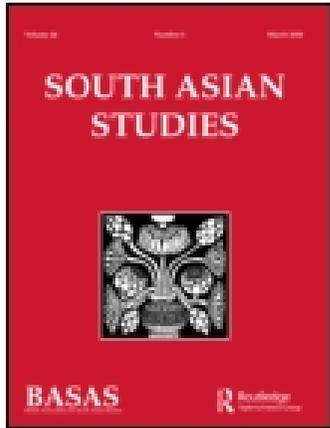


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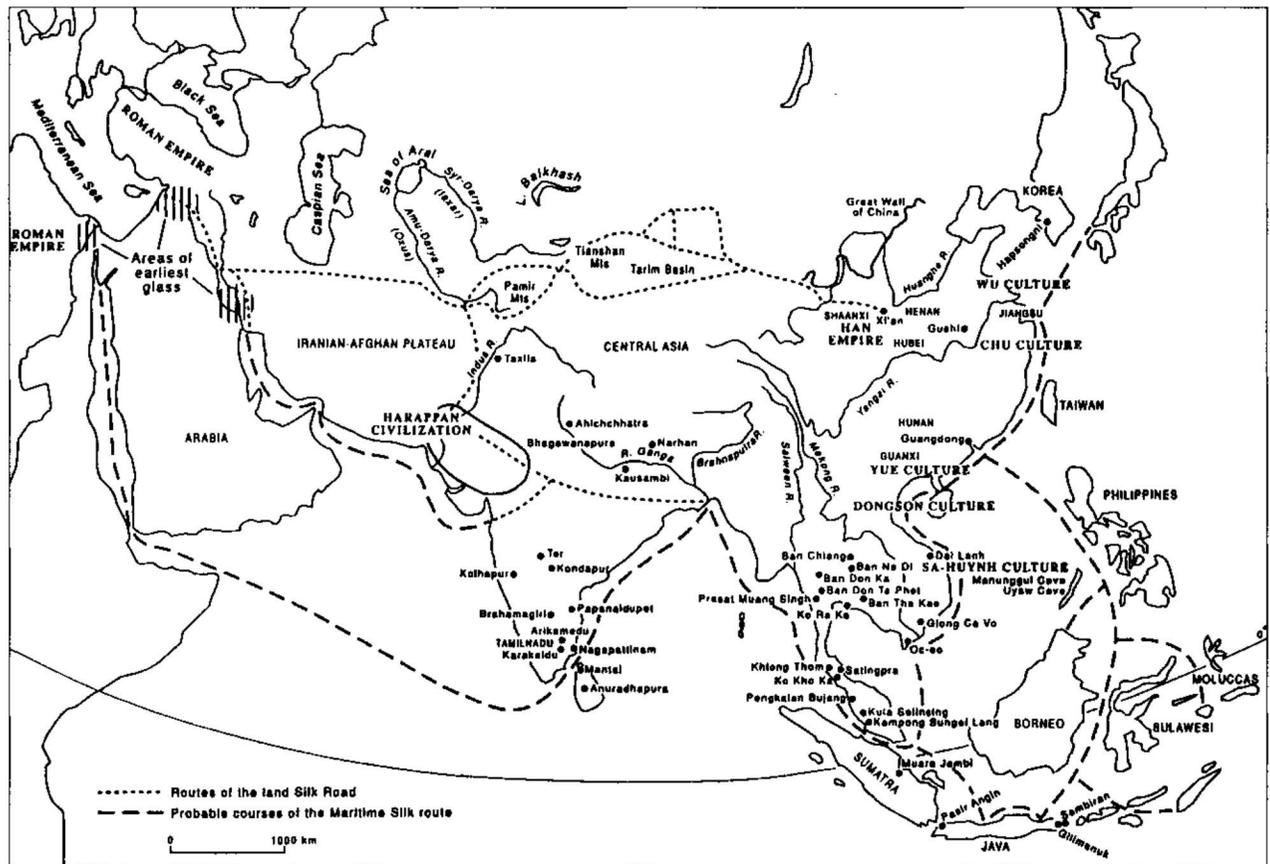
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The Far East, Southeast and South Asia: Indo-Pacific Beads from Yayoi Tombs as Indicators of Early Maritime Exchange

OGA KATSUHIKO and SUNIL GUPTA



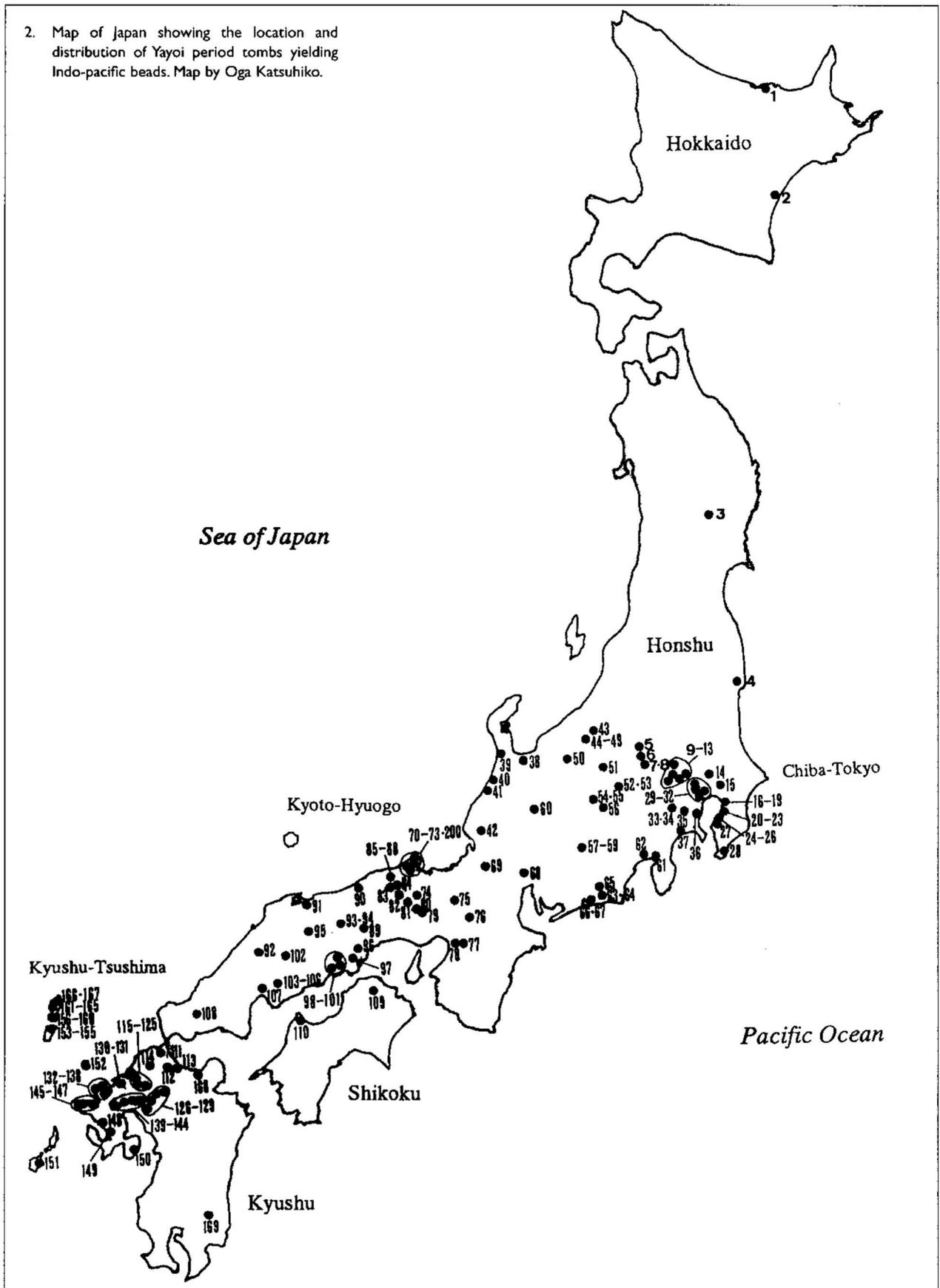
1. Map of the maritime Silk Route showing, *inter alia*, Indo-Pacific bead making sites in South – Southeast Asia and probable sea routes between eastern Indian Ocean to Japan (after Glover and Henderson 1995).

