at Tamatsukuri.
- XXVIII. Flat Polishing Stones found at Tamatsukuri.
- XXIX. Grindstones with Parallel Grooves found at Ôba.
- XXX. Grindstones with Parallel Grooves and Large Hollow found at Ôba and at Nogi.
- XXXI. Grindstones with Parallel Grooves found at Imbe.
- XXXII. Bead-Working of the Present Lapidaries at Tamatsukuri. (I)
- XXXIII. Bead-Working of the Present Lapidaries at Tamatsukuri. (II)
- XXXIV. Bead-Working of the Present Lapidaries at Tamatsukuri. (III)
- XXXV. Bead-Working of the Present Lapidaries at Tamatsukuri. (IV)
- XXXVI. Bead-Working of the Present Lapidaries at Tamatsukuri. (V)
- XXXVII. Bead-Working of the Present Lapidaries at Tamatsukuri. (VI)
- XXXVIII. Bead-Working of the Present Lapidaries at Tamatsukuri. (VII)
- XXXIX. Tools Employed by the Present Lapidaries (I) and *Magatama* and *Kudatama* Beads made by them, showing their Working Processes.

Map : Villages of Tamatsukuri and Imbe, showing the Distribution of the Sits where were discovered the Remains of Ancient Bead-Workers.
(By Mr. S. Ono from the Ordnance Survey Maps.)

Appendix Plates :

- I. Corpus of the Polished Stone Arrow-Points found in Japan.
- II. Corpus of the Polished Stone Daggers found in Japan.
- III. Specimens of Polished Stone Arrow-Points and Daggers found in Japan.

ILLUSTRATIONS

		Page in Japanese text.
Fig. 1.	Sketch map of the north-eastern parts of the province of Idzumo. (By Mr. S. Ono).	6—7
Fig. 2.	Stone sarcophagi and stone chamber of the ancient burial mounds at Tokurenba, Karasuba, and Komaruyama, Tamatsukuri. (Drawings by S. Shimada).	10—11
Fig. 3.	Rock-cut tombs at Iwayadera and Daimon-kôji, Tamatsukuri. (Ditto).	10—11
Fig. 4.	Grindstones found at Tamatsukuri. (Drawings by S. Umehara and S. Shimada).	23—24
Fig. 5.	Grindstones and polishing stones found at Tamatsukuri. (Ditto).	
Fig. 6.	Grindstones found in the province of Hôki.	23—24
Fig. 7.	Grindstone, the so-called "Polishing stone of the claws of a fox", in the precincts of the Tenjin Shrine of Temma, Osaka. (Photo sent by Mr. H. Ômichi).	14—15
Fig. 8.	Grindstone erected in the precincts of the Hiye Shrine, Numadzu. (Photo sent by Mr. J. Shibata).	14—15
Fig. 9.	Sandstone grindstone found at Behencourt, Somme in France. (After Mortillet).	14—15
Fig. 10.	Portable grindstones found at Akasa in Tôtômi, Japan (1) and at Trensum, Sweden (2). (After Mortillet).	16
Fig. 11.	Rock-crystal beads found at Iwahashi, Yamato, and at Kama, Bizen. (Drawings by Mr. Y. Tatsuma and K. Hamada). ...	26
Fig. 12.	<i>Magatama</i> , <i>kudatama</i> and <i>kirikodama</i> beads, to show the names of their different parts. (By K. Hamada)... ..	34
Fig. 13.	Finished and unfinished <i>magatama</i> , <i>kudatama</i> and <i>kirikodama</i> beads found in the province of Idzumo (1). (Drawings by S. Shimada and S. Umehara).	34—35
Fig. 14.	Ditto. (II).	34—35
Fig. 15.	Ditto. (III)	34—35
Fig. 16.	Jade-working of the present lapidaries in Peking. (1) ...	40—41

Fig. 17.	Ditto. (II).	40—41
Fig. 18.	Zuni Indian drilling jade. (After Pfeiffer).	60
Fig. 19.	Beads found at Hakoishi, Tango and at Ôsaka, Hôki. (Drawings by S. Umehara and K. Hamada).	45
Fig. 20.'	Various types of perforation of <i>magatama</i> beads. (Drawings by K. Hamada).	47
Fig. 21.	Agate <i>magatama</i> in the collection of the Shôsôin, Nara. (Drawing by S. Shimada).	50
Fig. 22.	Classification of the forms of <i>magatama</i> by Mr. S. Nodzu. (From the "History of the Shimane Prefecture").	51
Fig. 23.	Various forms of the perforation of <i>kudatama</i> and <i>kirikodama</i> beads. (Drawings by K. Hamada).	54
Fig. 24.	<i>Magaatama</i> -shaped ornament found at Naqada, Egypt. (Sketch by K. Hamada).	73
Fig. 25.	"Korean styled" <i>magatama</i> in the collection of the Shôsôin, and among the find of the Kinkan-tsuka tomb at Keishû, Korea. (Drawings by K. Hamada).	67
Fig. 26.	<i>Magatama</i> and <i>kudatama</i> beads found at various places in Japan and in Korea.	60—61
Fig. 27.	<i>Magatama</i> and other beads found in the precincts of the Shrine Isonokami, Yamato.	
Fig. 28.	Ditto. (Drawings by Mr. Koidzumi & K. Hamada).	
Fig. 29.	Jade <i>magatama</i> found at the neolithic and aeneolithic sites in Japan. (Drawings by Mr. K. Tazawa).	
Figs. 30—32.	Jade <i>magatama</i> found in the burial-mounds in Japan. (Drawings by Mr. Tazawa.)	
Fig. 33—35.	Jade <i>magatama</i> found in the burial-mounds in Korea. (Drawings by Mr. Koidzumi & S. Umehara).	
Fig. 36—37.	Jade <i>magatama</i> found in Japan.	
Fig. 38.	Jade <i>magatama</i> found in Korea and in Japan.	
Figs. 39—40.	Jade <i>magatama</i> found in Korea.	

