Ancient glass trade in Korea

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Introduction

The presence of numerous examples of ancient glass at many archaeological sites in Korea is clear evidence of cultural contact with neighboring countries in the ancient world (Figure 1). The synthetic study of ancient glasses from the prehistoric to the historic period in Korea according to type and distribution cast light on their cultural context.

Having examined many glass beads and glass vessels with the help of scientific analyses to understand the initiation and manufacturing of glass in Korea, and having compared the types of glasses with data from other regions in East Asia, I have determined whether or not a piece of glass was imported and have been able to identify evidence of glass making in Korea. On the basis of glass distribution in East Asia, I have outlined possible routes for glass trade and cultural exchange in ancient times.

Glass composition in Korea

According to scientific analyses by Lee, Brill & Fenn (1991), it becomes evident that at least four distinctly different families of glass compositions exist: A) lead-barium-silica glass, B) potash-silica glass, C) soda-lime-silica glass, and D) lead-silica glass.

A) Lead-barium-silica glass (Table 1)

The fact that some of the specimens found in Korea are lead glass is not surprising, since this composition is commonly found among the glasses of China, Korea and Japan (Lee 1990). Among the high lead Korean specimens, some also contain significant levels of barium. This, too, is the case among Chinese and Japanese glasses, which often contain between 5 and 25% BaO (Brill, Tong &

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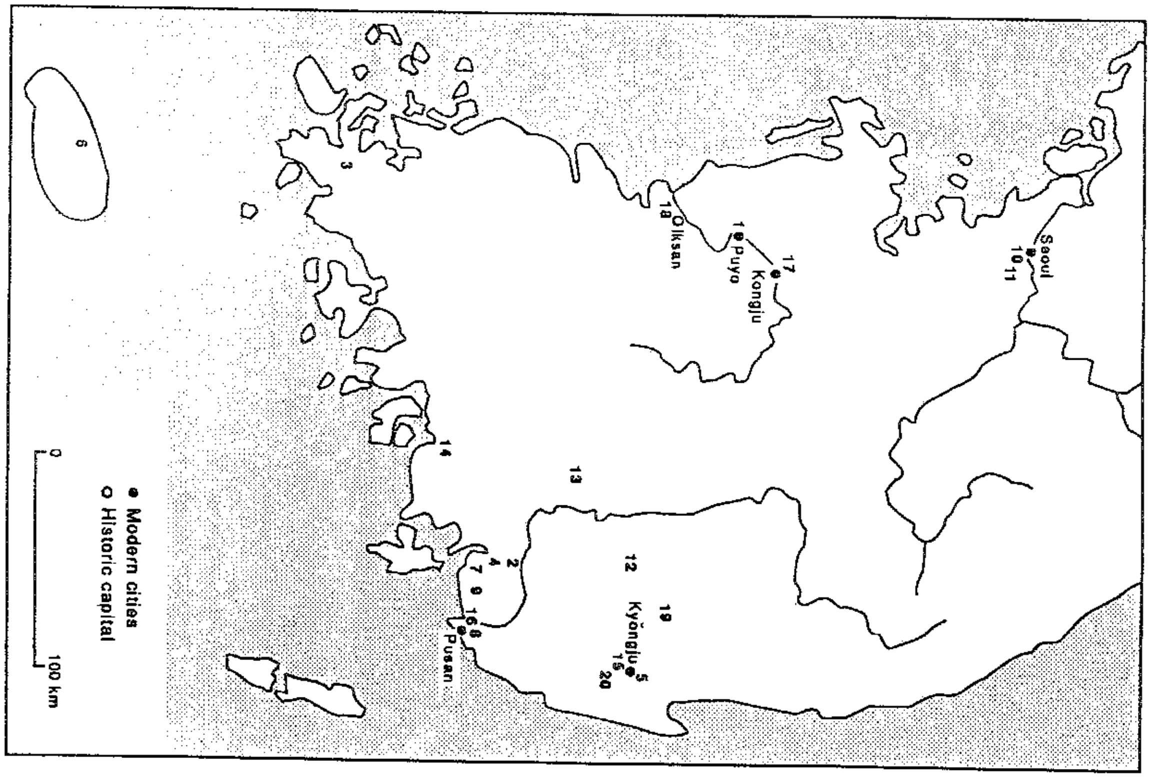