Scope of the paper

An artefactual signature of early long distance trade in the Indian Ocean is observed in the distribution of Indo-Pacific beads. These are a class of glass microbead, appearing in lands as far apart as South Africa and Japan and strung along a continuum from the 3rd century BC to the 14th century AD (Francis 1988-89, 1990). Available evidence shows that the microbeads were first produced at the southern Indian site of Arikamedu in the 3rd-2nd

century BC, and similar production centres emerged in South and Southeast Asia in time (Francis 1990, 1991) (Fig. 1). The microbeads can be distinguished by their circular design (doughnut shaped) and small size (outer diameter range of 6 mm and under). They are monochromatic and cut from 'drawn' glass. A consensus holds on this criterion for isolating microbeads from their bigger cousins (Blair 1973, p. 55; Francis 1991; Lee 1997).¹ Though the microbeads are known under various names, the term Indo-Pacific beads, as coined by Francis,

2. Map of Japan showing the location and distribution of Yayoi period tombs yielding Indo-pacific beads. Map by Oga Katsuhiko.



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is found most appropriate here.² Here the terms 'Indo-Pacific beads' and 'microbeads' are interchangeable.

Our focus is upon Indo-Pacific beads found in Yayoi Culture horizons in Japan and the likely sources of supply of these beads in South - Southeast Asia. Indo-Pacific beads appear for the first time in burials of the Yayoi period (300 BC-250 AD).³ In the succeeding Kofun period (250-600 AD), we find a greater distribution of microbeads in tomb sites, both in terms of quantity and spread.⁴ Since no production centre of Indo-Pacific beads has yet been located in Japan (or neighbouring Korea) we can assert - for the present - that microbeads found in funerary contexts in Yayoi-Kofun Japan were imported from production centres outside these countries.⁵

In the first part of the paper, we submit distributional and quantified data on glass microbeads found in Yayoi funerary sites in Japan.⁶ The data is presented in terms of mapped distribution of tomb-sites yielding microbeads, list of sites including prefectural location, number of microbeads recovered from each site, the colours of the microbeads, quantitative breakdown of beads in terms of colour for each site (where possible) and range of size for each colour category. In the second part - the discussion - the data is analysed from the broader perspective of bead trade between Yayoi Japan and Indo-Pacific bead production centres in the eastern Indian Ocean region.

Sites

Fig. 2 shows the location and distribution of Yayoi period tombs in Japan yielding Indo-Pacific beads. Table 1 lists the sites plotted in Fig. 2 and also presents data on microbeads recovered from each tomb-site. A total of 169 'microbead' tomb-sites have been plotted and listed. This figure does not include tomb-sites recently excavated but not yet reported and excavated sites which are not tombs. By our estimate, the 169 sites represent 70 per cent of Yayoi period tomb-sites in Japan where Indo-Pacific beads have been found. In the listed sites the microbeads are found as grave goods in jar coffins, wooden coffins and stone chamber burials (Figs. 3, 4).

Yayoi tomb-sites yielding microbeads can be bracketed into three broad chronological strata. Indo-Pacific beads appear for the first time in burials of the Early Yayoi period (3rd century BC) and are found again in tomb-sites of the Middle Yayoi period (2nd and 1st centuries BC). In the Late Yayoi period (1st and first half of 2nd century AD) the number of tombs register a dramatic increase over Early-Middle Yayoi burials yielding microbeads. Table 1 shows 2 Early Yayoi burials, 7 Middle Yayoi burials and 160 Late Yayoi burials containing Indo-Pacific beads. In Fig. 2 we can see that most of the 'microbead' sites are located on north-east Kyushu and southern Honshu. Three areas of concentration are

conspicuous: Kyushu-Tsushima Island; Kyoto-Hyogo Prefectures; and Chiba-Tokyo Prefectures. However very few Yayoi tombs containing microbeads are to be found on the islands of Shikoku and Hokkaido. In Kyushu and Honshu itself, we can discern the 'sparse' areas of southern Kyushu and eastern Honshu.

Quantity

Total number of microbeads in Table 1 : 50,180. Forty-five sites yield beads in the range 1 - 10; 62 in the range 10 - 100; 48 in the range 100 - 1000 and 12 in the range 1000 - 10000. The greatest number of microbeads from Yayoi contexts have been recovered from Kyushu-Tsushima area. The tombs in this area yield microbeads in multiples of hundred and some in multiples of thousand. The biggest hoard of microbeads has been reported from Tsushima island where more than 9000 microbeads were recovered (Mizuno *et al.* 1953). However, similar number of microbeads have been recently excavated from late Yayoi tombs in Kyoto Prefecture, suggesting that bead importation into Honshu was no less than Kyushu (see sites no. 72, 73 in Table 1).