STUDIES ON THE SITES AND REMAINS OF THE ANCIENT BEAD-WORKERS IN THE PROVINCE OF IDZUMO

(Résumé of the Japanese Text).

I. INTRODUCTION

It is well known from the passage in the Kogo-shûi 古語拾遺, &c., that the descendants of Kushi-akarutama(-no-mikoto) 櫛明玉命, the traditional ancestor of the bead-workers of the Imbe 忌部 family in the province of Idzumo, lived in that province at least down to the 9th century A.D., and presented the beads which they made to the Imperial court. The site where the bead-workers settled can be identified without doubt as the hot spring resort of Tamatsukuri and its vicinity, Imbe village, &c., from the descriptions in the Idzumo-Fudoki 出雲風土記, a topographical work compiled in the 8th century.

But the remains of ancient beads of these places were not noticed until some half a century ago, when people began to collect some *magatama* and *kudatama* beads which are not easy to distinguish from tomb furniture, then came the unfinished or broken beads as well as grindstones, undoubted remains of the ancient bead-workers. The late Momoye Endô, priest of the Shinto Shrine of Tamatsukuri-yu-no-Jinsha, was especially enthusiastic in the collection of these remains, and he was the first man who noticed and took care of the grindstones used for beads, though the polishing stones for the groove of the *magatama*, only came to light since some ten years ago. At Ôba village Mr. Hasegawa, and Mr. Katsube, however, had already collected since fifty years ago such grindstones, but no beads have yet occurred, and at Imbe village the collection of the bead-workers' remains only began some fifteen years ago.

These remains of the ancient bead-workers, however, were not known to the archaeological world, until Mr. H. Ômichi⁽¹⁾ wrote an article in 1909,

(1) See the article in the *Kôko-kai-Zasshi* (*Journal of Archaeology*), Vol. VIII, No. 2.

followed by others, for example, Messrs. J. Shibata, N. Ono, S. Umenara, etc., and the matter finally studied more thoroughly by Mr. S. Nodzu in his "History of Shimane Prefecture". We shall now first describe all the details of the sites and remains of the ancient bead-workers in Idzumo and then investigate their technical processes and finally discuss the question of jade in Japan.

II. SITES OF ANCIENT BEAD-WORKERS

1. Tamatsukuri and its Shrine

(Plates I—III)

Tamatsukuri 玉造 is situated furthest west among the sites which have yielded the remains of the ancient bead-workers in the province. The village stands by a small river of the same name, which empties into Lake Shinji, two miles north of the village⁽²⁾. As the Fudoki mentions, in the 8th century, the hot springs gushed out here along the river banks, and were frequented by people far and near. These springs were called in those far-off days the "Holly Springs" 神湯 and some of them seem to have issued even near the sea (lake) side. But since the water of the lake receded and the alluvial plain has developed, we find no more lake-side springs at Tamatsukuri. But the centre of the hot spring resort is ever the same place as before, and the "Chimata" (street) of Tamatsukuri 玉造街, mentioned in the Fudoki, is nothing but the present Yumachi, if we carefully study the ancient topography. This "Chimata" or street which may have had shops where the beads were sold, was certainly the junction of the "Right-Western Highway" 正西通 and the "Right-Southern Highway" 正南通, the latter passing through the hot spring resort, where the beads were actually made. (Fig. 1.)

In the village of Tamatsukuri stands the Shrine of Tamatsukuri-yu-no-Jinsha 玉造湯神社. This is the very old shrine mentioned already in the Fudoki, as

(1) A full biography is given in the Japanese text of the volume, p. 3.

(2) Tamatsukuri can be reached from the city of Matsuyama, where associations of Lafcadio Hearn ever dwell, only 15 minutes by rail to Yumachi, the next station west, and then by motor or rikisha, less than a two miles drive to the hot spring resort.

well as in the list of shrines compiled in the 10th century⁽¹⁾, where was enshrined the traditional ancestor of the bead-workers, Kushi-akarutama, &c., though the present edifice is but a modern building put up in 1650. All the remains of the bead-workers found in the village, are now kept in the shrine, under the care of the priest.

2. Site of Tamatsukuri

(Plates IV—XII).

There are many places in Tamatsukuri, where the remains of the ancient bead-workers have been discovered.

- (a) Vicinity of the Shrine: Every sort of unfinished beads, grindstones, &c., occur.
- (b) Vicinity of Tamanomiya 玉の宮: This is south of the shrine, in the valley of Dairen-gawa, where once stood a small shrine, dedicated to the same hero, Kushi-akarutama. Unfinished beads and grindstones were found.
- (c) Bessho-dani 別所谷: A valley to the west of Tamanomiya where grindstones were discovered.
- (d) Mukô-shingu 向新宮: East of the shrine, south of Mt. Kasen, unfinished beads as well as grindstones occur here.
- (e) Miyagaki 宮垣: North of the shrine, on the eastern bank of the river. Formerly on this terraced hill stood a small shrine, Kigarashi-Jinsha 記加羅志神社. Rich finds of unfinished beads and grindstones have been made here, and we see still jasper, agate and wastes of beads on the ground.
- (f) Hiratoko 平床: North-west of the village, near the hill of Namitome-yama 波止山. Grindstones and bead-wastes.
- (g) Mt. Kasen 花仙山: This is most probably the Mt. Tamatsukuri mentioned in the Fudoki, 199.7 metres high, consisting of basaltic andesite. On the southern and western slopes materials for beads are still quarried, such as jasper, agate, &c. There are many pits, old and modern, at Kurarasako, Ôtani, Makiyabori, &c.