Figure 1 *Map of sites yielding glass on the Korean peninsula.*
1. Hapsong-ri; 2. Taho-ri; 3. Gun'gok-ri; 4. Taepyŏng-ri; 5. Joyang–dong; 6. Yongdam-dong; 7. Samdong-dong; 8. Nop'o-dong; 9. Togye-dong; 10. Sŏkch'on-dong; 11. Mongch'on; 12. Imdang-dong; 13. Okjŏn; 14. Chinju; 15. Hwang'o-ri, Hwang'o-dong; 16. Tugu-dong; 17. Muryŏng tomb; 18. Miruk Temple; 19. Songlim Temple; 20. Sŏbong-ch'ong

SITE	Hapsong-ri	Taho-ri	Kun'gok-ri	Taepyŏng-ri	?	Kun'gok-ri	Kun'gok-ri	Togye-dong	Chinju	Chinju	Kyŏngju #98 tomb	Silla tomb	Miruk temple	Anap pond
OBJECT	tubular bead	annular bead	tubular bead	tubular bead	bead	annular bead	annular bead	bead	spherical bead	spherical bead	vessel	bead	fragment	bead
COLOUR	blue	green	blue	light blue	dark blue	brightt green	dark green	blue-black	brown	colorless	blue	gray	green	yellow
DATE	2cBC	BC1c	AD1c	AD2-3c	?	AD1c	AD1-2c	AD4-5c	AD5c	AD5c	AD5c	AD5-6c	AD7c	AD8c
% WT														
SiO_2	51.38	34.9	39.0	66.94	68.69	25.11	27.34		16.3	61.92		24.6	26.73	57.5
Na_2O	6.28	2.9	3.36	2.44	15.51	1.27	0.04	0.008			0.27		0.01	0.03
CaO	0.65	0.86	3.69	0.51	4.23	0.06	0.14		0.76	2.36			0.05	0.05
K_2O	0.04	0.15	0.06	0.85	2.45	0.14	0.11	0.048	0.188	1.86	0.46		0.09	0.01
MgO	0.53	0.12	0.40	0.20	2.58	0.13						0.01	0.06	0.04
Al_2O_3	0.69	0.3	0.43	1.69	1.35	0.39	0.25		3.41	2.07		0.48	0.27	0.16
Fe_2O_3	0.26	0.17	0.16	0.60	0.21	0.14	0.13	0.113	1.08	0.46	0.07		0.13	0.35
TiO_2		0.001	0.001			0.001							0.001	0.01
Sb_2O_5		0.05	0.01										0.01	1.08
MnO		0.001	0.001		0.29	0.001	0.01						0.001	0.01
CuO	1.08	0.88	0.84		0.04	0.2	0.46						0.26	0.13
CoO		0.01	0.01										0.01	0.001
SnO_2		0.1	0.001			0.02							0.08	
Ag_2O	tr.	0.022	0.01			0.02							0.02	0.10
PbO	26.73	53.00	37.5	19.45	4.12	72.5	72.4	39.3	75.4	30.37	27.3	73.9	72.2	40.1
BaO	11.98	6.48	14.4	4.81	1.13	0.01	0.1						0.01	0.003
Total %	99.62	99.84	99.87	97.49	100.6	99.99	100.98	39.47	97.14	99.04	28.1	98.99	99.92	99.57

Table 1 *Lead-barium-silica glass and lead-silica glass compositions.*

Dorenwend 1987). Consequently, there is a good chance that some of those glass objects were imported, or that they were fashioned into objects in Korea from imported cullet (waste glass for melting and reuse). However, one should not dismiss too quickly the possibility that Korean glassmakers might have learned to make glass from Chinese glassmakers and that they therefore could have used similar batch materials, thereby producing glasses of the same compositional families.

The production of barium-containing lead glass appears to have ceased at least by the end of the Eastern Han Dynasty (AD 220) and possibly even earlier—by the end of the Western Han Dynasty (AD 24). Thus, the compositions of samples from Hapsong-ri, Taho-ri and Kun'gok-ri Shellmound (Lee 1989) are consistent with their dates between 200 BC and 100 AD. Interestingly, these dark blue glasses appear to be coloured only with copper; no cobalt was present.

B) Potash-silica glass (Table 2)

Some of the Korean specimens were found to be potash-silica glass, a composition which is beginning to take on great significance in the study of East Asian glass. Because this type of glass is present in many different sites, ranging in date from AD 0-500, it must have been widespread in Korea.