Our quantification of microbeads indicates substantial importation of Indo-Pacific beads in the first two centuries of the Christian Era. The greatest number of microbeads have been recovered from Late Yayoi contexts. From Fig. 1 we can see that 5 beads were found in Early Yayoi tombs, 12 in Middle Yayoi tombs and 50,163 in Late Yayoi tombs.

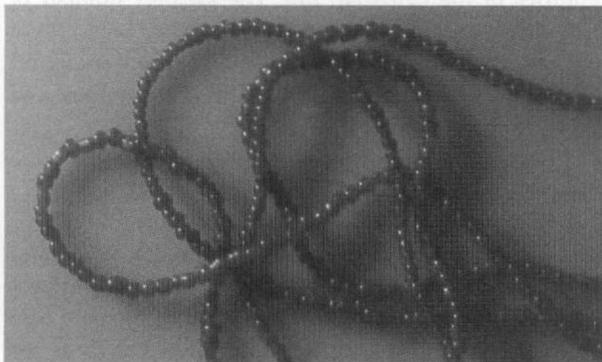
Colours

We have been able to examine personally Yayoi and Kofun period microbeads in a number of prefectural museums and archaeological institutes in Kyushu and Honshu. In Kyushu area we studied beads from the Yayoi period tombs of Suku-Okamoto, Futatsukayama, Monden, Shioigake, Suku-Tounashi, Uchihata and Koutyoujinjya and Kofun period tomb of Monden. In the Kyoto area we examined beads from the Yayoi period tombs of Kanaya, Sasaka, and Naguoka and Kofun period tombs of Shimooka and Atagojinjya. At Ishinomaki City Centre north of Tokyo one of us (SG) could see the 'northern-most' beads on Honshu. We believe our study tour exposed us to a fairly representative corpus of Indo-Pacific beads in Japan.

Among the Yayoi period microbeads, the most common colour observed was blue; in hues of cobalt blue, light blue and blue-green (Fig. 4). Green beads came next, though their numbers were much less than the ubiquitous blue. The green beads can be grouped into the translucent and opaque variety. Red or reddish brown beads of opaque variety constituted the smallest number among the Yayoi beads. The basic microbead



3. Jar coffins of the Late Yayoi period (1st-2nd century AD). Suku- Okamoto tomb, Fukuoka prefecture, Kyushu. Photo by Sunil Gupta.



4. Blue coloured Indo-Pacific beads from the late Yayoi tombs at Monden, Fukuoka prefecture, Kyushu. Photo by Sunil Gupta.

colours of the Yayoi period – blue, green, red – seemed also the basic colours in Kofun times. However, while the blue and blue-green still prevailed numerically among the Kofun period microbeads, we observed a larger number of opaque red beads and a new colour – opaque yellow. Opaque green beads were also present in the Kofun period collections. Some of the opaque reds in the Yayoi-Kofun contexts had dark ‘strips’ and are similar to the *mutisalah* beads found in Southeast Asia. The figures in Table 1 reflect our observations on the ground. Numbers were as follows: Light Blue beads: 23,874; Cobalt Blue beads: 15961; Green: 2865; Violet: 663 and Red-Brown: 341.

Size-Range

In terms of size, most of the beads ranged between 2.5 to 5 mm in outer diameter. However, a few red and violet beads were extremely small – 1 to 2 mm outer diameter – and had to be observed through a magnifying glass. The term in usage in Japan for the ‘small’ microbeads is *awadama* and the ‘larger’ microbeads are called *kodama* (Blair 1973; Fujita 1994)

Discussion

The largest number of Indo-Pacific beads have been found in northern Kyushu. This is the area of original Yayoi settlement in Japan. (Kanaseki 1986, pp. 317-333). Northern Kyushu – Tsushima area is very close to southern Korea where we also find substantial deposition of Indo-Pacific beads. Other recorded areas of microbead concentration in the Far East are southern China and Luzon region of Phillipines. However, no production facility for making Indo-Pacific beads has yet come to light in any of the above areas. In all likelihood, glass crafting centres in South and Southeast Asia were the sources of supply of microbeads to Japan and the Far East in early-mid 1st millennium AD. Apart from the ‘pioneering’ production facility at Arikamedu in south India, a number of microbead production centres have been identified in Sri Lanka, Malaysia, Thailand and Vietnam (Fig. 1). Francis (1991, pp. 34-36) posits that

Indo-Pacific bead making techniques spread to Southeast Asia from southern India at the turn of the Christian Era. In its essentials, this network of microbead production centres stretching from Arikamedu to Oc Eo was sustained by shared glass working technology and interaction between craftsmen.⁷ The demand for microbeads in the Far East may have been a factor in the formation of an 'integrated' South-Southeast Asian bead production base. The great demand for microbeads in Japan can be gauged by the fact that almost 90% of crafted glass found in Yayoi Japan constitute Indo-Pacific beads. With regard to the evidence from the Philippines, Francis (www.thebeadsite.com) estimates that Indo-Pacific beads comprised 66% of all beads of all material dated from 1-1200 AD. Though quantified figures of microbead deposition in China and Korea are not available to us, the published literature indicates substantial deposition of microbeads in these regions.⁸

In the context of factors discussed above, a specific line of analysis is proposed. The analysis focuses upon blue microbeads found in Yayoi tombs. As we have pointed out, blue microbeads – of cobalt blue and light blue colour – are numerically predominant among the Indo-Pacific beads recovered from Yayoi burials. Blue microbeads have been found in almost all the sites listed in Table 1. This constitutes about 90% of the beads aggregated by us. Results of chemical compositional analysis of Indo-Pacific beads published in Japan are mostly of blue microbeads. A review of analysed results of blue microbeads from Yayoi tomb shows – invariably – a high potassium (12–20%) and low sodium (0.2–2%) composition by weight percentage.⁹ Yayoi Japan was importing blue microbeads in bulk, presumably from one or more production centres in the eastern Indian Ocean. High potassium – low sodium glass and glass beads have been found in early-mid 1st millennium AD contexts in Southeast and South Asia. In Table 2, compositions of blue glass (beads and waste) are presented from two tomb-sites of Yayoi Japan (Sasaka and Miyanomae) and the beadmaking centres of Tra Kieu in Vietnam, Ban Chiang in Thailand and Arikamedu in India. The compositions of Indo-Pacific beads found in the Yayoi tombs of Sasaka and Miyanomae are found to be close to results obtained from blue glass finds at Tra Kieu, Ban Chiang and Arikamedu. Interestingly, blue microbeads comprised the highest quantity of microbeads produced at Arikamedu. A census of Indo-Pacific beads from Arikamedu carried out by Francis (1987, p. 16) revealed that 42% of the beads are of blue colour followed by red microbeads at 33%. Francis (1990a, pp. 1–21) places the blue microbeads in his 'non-red' category which show a high potassium composition relative to sodium at Arikamedu. This is corroborated by compositional analysis of blue glass from Arikamedu carried out by

Henderson (in Henderson and Glover 1995, p. 162; Table 2). The numerical dominance of blue glass microbeads at Arikamedu is similar to the situation in Yayoi Japan, where blue microbeads are also dominant in the corpus. This correlation appears close when we juxtapose it with the similar chemical composition of blue glasses from Arikamedu and Yayoi sites (Table 2). Are some of the blue microbeads in Yayoi tombs from South India?