(1) The list of shrines is found in the Books of Regulations of the Engi era (901—923 A.D.), generally called the Engi-shiki 延喜式.

The sites, Miyagaki, Iamanomiya, &c., where abundant remains of bead-workers occur, seem undoubtedly the places where the ancient bead-workers settled and fabricated the beads, but leaving no indications of houses, workshops, &c., as the remains are simply collected on cultivated ground.

Ancient burial-mounds with stone sarcophagi or chambers, at Miyagaki, Tsukiyama 築山, &c., and rock-cut tombs, at Iwayadera 岩屋寺 and Daimon-kôji 大門小路, seem most probably to belong to the sepulchres of the families of bead-workers, though they do not afford us special materials for our study of bead-fabrication. (Figs. 2 & 3).

3. Sites of Imbe and of Ôba

(Plates XII—XIV)

Imbe village lies to the east of Tamatsukuri, and to the south-east of Mt. Kasen. Some think that this village, as the name denotes, was the original home of the Imbe clan to which the bead-workers belonged, instead of Tamatsukuri as is generally believed. Recently remains of unfinished beads as well as grindstones, &c., have been found and collected by the priest, Mr. I. Wada, of the Imbe Shrine, which is also dedicated to the bead-workers' ancestor. Near the shrine is the so-called site of the dwellings of the Imbe family, and also the traditional tomb of the ancestor of the bead-workers, which are but fictitious in nature. Mr. Nodzu thinks however that this Imbe was the original home of the clan, and that the beads were first manufactured here, until the quarry of bead materials was exhausted, and some hot springs, which once existed, ceased to issue, and then they migrated to Tamatsukuri where they flourished and most actively manufactured beads. But at present we are not yet convinced of the accuracy of this theory, though we do not doubt that here too some people belonging to that clan lived and made beads for some time, deriving their materials from the same mountain, *i.e.* Mt. Tamatsukuri. The following are the places where the bead-workers' remains have been discovered.

- (a) Vicinity of the Imbe shrine: Though no grindstones and beads have yet been found, wastes of materials, jasper, agate, &c., have been come upon, together with some fragments of pottery (Iwaibe and Yayoishiki).
- (b) Ushirobaru of Miyauchi 宮内後原: East of the shrine, some grindstones

as well as unfinished beads have been found. Ancient burial-mounds also exist.

- (c) Near Kôdo 神戸: Grindstones and unfinished beads.
- (d) Shimo-imbe 下忌部: Near Hiramatsu, &c., grindstones and unfinished beads have occurred.

The village Ôba is situated further to the east of Imbe and many examples of grindstones have been found in the vicinity of the shrine Rokusho-Jinsha 六所神社, but no beads have yet met with. This village was certainly not the original settlement of the bead-workers, but it is supposed that some of them migrated to this place, after the prefectural government, Kokufu 國府, was established near this village, to meet the demand of the townspeople, perhaps some other objects were made besides beads, because at that time the fashion of wearing beads almost went out.

Outside of the above-mentioned sites, grindstones have occasionally been discovered at Yatake 矢竹, east of Ôba and the site of the Kokufu, and at Noshiro 乃白, north of Imbe, &c., but these places are also not far from the sites already described.

III. REMAINS OF THE ANCIENT BEAD-WORKERS

Though the sites of the ancient bead-workers in Idzumo, above-mentioned, show very few indications of dwellings or workshops, we are able to deduce that they lived in groups here and there and manufactured beads as a home industry, the remains themselves, which have come out from the sites, such things as unfinished or broken beads, wastes of materials, grinding and polishing stones, are the most trustworthy evidence of the industry or craft from which we can reconstruct their craftsmanship in the art of making beads. But the remains of the so-called ancient glass-working found recently at Tamatsukuri⁽¹⁾ and elsewhere, however, are of no scientific value yet, so we have to reserve a description of it to another opportunity.

1. Grinding and Polishing Stones

(Plates XXIV—XXXI)

Stones for grinding beads are of two sorts, while stones for polishing them have no varieties.

(a) Grindstones with parallel grooves (Figs. 4 & 5): These almost all consist of granite produced in the neighbouring districts, and rarely of sandstone or of basalt, &c., in the shape of a somewhat rectangular block, with long parallel grooves on the obverse, and occasionally on the sides and reverse as well. The groove is generally a depression one foot in length, half an inch in width and in depth, a few lines on one surface, but sometimes more than that, indicating that a hard material like jasper was ground continually in the same groove. About 80 pieces in all have been found in the province, while more than 60 at Tamatsukuri. A few examples of this kind of grindstone occur outside of Idzumo, as at Osaka, in Hōki and in Suruga (Figs. 6—8), &c., and all resemble those discovered in Europe. (Fig. 9).

(b) Grindstones with a large circular depression (Figs. 4 & 5): Also of

(1) S. Nōdzu, *History of Shimane Prefecture*. Vol. IV, Chap. XI, and also his articles in the *Kōkōgaku-Zasshi* (*Journal of Archaeology*), Vol. XV. No. 9 & Vol. VII. No. 5.

granite, but only a small number is known. We do not know exactly for what purpose this sort was employed in bead-working.