Potash-silica compositions are unknown in ancient glass of the West. However, recent studies (Shi, He & Zhou 1986) have established that such compositions are, in fact, quite common among Han Dynasty glasses excavated in China. It is not yet certain whether this type of glass was made in China or whether it was imported from Southeast Asia (Brill 1991). A few specimens have characteristically Chinese forms, but most are ubiquitous shapes. In any event, the Korean analyses are, for all practical purposes, chemically indistinguishable from the glasses found in China (Lee, Brill & Fenn 1991). Among the Southeast Asian analyses, we have three undated beads from Ban Chiang, Thailand, which are a very close match for the Korean and Han Dynasty glasses, and also eight 4th-century BC beads from Ban Don Ta Phet, Thailand, (Basa, Glover & Henderson 1991) which are potash-lime-silica glass. The Ban Chiang beads seem to have come from the same glassmaking tradition as the Korean and Han dynasty glasses, and the Ban Don Ta Phet glasses appear to be their second cousins. The analysis of these beads from Korea is indeed intriguing.

C) Soda-lime-silica glass (Table 3)

Many samples proved to be soda-lime glass. Generally, these soda glass examples can be separated into two chemical types: one resembling western glasses (although they were not necessarily made in the west), and another having unusually high alumina and titanium contents but very low lime contents (Brill 1991). We can call the latter an Asian type of soda glass found in India, Sumatra and Korea.

SITE	Choyang-dong	Yondam-dong	Samdong-dong	Nop'o-dong	Sŏkch'on-dong	Imdang-dong	Togye-dong	Mongch'on	Chinju	Chinju	Kyŏngju #98 tomb
OBJECT	spherical bead	tubular bead	bead	bead	spherical bead	bead	bead	spherical bead	bead	bead	bead
COLOUR	dk blue	blue	blue	blue	brown	dk blue	dk blue	lt blue	brown	blue	blue
DATE	AD1c	AD2-3c	AD3c	AD3c	AD3-4c	AD4-5c	AD4-5c	AD3-5c	AD5c	AD5c	AD5c
% WT											
SiO_2	**73.5**	**74.4**	**77.32**	**78.33**	**83.36**	**77.17**	**76.7**	**57.97**	**62.69**	**67.48**	
Na_2O	0.89	1.11	0.36	1.19		0.37	1.55	3.59	0.39	0.44	0.67
CaO	1.42	**3.84**	1.16	1.24	3.37	0.99	1.1	**19.50**	**18.45**	**15.30**	
K_2O	**14.9**	**14.5**	**17.61**	**16.7**	**6.95**	**18.54**	**17.14**	10.31	**10.90**	**11.03**	**12.6**
MgO	0.42	0.37	0.32	0.33		0.24	0.26	3.73	1.28	0.73	
Al_2O_3	**3.48**	2.55	1.36	1.32	**4.58**	1.19	2.22	2.67	4.13	3.40	
Fe_2O_3	2.38	1.33	1.89	0.85	0.42	1.59	1.19	0.44	0.95	0.78	1.32
TiO_2	0.2	0.15	0.12	0.06	0.21	0.11	0.08	0.27	0.48		
Sb_2O_5	0.01	0.01									
MnO	2.29	1.24	1.8	1.52		1.7	1.43				
CuO	0.02	0.01	0.04	0.05		0.04	0.02	0.45	0.08		
CoO	0.1	0.05									
SnO_2	0.001	0.001									
Ag_2O	0.001	0.001									
PbO	0.01	0.01		0.01		0.03	0.03				0.12
BaO	0.3	0.3	0.27	0.3		0.25	0.23				
Total %	99.02	99.83	100.45	101.9	98.89	102.22	101.95	98.93	99.35	99.86	

Table 2 *Potash-silica glass compositions.*

SITE	Kun'gok-ri	Kun'gok-ri	Yang-dong	Nop'o-dong	Mongch'on	Okjŏn	Togye-dong	Imdang-dong	Hwang'o-ri
OBJECT	tubular bead	bead	bead	bead	annular bead	bead	bead	bead	sword ornament
COLOUR	green	opaque orange	blue	dark blue	light green	blue	bluish green	greenish blue	blue
DATE	AD1c	AD2c	AD2-3c	AD3c	AD4-5c	AD4-5c	AD4-5c	AD4-5c	AD5-6c
% WT									
SiO_2	**68.37**	**61.82**	**73.87**	**74.46**	**63.38**		**64.33**	**65.33**	**68.3**
Na_2O	**17.8**	7.97	**17.12**	**17.54**	**19.76**	**11.2**	**20.72**	**22.36**	**19.36**
CaO	1.73	2.40	1.99	**3.49**	2.09		3.94	2.93	**5.54**
K_2O	2.92	3.54	1.32	0.55	2.06	1.46	2.38	1.65	1.1
MgO	0.94	0.36	0.36	0.33	0.31		1.72	0.43	2.19
Al_2O_3	**6.29**	**11.19**	**3.28**	2.12	**9.12**		**5.01**	**7.77**	2.44
Fe_2O_3	1.34	5.00	1.49	0.97	1.21	0.68	1.48	1.19	1.63
TiO_2	0.25	0.52	0.15	0.11	0.53		0.29	0.39	0.23
Sb_2O_5	0.01								
MnO	0.07		2.1	1.46			0.09	0.19	0.17
CuO	0.003	6.45	0.02	0.02			0.95	0.62	0.16
CoO	0.01					0.03			
SnO_2	0.05								
Ag_2O	0.001								
PbO	0.05		0.02	0.03		0.06	0.02	0.02	0.14
BaO	0.1		0.32	0.29	0.09		0.08	0.14	0.06
Total %	99.93	99.25	102.04	101.37	98.58	13.43	101.01	103.02	101.32