However, high potassium – low sodium blue glass is also found in Southeast Asia. Pieces of translucent blue glass waste were recovered from Khuan Lukpad in southern Thailand (Glover and Henderson 1995, p. 149) and Tra Kieu in coastal Vietnam (Table 2). As we show in Table 2, the blue glass waste fragment from Tra Kieu also has the same chemical composition as the blue glasses from Arikamedu and the Yayoi sites. The question is, do these wastes represent cullet imported from South Asia or glass made in Southeast Asia itself. The origin of high potassium glasses found in Southeast Asia and the Far East is a much debated issue. Brill (1973, p. 73), commenting on potash glasses in Han period contexts in China says that "potash glasses include some typically Chinese forms, but in addition there are beads which could just as well have been made somewhere other than China." On this subject Insook Lee (1997, p. 17) says: "potash glass found in Korea has a compositional ratio similar to that of the potash glass of the Han dynasty in China. But the manufacturing places of potash glass – whether in China or somewhere in Southeast Asia – remain unknown." Glover and Henderson (1995, p. 153) are of the opinion that potash glasses found in early Southeast Asian contexts are both South Asian imports and those of local manufacture. To quote: "we can say several types of beads are found in Southeast Asia, some are typically Indian, some probably locally made, and it is fair to assume that more than one centre in India exported glass beads. However, there is increasing evidence to show that some of the low alumina potash glasses were made in South East Asia or possibly in South China, in the late 1st millennium BC."¹⁰

On the basis of the above observations, especially the compositional correlations for blue microbeads presented in Table 2, it is not far fetched to surmise that microbeads consignments from Southeast Asia to Yayoi Japan may have consisted of beads of both Indian and Southeast Asian manufacture. Also, the archaeological record indicates dynamic interconnections between the process of microbead production in South-Southeast Asia and importation of microbeads into Japan from late 1st millennium BC to late 1st millennium AD. In Japan, the earliest microbeads are found in Early-Middle Yayoi contexts dated to 3rd – 1st century BC. However, these are few in number, aggregating 5 beads from Early Yayoi tombs (3rd century BC) and 12 from Middle Yayoi tombs (2nd – 1st century BC) (see Table 1; Naguoka, a secondary

beadmaking site is not taken into account. See explanation in note 5). Nevertheless, the bead deposition in Early-Middle Yayoi period is worthy of close study as it represents the very first importations and, implicitly, the formation of a nascent market for microbeads in early Iron Age Japan. The earliest microbead depositions in Japan indicate that maritime networks had become active between Southeast Asia and the Far East in the 3rd century BC. This is broadly the time when bead trade started between India and Southeast Asia. The site of Ban Don Ta Phet in Thailand, dated to 4th century BC on the basis of carbon 14 determinations, has yielded a large number of Indian stone and glass beads. About 40% of the glass beads from BDTP constitute Indo-Pacific beads (Glover and Henderson 1995, pp. 148-150; Glover 1996, pp. 365-400). There is no credible evidence for manufacture of Indo-Pacific beads in Southeast Asia as early as the 4th-3rd century BC. On the other hand, there is evidence of microbead production in South Asia in this period. Arikamedu began to manufacture microbeads from the 3rd century BC and continued till the 17th century AD (Francis 1990b, p. 3; personal communication).

From South Asia, microbead technology spread to the following beadmaking centres in Southeast Asia: Klong Thom or Khuan Lukpad (Thailand) in 1st - 2nd century AD and Oc-Eo (Vietnam) in 2nd - 3rd century AD. These sites continued to produce Indo-Pacific beads at least till the 7th century AD.¹¹ Interestingly, importation of microbeads into Japan registers a sharp increase from the 1st century AD. From our data we find 9 sites in Early-Middle Yayoi period yielding 17 microbeads compared to 160 tomb-sites in Late Yayoi period yielding 50, 163+ microbeads. The figures indicate dramatic increase in imports of Indo-Pacific beads into Japan in the beginning of the Christian Era. The sharp rise in depositions of microbeads in Japan coincides with the spread of microbead production centres from South to Southeast Asia in the same period. The parallelism suggests that Late Yayoi period Japan had become closely integrated into the maritime networks of the Far East - Indian Ocean. It is posited that the eastward 'migration' of bead making centres from South-Southeast Asia was motivated, *inter alia*, by the lucrative Far Eastern markets, Japan included.

The markets of the Far East continued to grow. Microbeads occur as grave goods in Japan till the end of the Kofun period in 7th century AD (Blair 1973; Fujita 1994). We have pointed out that the importation of microbeads into Kofun period Japan (3rd - 7th century AD) was much more than in the Late Yayoi period (see Note 4). Southeast Asian centres like Klong Thom and Oc Eo carried on producing microbeads till the 6th - 7th century AD. Oc Eo, in particular, seems to have been oriented towards the Far Eastern markets. After Oc Eo

was abandoned in 7th century AD, bead making 'regressed' westwards, the craftsmen searching out new centres in Thailand, Malaysia and crossing again to South Asia (Francis 1990b; 1991). The parallelism between the end of bead production at Oc Eo and the end of importation of microbeads into Japan in the 7th century AD indicates snapping of regular trade contact. The congruence between 'core' manufacturing period of microbeads in South-Southeast Asia and their period of importation into Japan (1st - 7th century AD) is conspicuous. Rising demand for microbeads in Late Yayoi-Kofun period Japan, and in other contemporaneous markets of the Far East, must have played a catalytic role in the diffusion and consolidation of bead making centres in South-Southeast Asia in early-mid first millennium AD.