(c) Flat polishing stones (Figs. 4 & 5): These have been noticed more recently and mostly at Tamatsukuri. About a dozen pieces in all. They are small in size, about 5 or 6 inches long and flat, only half an inch thick, consisting of quartziteschist, piemontiteschist or chloriteschist. It is conjectured that these stones were used mainly for polishing the concave side of *magatama* beads, being distinguished from common portable grindstones by their shape. (Fig. 10).

2. Remains of Beads, Unfinished and Broken

(Plates XV—XXIII)

As the finished beads afford less material for our study, and since it is difficult to distinguish whether they belong to tomb furniture or to the workshop, especially they come from a site, like Miyagaki of Tamatsukuri, where burial mounds exist, it is more profitable for us to deal chiefly with unfinished or broken beads and wastes of jasper, agate, cornelian or rockcrystal.

(a) *Magatama* beads (Figs. 13 & 14): This is a curved bead in shape like a comma with a hole in its head⁽¹⁾. About 40 pieces from Tamatsukuri, 7 from Imbe, mostly in jasper and agate, and rarely in rock-crystal. But it is noteworthy that no jade, nephrite or jadeite, examples or even wastes have been found in the province, though pieces of these material not rarely occur in ancient tombs. Those in unfinished or broken condition show sometimes merely a rough shape, sometimes in nearly finished state, with or without perforation. Those broken at the head through the hole are not uncommon, and tell us that they cracked during the process of drilling the hole. Some, however, appear as though the working was abandoned for other reasons not technical.

b) *Kudatama* beads (Fig. 15): Or long cylindrical beads, nearly 20 from Tamatsukuri and no example from Imbe. These are without exception in green jasper and in the unfinished state, sometimes only as a more or less rectangular

(1) For a general description of the beads see Gordon Munro, *Prehistoric Japan*; Gowland, *Dolmens and Burial Mounds of Japan*, &c.

or polygonal body, and sometimes as a nearly round tube. A few of them have unfinished perforations, discontinued or broken during the working process.

(c) *Kirikodama* beads (Fig. 15): Beads like, truncated hexagonal pyramids with a common base, most probably derived from the ornament adopted from rock-crystal in its original state. So they are all made of rock-crystal without exception. 5 from Tamatsukuri and 1 from Imbe. Some have merely had the pyramidal head and base cut off, while others are drilled halfway or polished in the shape of a barrel. There is a single example which has a hole drilled in the crystal body laterally without any other working. (Pl. XXII. 107). This is of course not a sort of *kirikodama*, but a variety of *magatama* bead. Similar examples have been found in various places in Japan. (Fig. 11).

(d) *Hiradama* and *marudama* beads (Fig. 15): The former is a flat round bead and the latter simply a small round one. About 25 from Tamatsukuri and 1 from Imbe. Mostly of rock-crystal, with a few of jasper. Some are still edged, while some are almost round, but no examples with perforation, finished or broken, have yet been discovered.

IV. TECHNICAL METHODS OF BEAD-WORKING

1. Methods used by Modern Bead-Workers

(Plates XXXII—XXXIX)

To recover the methods used by the ancient bead-workers it is indispensable to compare the results which we get from ancient beads, unfinished or broken, to the ethnographical facts afforded by modern bead-workers. Fortunately, there are two bead workshops at present at Tamatsukuri, though the craftsmen are not direct descendants of the ancient bead-workers of Idzumo in their lapidary technics, but are an importation from Kai province, some half century ago, where rock-crystal working has been flourishing from old times. In any case methods of hard stone working can not be so very different in places, nor can they have been essentially altered in the course of time. So we shall first describe the technical methods practised in a modern workshop, as related by Mr. S. Fukuba, and from what we saw in his shop. (Pl. XXXII).

(a) The quarrying of materials: Jasper, agate, cornelian, and rock-crystal are produced from Mt. Kasen. A deep pit is dug until a "kama" or lenticular mass of jasper in the vein under the ground has been reached. This pit may occasionally be a dozen feet or more in depth. The bead material is then excavated with picks in block form. (Pl. VII).

(b) Cutting the raw materials: Before working the material must be tested, broken by a nail-like tool called "ya" (Pl. XXXIV 2). Next the cutting is made with a wooden-framed iron saw (toothless) under water, pouring now and then granet-sand (now used carborundum), and the block is broken by a nail or thin chisel-like tool, hammered into the cutting. (Pls. XXXIII 1 & XXXIV 2).

(c) Rough-shaping: The material already cut to the required size is chipped with an iron bar called "kengane", some 3 feet long pointed at both ends, held down at one end by a "pillow" of wood, and the another end moved by hand on a wooden board, until the material is shaped into the required form. (Pl. XXXIII 2).

(d) Drilling the hole: After rough shaping the beads are usually perforated.

They are placed upon a wooden stand which has depressions to hold them, while working. A man holding a steel awl "anaakashi-ya" between thumb and forefinger, rotates it, at the same time striking the head of the awl with a small hammer. (Pl. XXXV 1). At times the awl is dipped into oil and garnet-sand. According to the old tradition, it is said that the beads are drilled from one side and a bow-drill is not employed, because it is more risky, since it is not possible to regulate the rotation of the awl, especially when the drill is nearly through. As oftentimes there is possibility of breakage at the outlet of a hole, it is preferred to make this part a little thicker beforehand, and chip it off afterward with the "kengane". The hole thus perforated is cleaned with the help of a wire and garnet-sand. (Pl. XXXV 2). The process of drilling a hole takes rather a long time, in a jasper *kudatama* a hole one inch depth requiring about three hours, while for an agate bead, half the time is enough. Sometimes the perforation is done after the next process, the rough-polishing.