Table 3 *Soda-lime glass compositions.*

SITE	Hwang'o-dong	Kyŏngju #98 tomb	Tugu-dong	Muryŏng tomb	Muryŏng tomb	Muryŏng tomb	Muryŏng tomb	Muryŏng tomb	Muryŏng tomb
OBJECT	spherical bead	bead	bead	bead	bead	bead	bead	bead	bead
COLOUR	dark blue	blue	blue	opaque yellow	blue	opaque orange	green	yellow	black
DATE	AD5-6c	AD5c	AD6c	AD6c	AD6c	AD6c	AD6c	AD6c	AD6c
% WT									
SiO_2	**63.53**	**65.0**	**66.81**	**62.97**	**70.27**	**59.35**	**70.36**	**67.68**	**67.63**
Na_2O	**19.3**	**14.9**	**20.14**	**19.68**	**18.72**	**13.21**	**17.71**	**17.73**	**16.57**
CaO	**4.83**	**5.58**	**5.38**	**5.41**	**4.01**	2.77	0.95	1.36	2.27
K_2O	2.43	1.11	1.64	3.2	1.05	2.23	0.81	2.07	2.0
MgO	**5.74**	2.84	1.68	2.85	0.58	0.63	0.53	0.45	0.63
Al_2O_3	2.32	**5.94**	3.46	2.53	4.12	**10.84**	5.01	**7.74**	**10.23**
Fe_2O_3	1.26	2.16	1.47	4.59	1.8	2.67	2.14	1.33	2.13
TiO_2	0.18	0.27	0.3	0.12	0.26	0.74	0.72	0.63	0.6
Sb_2O_5	0.01								
MnO	0.13	1.2	0.14	0.22	0.3	0.05	0.09	0.06	0.07
CuO	0.03	0.08	0.09	0.01	0.09	9.34	1.0	0.01	0.01
CoO	0.05	0.31							
SnO_2	0.02								
Ag_2O	0.001	0.002							
PbO	0.05	0.2	0.05		0.06	1.1		0.01	0.01
BaO	0.01	0.06	0.07	0.04	0.05	0.1	0.06	0.14	0.13
Total %	99.89	99.45	101.23	101.62	101.04	103.03	99.38	99.14	102.28

Table 3 *Soda-lime glass compositions (cont'd).*

The two soda groups must certainly have been made from different types of batch materials and, therefore, were probably made in different places or at different times. There is not a perfect one-to-one correlation between the chemical types and the places or dates of manufacture, although the one earliest glass from Kun'gok-ri Shellmound is of the low CaO (1.73%), high Al_2O_3 (6.29%), high TiO_2 (0.25%) group. The other glasses in this group are from the tomb of King Muryŏng of Paekche (r. 501-523) (Lee, Brill & Fenn 1991). Because it is described as being very different from the other King Muryŏng glasses, perhaps it is unsurprising that it has a different chemical composition, too.

The closest match we have for the low CaO, high Al_2O_3 high TiO_2 soda glasses are some glasses from Kausambi and elsewhere in India. They date from about 200 BC to AD 200. It is possible that they share a common origin with the Korean glasses, but the point is far from proven.

We cannot say much about the other Korean soda glasses with 'more ordinary' compositions except that they deserve further study. In fact, the most important conclusion to be drawn from my study to date is that chemical analyses of glasses excavated in Korea are already yielding significant findings, and the entire subject certainly deserves further attention.

D) Lead-silica glass (Table 1)

Two samples also from Kun'gok-ri Shellmound (200 BC-AD 100) have very high lead contents (70% PbO) but only trace levels of barium. Their bright green color is produced by copper in a high-lead matrix. Such lead-silica compositions are familiar to us from Tang Dynasty (AD 618-907) glasses in China and from the Kofun-Nara periods in Japan (AD 300-794). A chunk of brownish turbid glass found in Korea beneath a stupa at the Miruk Temple at Iksan, N. Chŏlla province (Lee 1989), has a composition almost identical to the two green beads from Kun'gok-ri. The Miruk Temple glass is said to date from the 7th century or earlier.