The parameters discussed above for bead trade between Yayoi Japan and South-Southeast Asia are connected to several collateral themes. Possibilities of early contact and interchange between Jomon-Yayoi Japan and Island Southeast Asia is one pertinent subject. Bellwood (1997, pp. 306-307), discusses common material culture traits in the jar burial culture tradition stretching from the Philippines through the Batan Islands to Japan and hypothesises such contact. Microbeads are ubiquitous grave goods in this funerary zone (Solheim 1960, pp. 115-146; Fox 1985, pp. 4-23). The 'southern hypothesis' on the origin of the Japanese language links it with Austronesian diffusions from, *inter alia*, Southeast Asia (Hudson 1996, pp. 267-279 for review). Can we think of a maritime trade corridor to Japan through the Philippines and Taiwan functioning at the turn of the Christian Era? The delineation of such a corridor for the bead trade has to take into account the other probable route for the bead trade: up along the coast of China to Korea-Japan. The ancient Chinese text *Sangokushi* (dated to 3rd century AD) describes a traditional coastal route from China to Wa (Japan) (Choi 1997, pp. 5-13). The microbeads in Late Yayoi tombs are often found with iron tools and some decorated bronze mirrors imported from China. The grave goods - microbeads, iron tools and mirrors - may have been imported along the coastal route described in *Sangokushi*. The issue of early bead trade between Japan and eastern Indian Ocean region also creates the imperative to search for evidence of early maritime traditions. Legends in the early chronicles of Japan and Korea speak of the arrival of seafaring communities and their contribution to the genesis of early dynasties. The first volume of the *Kojiki* and *Nihon Shoki*, the oldest Japanese chronicles, speak of the daughter of the Ocean People giving birth to the Emperor Jinmu who established the Kingdom of Yamato at Nara in the 3rd-4th century AD. The Korean chronicle *Samguk Yusa*, informs that the first queen of the Kaya kingdom in southern Korea (1st - 4th century AD) came



5. Reconstruction of a Yayoi village.

from the 'south' in a ship with red sails. Commentators see in these legends pointers to early maritime conduits linking the Far East with the eastern Indian Ocean region.¹³ It is along these routes that the microbeads must have been traded.

Primarily, our endeavour has been to present a preliminary database on Indo-Pacific beads in Yayoi

Japan and offer a working hypothesis with regard to possible sources of acquisition of these beads. The provenancing of microbeads – especially the blue variety – from Yayoi tombs will remain 'open ended' till we know fully about early glass manufacturing in Southeast Asia and even southern China. In South Asia, more chemical analyses of microbeads from Arikamedu and other contemporaneous sites are required to generate a credible compositional record for comparing with tested data from microbeads found in Southeast Asia and the Far East. Within Japan, the chemical composition analyses of 'non-blue' beads, especially green and red microbeads, has been neglected. This lacuna inhibits comparing the full colour range of Japan microbeads with the South-Southeast Asian corpus. These issues have to be resolved. The study of Indo-Pacific beads in Japan is not only relevant in itself but also to the larger questions of material culture spread and long distance contact along yet unknown conduits between the Far East and the Indian Ocean region.

Table 1. Detailed list of early, Middle and Late Yayoi tombs yielding Indo-Pacific beads.

Numbers in the first column to site numbers in Figure 2.

Colours – CB = Cobalt Blue, BL = Light Blue, VI = Violet, GR = Green, BR = Brown

Map	Early Yayoi Site	Tomb	Prefecture	Bead	Colour	CB	BL	VI	GR	BR
115	Yoshitake-Takagi	1	Fukuoka	1	CB	1				
140	Higashiyamada-Ipponsugi	1	Saga	4	CB	4				
Map	Middle Yayoi Site	Tomb	Prefecture	Bead	Colour	CB	BL	VI	GR	BR
78	Kami	2	Osaka	2	BL		2			
80	Nanokaichi	1	Hyogo	1	BL		1			
89	Nagao-Okita	1	Hyogo	1	CB	1				
93	Nishiyoshida	1	Okayama	5	CB BL	1	4			
132	Kashiwazaki-Matsumoto	1	Saga	1	CB	1				
133	Nakabaru	1	Saga	1						
149	Tominoharu	1	Nagasaki	1	CB	1				
200	Naguoka	–	Kyoto	50+	BL		50+			
Map	Late Yayoi Site	Tomb	Prefecture	Bead	Colour	CB	BL	VI	GR	BR
1	Tokorogawakou	1	Hokkaidou	20						
2	Tokachi-Futowakatsuki	3	Hokkaidou	13	BL		13			
3	Tokiwahinomachi	1	Iwate	2	BL		2			
4	Hirakubomoroni	1	Fukushima	1						
5	Arima	49	Gunma	318	CB BL	15	303			
6	Nishiuraminami	2	Gunma	21	BL		21			
7	Shinbo	3	Gunma	4	CB BL	1	3			

Map	Late Yayoi Site	Tomb	Prefecture	Bead	Colour	CB	BL	VI	GR	BR
8	Shinbo-Tanakamurae	4	Gunma	86	CB BL	36	50			
9	Yakushikouchimae	2	Saitama	15	CB BL	6	9			
10	Azumanoue	3	Saitama	16	CB	15	1			
11	Kitadohri	1	Saitama	31	CB	31				
12	Joudaiji	1	Saitama	43	CB BL	41	2			
13	Inumakata	4	Saitama	32	CB BL					
14	Ishiage	3	Chiba	45	CB BL	1	44			
15	Osaruyama	1	Chiba	44	CB BL	6	38			
16	Odappe	1	Chiba	300 ±	CB	300 ±				
17	Goudo	2	Chiba	400 +	CB BL					
18	Choubeidai	3	Chiba	43						
19	Noumankamikaizuka	1	Chiba	23	CB BL	10	13			
20	Sakai	1	Chiba	21	CB	21				
21	Shimizui	3	Chiba	77 ±	BL		77 ±			
22	Biso	2	Chiba	52						
23	Fumiwaki	1	Chiba	17	CB BL	10	7			
24	Koushinzuka	3	Chiba	197	CB BL	14	183			
25	Ohatadai	1	Chiba	1	CB	1				
26	Miyawaki	2	Chiba	44	CB	44				
27	Sekinomae	2	Chiba	64	CB BL	19	45			
28	Takeda	1	Chiba	3						
29	Maruyamahigashi	3	Tokyo	70	CB BL	41	28			
30	Wadaborikouen	1	Tokyo	12						
31	Nishiwasedasanchoume	1	Tokyo	18	CB	18				
32	Denenchoufuminami	1	Tokyo	8	CB	8				
33	Utsuki-Mukaihara	3	Tokyo	10	CB BL	8	2			
34	Fujimichou	3	Tokyo	14	CB	14				
35	Tamanyutaun No 200	1	Tokyo	1	BL		1			
36	Ukechidaiyama	1	Kanagawa	182	CB BL	20	162			
37	Oujinodai	1	Kanagawa	7	CB BL	6	1			
38	Minamitaikouyama I	1	Toyama	5	BL		5			
39	Nakanuma C	1	Ishikawa	112	BL		112			
40	Asahi	1	Ishikawa	2	CB	2				
41	Hiraomote-Kakehashigawa	1	Ishikawa	7	BL		7			
42	Nishiyama	1	Fukui	18	BL		18			
43	Ushidekoyou	1	Nagano	3	BL		3			
44	Isemya	1	Nagano	9	BL		9			
45	Honmura-Higashioki	2	Nagano	14	BL		14			
46	Ishikawajouri	3	Nagano	17	CB BL	2	15			
47	Shinonoi	10	Nagano	73	CB BL	4	69			
48	Kitadaira	2	Nagano	14	CB BL	6	8			