(e) Rough-polishing: This is performed under water with garnet-sand (now carborundum) of three kinds, the first to the third, according to their fineness, on an iron board, a flat one for flat objects (Pl. XXXVI 1) and a concave one "higane" for convex pieces, like the back of *magatama*. (Pl. XXXVI 2). And a round iron rod or the margin of the concave board is used for concave objects, like the concave part of *magatama*. (Pl. XXXVII 1).

(f) Finishing: After the previous process the objects are polished on slate grindstones, instead of on the granite ones of the ancients, but with similar parallel grooves, which have also three gradations of fineness. (Pl. XXXVII 2). Finally, the surfaces of the beads are polished on a board of paulownia wood or with a stick of it, powdered with borax or red ochre to give them a bright sheen. (Pl. XXXVIII 1). For finishing the hole an iron rod is used polishing with fine garnet-sand. (Pl. XXXVIII 2).

The foregoing description chiefly concerns the working of jasper beads, but in the case of cornelians or agates, it is necessary before working to burn the material in a kiln with charcoal fire, to make it softer as well as brighter in colour. This is a modern improvement, and ancient beads can therefore be easily distinguished since they never underwent this process.

Before we inquire into the technical methods of the ancients, it will be

instructive to glance for a moment at the methods of Chinese jade-workers. The Chinese who value the jade so highly from the time of the Chou and Han dynasties, were and are the greatest jade-workers in the world. Though in the Chou-li 周禮 on the name of yü-jên 玉人, the specialists of this type of lapidary work, is mentioned, no description of the technical methods is given. And as we have no archaeological information about the ancient jade workshops yet in that country, our knowledge is based simply upon the scanty descriptions in comparatively modern books, such as Sun Ying-hsing's 宋應星 the T'ien-kung-k'ai-wu 天工開物 of the Ming dynasty, &c., and the ethnographical observations of the present-day jade-workers in Peking or elsewhere. As Bushell described, and Hamada himself observed it, they use various sorts of iron saws, long and circular, sometimes of wire, drills, pointed and tubular, frequently even diamond-drills, revolved chiefly by the help of lap-wheels worked by treadles. Four kinds of abrasives, yellow, red, black and jewel-dust are employed in the working, but the final polishing is made with wooden sticks or leather with finest abrasives, usually in different workshops⁽¹⁾. (Figs. 16 & 17).

It is evident that the Chinese jade-workers are more advanced in their technical methods than our Idzumo bead-makers, the latter, being more conservative, preserve the methods, old and primitive. And it is a great contrast to compare the jade-workers' shops in Peking, so lively with crowded work-men, standing in rows in a special quarter, while those at Tamatsukuri, only one or two in all, working lonely with their sires and wives, dreaming of those bygone days when their ancestors once flourished.

2. Methods used by the Ancient Bead-Workers (I)

(Plates XV—XXXI)

The fragments of jasper, agate, cornelian and rock-crystal, scattered on the ground in various places at Tamatsukuri and Imbe, must have been the wastes of bead-manufacturing, chipped, broken, or cut by the ancient workers who used probably also pointed iron bars and some kinds of saws, &c., though we have

(1) For details see Bushell, *Chinese Art*. Vol. I. Chap. VII. (London, 1909) and Hamada. *The Yûchikusai-kogyokufu or the Early Chinese Jades in the Collection of the Late R. Uyeno*. (Kyoto, 1925).

not yet come across any remains. But for the garnet-sand, which is said in the history to have been discovered by a certain Hita 斐太 only in 743 for the first time at Ôsaka in Yamato province, they had been satisfied with quartz-sand or something similar before that time. For the rough and finer polishing as well, undoubtedly they used those very granite grindstones with parallel grooves and those flat polishing stones for the concave portion of *magatama*. Red ochre and wooden sticks must have been utilized for the final polishing too.

The perforation was done after rough shaping or sometimes before the finer polishing as the remains of unfinished beads tell us. It is a question, however, whether they used any sort of the bow-drill⁽¹⁾ or a simple iron awl as the present workers. Perhaps the both tools were used by the ancients, especially the former in an earlier period for those beads drilled from both sides and left spiral traces around the hole, and the latter mainly in a later times for those perforated from one side. And we know that from the specimens of broken beads discovered at Hakoishi, Kabutoyama, &c., the awls were not very sharp. (Fig. 19).

The hole of *magatama* can be classified into three categories, that is to say, (I) from both sides; (II) from one side, generally the exit side is smaller; (III) from one side, but the exit is retouched. According to Mr. Tatsuma we have the following statistics on those in the collection of the Tokyo Imperial Museum⁽²⁾:

Materials	Jade	Glass	Jasper	Agate		Rock-crystal	Rôseki*	Clay	Tuff	Total	
				(1)	(2)						
Types of Hole	(I)	12	12	—	—	—	—	—	—	24	
	(II)	22	—	38	66	32	12	9	2	4	185
	(III)	—	—	9	65	31	11	—	—	—	116
Total	34	12	47	131	63	23	9	2	4	325	
				194							

(1) Square-formed. (2) Fine-shaped. * Rôseki is steatite or agolmatolite.

This table shows that the whole of glass and about half of the jade beads

(1) An iron awl might have been rotated horizontally by moving a wooden board back and forth which presses the awl, as this method survived until lately in some places in Japan for drilling beads.

(2) *Archaeological Studies on the Prehistoric and Proto-historic Beads in Japan*. (Unpublished).

are drilled from both sides, while those in other materials are all from one side only. What was the reason for this? To drill from both sides of course is the best way of making a hole even on the sides, but at the same time there is a risk of not meeting at the centre. We frequently find specimens which have turned out failures at this point. But the beads made of jade, the most precious material produced only in the continent of Asia are well worth the risk and trouble of making the nicest possible holes, while other inferior materials, like jasper or agate, may rest to content enough with simpler methods of perforation, though sometimes there is need to mend or retouch the outlets of holes in a conical shape. Glass beads, which were not of such humble material in those times as to-day, deserved to chose the best way of perforation, and moreover, the material is too brittle to drill from one side. (Fig. 20.)

At Tamatsukuri the bead-workers now make *magatama* first into a somewhat crescent-shaped piece, then chipping off the concave part. This is naturally a more convenient way, though at the same time the shape of the bead will be square-formed, or more or less conventionalized. We frequently meet this square kind of form among the tomb furniture, mostly in agate, and also in the collection of the Imperial Repository of Shôsôin at Nara. (Fig. 21.) This is certainly a corruption of the *magatama* shape, indicating their belonging to a later age, and we never come upon this type in *magatama* of jade, which are always in forms quite free and not conventionalized, generally very elegant and beautiful. (Figs. 30—36.) At Tamatsukuri this later form occurs occasionally, thus indicating the lower limit of the age of this working place.

3. Methods used by the Ancient Bead-Workers (II)

We have now to consider the perforation of the *kudatama*, cylindrical beads. This is also classified into three types like the *magatama*, not conditioned by differences in length or materials, but according to the differences of the shades of green of the jasper of which almost all *kudatama* were made. See the following table, which is taken from Mr. Tatsuma's study in the collection of the Imperial Museum of Tokyo.

	Colour of jasper	Light-green	Green	Dark-green	Total
Types of Hole	(I) Drilled from both ends*	260	629	131	1020
	(II) Drilled from one end	58	106	227	391
	(III) Drilled from one end & its outlet retouched	—	3	75	78
	Total	318	738	433	1489

* Being impossible to see through, some of these may belong to type (II).

(I) has almost the same size of hole at both ends, (II) one end larger and the other very small generally, (III) the smaller hole at one end is retouched in a conical shape. As the table shows us, the light-green ones are much more drilled from both ends, and never from one side. We know from other facts, the associated objects, &c., this sort of beads, mostly slender in form, belonging to an older age than the dark-green ones. Now the older beads show that they were drilled from both ends, the best way but uncertain to meet at the centre, as we see occasionally from failures. The methods of drilling adopted by the later bead-makers on the dark-green beads, are simpler but produce always very ugly holes, that at one end being very wide and that at the outlet at the other end very small, and oftentimes the ugly outlets of holes had to be repaired or adjusted. The slender light-green specimens, sometimes only 2 mm. in diameter with a hole of more than 1 mm., must have been polished in the final shape absolutely after the perforation was finished, while the thicker dark-green beads which very frequently have irregularly slanted hole, show that the drilling took place after the shaping was almost finished. (Fig. 23.)

Next the *kirikodama* beads, generally made of rock-crystal, are perforated from one end, as the table shows :

Types of Hole	Forms	Hexagonal		Pentagonal		Bi-conical		Total
		(1)	(2)	(1)	(2)	(1)	(2)	
	(I) Drilled from both ends	1	—	—	—	—	—	1
	(II) Drilled from one end	62	4	—	—	24	4	94
	(III) Drilled from one end & its outlet retouched	89	38	2	—	4	14	147
	Total	152	42	2	—	28	18	242
		194		2		46		

(1) More than 2 mm. long. (2) Less than 2 mm. long.

The transparency of rock-crystal made easier to drill a hole vertically, it being possible to look through from the outside, and this bead, not so important as the *magatama*, was drilled from one end and the outlet of the hole was dressed afterward, generally in a hasty way.

Other beads, such as *natsumedama*⁽¹⁾ (a variety of the *kiriko*) *marudama* or round bead, and *hiradama*, flat round beads, of rock-crystal or of other materials, are drilled usually from one end, because of their unimportance and easiness.

After perforation, the process of bead fabrication seems very facile, only to be polished on the granite grindstones, or by the flat polishing stones and perhaps finished with wooden polisher with red ochre or something like that.

According to the present bead-workers at Tamatsukuri, it is said that a jasper *magatama* takes nearly one whole day's work for a man, and a *kudatama* half a day. It is very interesting to compare this fact with the price of beads as given in an ancient manuscript dated the 10th year of Tempyō (738 A.D.), almost in the last days of the bead-wearing fashion⁽²⁾

“ 7 red <i>magatama</i>	for 16.8 sheaves of rice,
1 light-green <i>magatama</i>	for 1.8 sheaves of rice,
1 round bead	for 0.12 sheaf of rice,
2 <i>bamboo</i> beads	for 0.34 sheaf of rice,” &c.