Map	Late Yayoi Site	Tomb	Prefecture	Bead	Colour	CB	BL	VI	GR	BR
49	Murahigashi-Yamate	3	Nagano	17	BL		17			
50	Nakajoubara	4	Nagano	47 +						
51	Udehara	2	Nagano	24						
52	Suouhata B	1	Nagano	13						
53	Takedamine	1	Nagano	2	CB	2				
54	Okachugakkou	1	Nagano	110	CB BL	108	2			
55	Nakabasami	1	Nagano	135	CB BL	27	108			
56	Ieshita	1	Nagano	72	CB BL	5	67			
57	Gongendoumae	1	Nagano	1						
58	Ishikohara	1	Nagano	2	CB	2				
59	Shimizu	1	Nagano	42						
60	Tsurune	1	Gifu	17	CB	17				
61	Kitajinmedote	1	Shizuoka	32	CB BL	18	14			
62	Nakano	2	Shizuoka	16	CB BL	9	7			
63	Takao-Mukaiyama	7	Shizuoka	111	CB BL	16	95			
64	Aino-Mukaiyama 2	6	Shizuoka	39	CB BL	4	35			
65	Mineyama	1	Shizuoka	1						
66	Shiroyama	1	Shizuoka	217 +	BL		217 +			
67	Shimotaki	8	Shizuoka	255	CB BL	1	254			
68	Asahi	5	Aichi	200	CB BL	1	199			
69	Kuroda-Nagayama	2	Shiga	428	CB BL	8	420			
70	Ohyama	5	Kyoto	269+	CB BL	2	267			
71	Kanaya	2	Kyoto	259	CB VI	32		227		
72	Sasaka	17	Kyoto	2041	CB BL	11	2030			
73	Misakajinija	17	Kyoto	3009	CB BL	145	2864			
74	Houzousan	1	Kyoto	252	BL		252			
75	Tou	1	Kyoto	5	BL		5			
76	Shibagahara	1	Kyoto	1563	BL		1563			
77	Komahaiji	1	Osaka	13	BL		13			
79	Naibayama	2	Hyogo	132	BL		132			
81	Borayama	4	Hyogo	101	BL		101			
82	Katitsubo-Nakayama	3	Hyogo	586	CB BL	317	269			
83	Yagi-Nishimiya	1	Hyogo	6	BL		6			
84	Irusayama	2	Hyogo	500						
85	kamata-Wakamiya	1	Hyogo	7	BL		7			
86	Kamihachiyama-Higashiyama	4	Hyogo	380	CB BL	23	357			
87	Tsuchiyagahana	2	Hyogo	18	BL		18			
88	Kasumi-Mondani	11	Hyogo	1109						
90	Katsurami	1	Tottori	6	CB	6				
91	Yoshitani-Uenoharayama	1	Tottori	271	BL		271			
92	Junnanbara	2	Shimane	63	BL		63			

Map	Late Yayoi Site	Tomb	Prefecture	Bead	Colour	CB	BL	VI	GR	BR
94	Arimoto	1	Okayama	3						
95	Nishie	2	Okayama	22	BL		22			
96	Yotsuji	1	Okayama	21	CB BL	3	18			
97	Yatoujiyama	1	Okayama	50	BL		50			
98	Tatetsuki	1	Okayama	94	CB	94				
99	Tsujiyamada	1	Okayama	80+	BL VI		10+	70+		
100	Ibushidani	1	Okayama	665+	CB BL	658+	7			
101	Wada	2	Okayama	28	CB BL	26	2			
102	Yatani	2	Hiroshima	6	CB	6				
103	Shigatani	1	Hiroshima	4	BL		4			
104	Goma No 4	1	Hiroshima	5	BL		5			
105	Goma No 5	1	Hiroshima	36	CB BL	7	29			
106	Joufukuji	3	Hiroshima	34						
107	Ege	1	Hiroshima	1	CB		1			
108	Asada	2	Yamaguchi	170	CB BL BR	62	106			2
109	Gokurakuji	3	Kagawa	21	BL		21			
110	Karakodai	2	Ehime	42	CB BL	38	4			
111	Takatsuo	1	Fukuoka	53	CB BL					
112	Tokunaga-Kawanoue	6	Fukuoka	218	CB BL BR	190	26			2
113	Anagahayama	3	Fukuoda	15	CB BL					
114	Shioigake	7	Fukuoka	826	CB	714				
116	Miyanomae	1	Fukuoka	128	CB BL GR	12	60		56	
117	Houmano	1	Fukuoka	540	CB BL	535	5			
118	Nokata-Nakabaru	2	Fukuoka	13	BL		13			
119	Nokata-Kubo	1	Fukuoka	20	BL		20			
120	Hiwatashi	2	Fukuoka	51						
121	Karumerushoudouinnai	2	Fukuoka	715	CB BL	632	83			
122	Suku-Okamoto	3	Fukuoka	2131	BL VI		2115	16		
123	Suku-Tounashi	1	Fukuoka	151	CB BL GR BR	61	64		22	4
124	Morden	4	Fukuoka	1422+	CB BL GR	1052+	29		341+	
125	Okerayama	1	Fukuoka	4	CB	4				
126	Tsukoshougake	1	Fukuoka	57	BL		57			
127	Kouchoujinjya	1	Fukuoka	335	BL GR		1		334	
128	Kitsunozukaminami	1	Fukuoka	1	BL		1			
129	Ichinosau	2	Fukuoka	2226	CB BL	1985	241			
130	Mikumo	1	Fukuoka	8	CB BL	1	7			
131	Hiabaru	2	Fukuoka	700+	CB BL BR	400±	+			300±
134	Ukikunden	2	Saga	37	CB	35				
135	Sakuranobaba	1	Saga	1						
136	Tajima	2	Saga	105+	CB BL	1	104+			
137	Ohtomo	1	Saga	286	CB BL	95	191			

Map	Late Yayoi Site	Tomb	Prefecture	Bead	Colour	CB	BL	VI	GR	BR
138	Shiotsuru	1	Saga	73	CB GR	45			28	
139	Honkoku	1	Saga	7						
141	Tsubuteishi B	1	Saga	2	BL		2			
142	Hichigase	1	Saga	251	CB	251				
143	Futatsukayama	2	Saga	3575	CB BL	1083	2490			
144	Uchihata	1	saga	1969	BL		1969			
145	Tasuke	1	Nagasaki	418	CB BL	148	267			
146	Nakanonotsuji	3	Nagasaki	457	CB BL	454	3			
147	Kayanoki	1	Nagasaki	350 ±	VI			350 ±		
148	Shiraigawa	2	Nagasaki	41						
150	Imafuku	2	Nagasaki	4	CB	4				
151	Ippongi	1	Nagasaki	210 ±						
152	Harunotsuji	11	Nagasaki	850 ±	CB BL VI GR BR	336	137	+	14	4
153	Byakurenkouura No 2	1	Nagasaki	60	CB BL					
154	Takahamahinata	2	Nagasaki	+						
155	Kagarimatsubana	1	Nagasaki	1178	CB	1178				
156	Tousaki	1	Nagasaki	40 +	CB BL					
157	Sahoura-Akasaki	1	Nagasaki	321						
158	Kuroki-Minamibana	1	Nagasaki	1047						
159	Harou	4	Nagasaki	788 +	CB BL					
160	Kannonbana	1	Nagasaki	3	CB BL	2	1			
161	Kisaka	4	Nagasaki	224	CB BL GR BR	17	195		9	3
162	Shimogayanoki	1	Nagasaki	771	BL		771			
163	Kamigayanoki	1	Nagasaki	+						
164	Takamatsunodan	1	Nagasaki	290	CB BL					
165	Shiinoura	2	Nagasaki	385	CB BL GR BR	190	36		136	21
166	Tounokubi	3	Nagasaki	9643 +	CB BL GR BR	4126	2920		1879	2
167	Kyounokuma	3	Nagasaki	339	CB BL GR BR	59	231		46	3
168	Mega	1	Oita	1						
169	Ohagi	2	Miyazaki	641	CB BL	21	620			

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(serial numbers relate to site numbers in Fig. 2)

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Table 2: Comparison of chemical composition of blue glasses from early-mid first millennium A.D. sites in Japan, Vietnam, Thailand and India

Samples

Sasaka and Miyanomae (Japan), Cobalt blue Indo-Pacific beads; Tra Kieu (Vietnam), Cobalt blue fragment of waste; Ban Chiang (Thailand), Translucent blue long barrel bead; Arikamedu (India), cobalt blue fragment of waste.

Source

Sasaka and Miyanomae: Koewka 1995: p.943, table 6(3), nos. 4, 17; Tra Kieu and Ban Chiang: Salisbury and Glover 1997: table 1, nos. 1 & 19, table 3, nos. 1 & 19; Arikamedu: Glover and Henderson 1995: 162.

	SiO ₂	K ₂ O	Na ₂ O	Al ₂ O ₃	CaO	MgO	PbO	MnO	CuO
Sasaka	74.7	1 9.4	0.5	1.5	0.8	0.4	—	1.14	0.02:
Miyanomae	74.4	1 8.4	0.2	2.3	0.6	0.3	—	2.4	0.04
Tra Kieu	76.33	17.46	0.49	2.06	1.02	0.1	0.1	0.98	0.1
Ban Chiang	76.41	16.44	0.14	2.98	0.82	0.1	0.1	1.03	0.1
Arikameau	72.9	12.9	0.7	1.8	1.3	0.3	—	2.1	—

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NOTES

- Blair (1973, p. 55), "The essential difference between marudama and kodama is a matter of size. The point of division is a bit vague, but it may be considered that marudama are approximately 0.5 centimetre or more in diameter and the kodama anything smaller than that."
 Francis (1991, p. 33), "...by far the the most common Arikamedu bead was monochrome drawn bead, usually under 6mm in diameter."
 Lee (1997, p. 18), "Generally, the technology of making tiny glass beads (size: 1-2 mm or smaller) in many different colours reflects a highly developed technique with a long tradition. So we can presume that these beads were imported (into Korea) from ancient bead production centres like those in India or Thailand or somewhere else in Asia."
- Scholars have discussed the microbeads under various names. These appellations are usually derived from the regions where the microbeads are found. They are called Trade Wind Beads in the East African context (Francis 1990b, pp.1-2). In Southeast Asia, the term mutasilah (false pearl) has been current for the microbeads (Francis 1990b, pp. 1-2). In Japan, the microbeads are known by the term kodama (Blair 1973, p. 55) and the 'smaller' microbeads,