So one red *magatama* cost 2.4 sheaves of rice which is equivalent to 12 *shō* of rice of those days and to 4.85 *shō* of the present capacity, and if we calculate that a *shō* is worth 50 *sen*, then the price of a bead will be 2 *yen* 85 *sen*. In the like calculation, 1 light-green *magatama* will be 1 *yen* 81 *sen*, a round bead 12 *sen*, and a *bamboo* bead 17 *sen*, &c. This price does not greatly differ from the rate of the present-day bead-workers' wage, because it was paid in rice. Of course, in the case of jade beads the material itself perhaps was much dearer than the cost of labour, which was also higher, by reason of the difficult workmanship, while with the beads of jasper, agate and rock-crystal, &c., it was not necessary to take the material into account.

(1) This bead was sometimes made in jada and drilled from both ends. They have usually incised ornament and seem very old.

(2) Document preserved in the Shōsōin, see the *Dainihon-komonjo* or *Old Historical Manuscripts in Japan*. Vol. II. A fuller passage is given in the Japanese text of this report, p. 58. See on the subject also K. Kashiwagi's article in the *Bulletin of the Tokyo Anthropological Society*, Vol. II, No. 12.

V. CONCLUDING REMARKS:

The Jade Question in Japan

We have hitherto described the sites and remains of the ancient bead-workers in the province of Idzumo and their technical methods, reconstructed from the relics of beads, finished and unfinished, compared with the methods of present-day bead-makers. But to study the ancient beads in every detail is not our task at present, being concerned in the main with the methods of fabrication and materials, &c. For example, the origin of the form of the *magatama*, generally thought to have been derived from the claws or teeth of animals, must be more carefully examined, and there is much to say on the ways of bearing these beads, since we have derived ample evidences from the southern Korean tombs. But we are now confronted with an important question about the material of *magatama*, &c., that is to say the jade question.

As is well known, jade in China⁽¹⁾ it derived from two sorts of minerals, nephrite and jadeite, the former produced in quantity in Chinese Turkestan, near Khotan, &c., and the latter chiefly in Yunnan, Tibet and Burma⁽²⁾, though it is said to be found also in Chinese Turkestan, &c., but they have never been produced in Japan, notwithstanding the fact that beads in these materials not infrequently occur in ancient burial-mounds as well as in neolithic or aeneolithic sites in this country. We believe, however, that the neolithic or aeneolithic beads, are not older in absolute chronology than those that come from ancient tombs, as Mr. Tatsuma has demonstrated, being rather imitations of *magatama*, made of the same material which was obtained through the hands of burial-mound builders. Those, then, who made the neolithic or aeneolithic beads were merely a people who lingered in a past civilization. (Figs. 26—36.)

Now, then, how did those mound-builders, ancestors of the Japanese, get

(1) On the physical characters, &c., of nephrite and of jadeite see, Laufer, *Jade*, Bushell, *Chinese Art*, Vol. I, and Pope Hennessey, *Early Chinese Jade*, (Chap. I), &c. Nephrite is a calcium-magnesium silicate, and jadeite an aluminium sodium silicate, and their specific gravity, the easiest means of distinction of both minerals, being for the former, 2.9—3.1 and for the latter, 3.2—3.4 generally.

(2) It is commonly believed that the jadeite of Burma was known by the Chinese only since the 13th century. But anyhow this mineral was imported into China already in the 3rd century A. D. if we may learn from some *magatama* found in Japan in ancient burial-mounds.

these materials, the nephrite and jadeite of the continent? The sepulchral mounds in Japan seem to belong to the 2nd or 3rd century A.D. and downwards, and those in southern Korea, ancient Shiragi, to a century or two later than those of Japan. Anyhow it was a time later than when direct or indirect intercourse between China and these countries was opened, especially since the influence of the Former Han dynasty prevailed in Korea. The nephrite of Chinese Turkestan certainly was brought to China even before the Han time, but a greater quantity came in from that time onward, and the jadeite of the southern countries too must have been already imported in these time onward into China, though most of ancient jades are made of nephrite and we do not know exactly how much of jadeite was used among them. And it is rather a surprising fact that our ancient *magatama*, as well as Korean too, almost all are made of jadeite, as our specific gravity determination indicates, instead of nephrite⁽¹⁾ as it has been supposed. So it is most probable that our ancestors imported the jadeite from the continent, south-eastern Asia, directly or through the southern China, as the intercourse between southern China and Japan already existed since the 3rd century or so⁽²⁾. But the second question is, whether the raw materials were imported or beads already worked?

We do not know yet of any *magatama* or kindred forms of it that were ever made in China, either from remains or from literature, and the suggestion forwarded by Dr. Laufer that it might have originated in some south-eastern Asiatic regions, must be reserved for future reaserch⁽³⁾. At present it is better for us to deal with these beads as the indigenous ornaments of the Japanese and consequently the raw materials were imported and worked into beads in this country or in Korea, especially if we consider those small and irregular beads in jade found in Japan from neolithic sites as well as from burial-mounds,

(1) The the tables specific gravity of jade *magatama* and other beads found in Japan and in Korea is given at the end of the Japanese text, and a summary table will be found also at the end of the English column.

(2) Or we may say the jadeite was quarried in those days in Chinese Turkestan, which is now almost all exhausted. Why then the early jade objects in China of the Han dynasty or so were not made more in this material?

(3) Laufer discusses on the subject in an appendix chapter in his book, *The nephrite question of Japan*. But it is better now to say the jadeite problem instead of nephrite.

which it is quite impossible to look on as imported articles⁽¹⁾. (Fig. 19).