- those less than 2 mm in outer diameter are called awadama (personal observation of labels in Kasuga City Museum displaying red awadama beads). The term Indo-Pacific beads introduced by Francis (1990b, pp. 1-2; www.thebeadsite.com) is the shortened form of 'Indo-Pacific Monochrome Drawn Glass Beads.' According to Francis the unabridged term indicates the area of distribution, colour, method of manufacture and material of the microbeads.
- 3 The Yayoi Culture (300 BC - 250 AD) brought about a transformation of Japanese society. Drawing from the preceding 'neolithic' Jomon Culture and infused with new technologies and ideas brought by immigrants from outside the island, the Yayoi Period saw the introduction of iron tool technology, large scale rice cultivation, and spread of settlements (Barnes 1986).
 - 4 We estimate about 5000 Kofun tombs. The quantity of microbead deposition is much greater than in Yayoi period. For instance, just one Kofun tomb of Fujinoki Kofun at Nara has yielded 16,000 microbeads.
 - 5 The first evidence for glassmaking in Japan comes from a lead glass production site in Asuka Village, Nara Prefecture dated to 7th century AD (Koezuka and Yamasaki 1995, pp. 469-474). During the Middle Yayoi period (1st-2nd century BC) a secondary centre of bead making existed at Naguoka, Kyoto Prefecture. Here, imported glass beads were cut up and the pieces drilled to make smaller beads. These secondary beads are found in inland sites in eastern Honshu (site no. 200 in Table 1; Fig. 2).
 - 6 *Inter alia*, this paper is motivated by the realization that, outside of Japan, there is little information in circulation about the rich evidence of Indo-Pacific microbeads found in the country. This, in our opinion, is primarily due to the fact that nearly all the material on the Japan microbeads published so far is in Japanese, a language unfamiliar to most non-Japanese scholars studying microbeads. We therefore hope that our paper goes some way to fill this lacuna. The paper is addressed to an audience in Japan as well, for this is the first attempt to 'integrate' data on microbeads from Yayoi tombs.
 - 7 Francis (1991, pp. 34-35) identifies Indo-Pacific bead making sites in South-Southeast Asia on the basis of 'a wide spectrum of diagnostic wasters.' He specifically identifies two bead making centres - Khlong Thom and Oc Eo - as having direct links with Arikamedu. He projects a dynamic continuation of the bead making tradition beginning with migration of south Indian craftsmen to Southeast Asia. Though we need to know more about the ethnic roots of Indo-Pacific bead makers, Francis' projection is not far-fetched. We can imagine a generational handing down of skills. In particular, this may have been the case with the bead making centres of Khlong Thom/Khuan Lukpad and Kuala Selinsing where Indo-Pacific beads were produced from early to late 1st millennium AD (Glover and Henderson 1995, pp. 148-150).
 - 8 Thousands of monochrome drawn beads have been reported from Han period tombs in Guangxi Province of China (Huang 1991, pp. 185-192). Prof. Huo Wei of the University of Sichuan (personal communication) informs that southern China has a substantial concentration of microbeads. For microbeads in Korea see Lee (1993, pp. 5-13; 1994, pp. 65-82; 1997, pp. 14-23).
 - 9 We have reviewed most of the results published on chemical composition analysis of blue microbeads of the Yayoi Period. The results of lead isotope analysis of blue microbeads have not been discussed in this paper and thus not included in the references. Compositional data of blue microbeads from the following Yayoi tombs has been taken into account: Sasaka (Koezuka 1994, pp. 159-166; Koezuka 1995), Miyanomae (Koezuka 1995), Houmano (Koezuka 1995), Karako-Kagi (Koezuka 1995), Kokuryo (Koezuka 1995), Naibayama (Koezuka 1995), Kitajinme-Dote (Koezuka 1997, pp. 236-239), Misakajinjya (Koezuka and Kogure 1998, pp. 105 - 112), Hirabaru (Kyushu Kankyou Kanrikyoukai 1991, pp. 229-235), Mikumo (Mochizuki 1983, pp. 271-275), Odappe (Oda 1972, pp. 35-37), Futatskyama (Tomizawa 1979, pp. 233-241).
 - 10 Glover (persn. comm) now believes that most of the potash glasses in Southeast Asia - southern China were made somewhere in the region itself.
 - 11 The site of Khlong Thom is located in Krabi Province of Thailand. The mound is locally known as Khuan Lukpad (Bead Hill) and is highly disturbed on account of unauthorised digging. No coherent stratigraphic record is available for the site. However, Roman seals dated to the 1st century AD and 'collar beads' similar to those from Arikamedu indicate that Khlong Thom had started bead production in the beginning of the Christian Era (Francis 1990b, pp. 5-7; Bronson 1990, pp. 213-229; Glover and Henderson 1995). Oc-Eo, on the coast of south Vietnam was occupied from the 2nd to 7th century AD (Francis 1990b, pp. 5-6; Glover and Henderson 1995, p. 148).
On cessation of bead making at these sites, Francis (1990b, p. 6) says, "Khlong Thom and Oc Eo were both abandoned in the late sixth or early seventh centuries. Oc Eo was overrun by the Khmers; we do not know what happened to Khlong Thom. It is possible that Indo-Pacific beads continued to be made in the Khmer Kingdom, but there is no information on that score at present."
 - 12 Bellwood (1997, pp. 306-307) sees in the common funerary tradition the possibility of early contact between Japan and Island Southeast Asia. To quote, "...a coherent tradition of jar burial does occur in the late Jomon and Yayoi periods of southwestern Japan (1000 BC to 300 AD), where it appears that bones were often placed in two jars laid horizontally mouth to mouth. Although this pattern is not to my knowledge found in the Indo-Malaysian archipelago, there are records of vertical mouth to mouth jar burials on Batan Island between Luzon and Taiwan (Solheim 1960), at Plawangan on Java and at Gilimanuk on Bali. In addition, the Yayoi pottery style, which is different in many respects from that of the preceding Jomon periods, does include flasks, cutouts in ring feet, red-slipped surfaces, incised scroll patterns that overlap to some extent with the repertoire of the early Metal phase in the Phillipines. While I would not suggest Japan as a source for the Indo-Malaysian jar burials, I do feel that some degree of contact between two archipelago regions may have taken place from the late first millennium BC onwards."
 - 13 Senda (1996, pp. 335-337) associates the Ocean People with the present Ama community in Japan and considers them to be early maritime traders who arrived from somewhere in East Asia. Nelson (1997, pp. 2-4) sees in the early glass bead imports into southern Korea the archaeological underpinning to the Kaya legend 'of a ship with red sails which arrived from the south ('India') bearing the first queen.' It will not be out of place to allude here to the thesis advanced by the distinguished Japanese linguist Dr. S. Ono, that Tamil speaking migrants arriving in Japan in the Yayoi period contributed to the birth of the Japanese language (Ono 1990; 1994). From our point of view, the interesting

correlation is that microbead craftsmen at Arikamedu were Tamil speakers. This is indicated by the Tamil-Brahmi inscriptions on pottery excavated from the site (Wheeler 1946; Begley et al.1996). Can we envisage the spread of a Tamil speaking community of bead makers and merchants to Southeast Asia, some of them eventually reaching Japan? It is a far fetched proposition but one which cannot be altogether ignored. Tamil inscribed pottery, similar to that from Arikamedu has been found as far away as the Egyptian Red Sea coast (Salomon 1991, pp. 731-736; Mahadevan 1996, pp. 205-208). A positive identification of Arikamedu microbeads in Yayoi Tombs - if and when it happens - may strengthen Dr. Ono's case.

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