Then was Japan proper or southern Korea the original seat of the fabrication of jade *magatama*? Nowhere, in Idzumo or in any other province, have we found unfinished beads or wastes in jade, but we come across occasionally small and irregular beads in this material, as we have said, most probably made in the places from the fragments of these precious material, instead of throwing them away as wastes. But on the other hand, the large quantity of jade *magatama* occurred at Keishû in Korea⁽²⁾, can not be considered as exported from Japan, where these things were so highly valued at that time, except in the form of tribute or of gifts, though no site of any worksops has come to light yet in the peninsular. So it is wise at present to say only that the *magatama* beads was originated in a cultural (most probably ethnic too) area of ancient Japan, which includes western Japan as well as southern Korea, and manufactured in both regions contemporaneously. Naturally, beads made in Japan were often imported into Korea, as one of jasper discovered at Keishû most probably indicates, while Korean made *magatama* were brought into Japan, as we meet with "Korean styled" specimens, which occurred in quantity from Korean tombs, and occasionally in the tomb furniture in Japan as well as in the collection of the Shôsôin. (Fig. 25). So it is now impossible to say, as has been thought, that the *magatama* beads are only indigenous in Japan and any piece found in Korea was an imported object from Japan. But in any case, wherever the *magatama* was used, was the area of the old Japanese civilization expanded, and the people of bead-makers, Tamatsukuribe 玉造部, distributed in various places in Japan, for carrying out the demands of the people, as indicated by the Shinto

(1) In the *Wei-chih* 魏志 (in the passage of the Japanese 倭人傳) we see that "two pieces of big green curved beads" 青大勾珠二枚, &c., were presented to the Chinese court by a native queen, in 247 A. D. These must undoubtedly be jade *magatama* worked in Japan and the oldest record of it.

(2) From the ancient royal tombs at Keishû of the Shiragi period a great number of jade *magatama* have been found, for example, from the Kinkan-tsuka, or Gold Crown Tomb, over 70; from the Zuiho-tsuka or Happy Phoenix Tomb, opened for the honour of the royal visit of the Crown Prince and Princess of Sweden, October 1926, 50 pieces in all; while in Japan the richest record is from Isonokami Shrine, Yamato, 11 in all and 26 from a tomb in Harima, but usually only one or two pieces, if any. A Shinano tomb yielded about 66 jade beads, but they are almost all small and irregular, which can not be compared with other examples.

shrines of the ancestral founder of the bead-workers which existed or still exist⁽¹⁾, manufactured beads until the fashion of bead-wearing went out in the 8th century or so.

Finally, we have to consider why the ancient bead-workers first settled at Tamatsukuri and its vicinity in Idzumo? Kushi-akarutama, the ancestor of the workers, according to our mythology, has no special relationship with Ôkuninushi, the great hero of Idzumo. So it is most probable that the chief reason was the natural condition of products, the jasper, agate, cornelian and rock-crystal from Mt. Kasen, and most probably the hot springs too, attracted them to select the very place as their original settlement. The jade, hard and beautiful and green-coloured, was the chief material to make *magatama*, an amulet as well as an ornament for the ancient Japanese, and this colour itself was the essential character of the beads, and fascinated so profoundly the minds of the ancients. But the imported material was unfortunately so scarce, and especially since the importation was interrupted by some reasons, that people had to find its substitute, at least a material of a similar tint, in our own country. Jasper⁽²⁾ was the very mineral for that purpose, and sought and discovered after hard searching, in Idzumo, at Tamatsukuri. It might have been influenced by the Chinese idea to attach special estimation to jade, as a somewhat divine nature was ascribed to it, though we have no evidence to affirm this supposition. But it is very interesting to see that, notwithstanding that our ancestors were so profoundly influenced by Chinese civilization in every thing of life, they did not adopt the Chinese form of jade ornaments or ritual objects, such as *pi* 璧 or *kuei* 圭, but always preserve their own amulet or ornament form, the *magatama*, &c.⁽³⁾ This shows us how one nation has a strong adherence to its own national traditions, and develops its own history, while on the other hand assimilating the alien civilization of the neighbouring countries.

(1) This can be studied from the list of the shrines given in the Books of Regulations of the Engi era (901—923 A. D.)

(2) It is very interesting to know that the word jasper (Latin *jaspis*, Greek *iaspis*) is a wide spread word as the Hebrew *yashfeh*, Arabic *yeshb*, Assyrian *yashpu*, which all cognate with *yashm* or *yeshm* in Turkestan where denotes jade instead of jasper.

(3) The Three Sacred Treasures of the Imperial House of Japan consist of Sword, Mirror and *Magatama*.

**SUMMARY TABLE OF THE SPECIFIC GRAVITY OF
JADE MAGATAMA, &c., FOUND IN
JAPAN AND IN KOREA,**

In the Collections of the Imperial Mausolea, Imperial Museum of Tokyo,
Imperial University of Tokyo and of Kyoto, Government-General
Museums of Korea at Seoul and at Keishû, &c.

Determination carried out by

Messrs. S. Shimada and A. Koidzumi

Specific G. Provenance	Neph.	Nephrite			Jadeite			Jad.			Total
	2.70-	2.90-	3.00-	3.10-	3.20-	3.30-	3.40-	3.50-9	3.77	4.89	
Neolithic Sites in Japan	3	1	4	3	5	11	1	—	—	—	28
		8			17						
Burial-mounds in Japan	6	5	4	15	52	36	1	1	1	1	122
		24			89						
Burial-mounds in Korea	3	—	6	9	30	46	4	—	—	—	98
		15			80						
Total	12	6	14	27	87	93	6	1	1	1	248
		47			186						