The presence of lead in the glasses offers another opportunity to learn more about where these glasses might have been made (Brill & Wampler 1965). Lead isotope analyses, which can be performed on extremely small samples, can be used for this purpose. Such analyses yield numerical ratios which characterise the lead. By comparing these ratios with those of the lead in other objects, it is possible to distinguish objects made using lead from a particular mining region. Under the most favorable conditions, this is done by matching the lead ratios with those ores from particular mining regions. The technique has been applied to Chinese and Japanese glasses with considerable success (Brill *et al.* 1979). The first lead isotope ratio analysis of Korean glass done by the author (Lee 1990) shows that glass artefacts from the Miruk Temple are a Korean local product because the lead from the glass sample was proved by its isotope analysis to come from a mine in central Korea.

I hope to follow up the chemical analyses with lead isotope analyses of more Korean glasses so as to determine if they were made in the same or different places as the Chinese and Japanese glasses analysed previously (Brill *et al.* 1979, 1991).

Developmental stages in glass manufacture

Following the basic typology of glass objects by compositional group, a three-stage developmental sequence of glass manufacture is proposed (Lee 1988).

During the first stage, which began in the 2nd century BC, only glass beads are found, and their forms and colours are very variable. In the second stage, around the 4th century AD, glass vessels began to be introduced alongside numerous glass beads. More than forty glass vessels—including those from nine legally excavated Old Silla and Kaya tombs (*ca.* AD 300-600) are known to us (Lee 1990). Most of these vessels are probably of Late Roman type (Grose 1984), but I also identified local Korean products. It is very interesting that all of them are concentrated in the Kyŏngju area, capital of the Old Silla Kingdom in the southeastern part of the Korean Peninsula. If we consider the distribution of similar types of vessels in the Russian region and northern China (Yoshimizu 1977), it seems that these Roman glass vessels were probably made in the Syro-palestinian region (Whitehouse 1987) and transported across the Silk Road (the steppe route).

Finally, the 3rd stage began in the 7th century AD when high lead-silica glass, usually in the form of *sarira* bottles (Buddhist relic containers), prevailed in Korea.

Each of these stages is discussed in further detail below, and the correspondence of these three morphological stages with the duration of the major compositional classes can be seen in Figure 2.

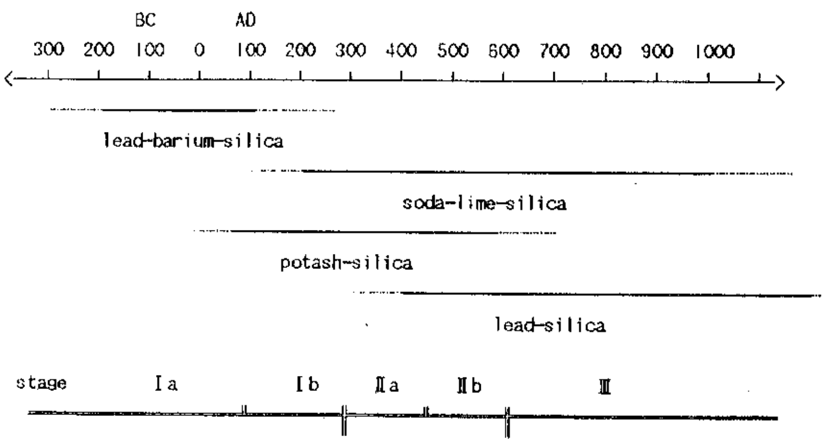

Figure 2 *Stages in the popularity of different glass types in Korea.*

Stage 1: Glass beads (200 BC ~ AD 300)

The initiation of glass technology in ancient Korea must be discussed with reference to imported technology and objects from China in the early Iron Age. So far, the earliest example of glass in Korea comes from the Hapsong-ri site, dated to the 2nd century BC. These blue cylindrical beads proved to be lead-barium glass, which is characteristic of Chinese glass of the Late Zhou and Han Dynasties (*ca.* 4th c. BC - AD 3rd c.) (Seligman & Beck 1938). Accompanied by bronze and iron artefacts (Lee K.M. *et al.* 1989), they are typical of early Iron Age assemblages in ancient Korea.

Lead-barium glass in Korea may be explained in the same cultural context as Japanese Yayoi-period glass objects made from Chinese materials (Brill *et al.* 1979). It is probable that glass beads and typical Korean bronze artefacts were introduced from Korea to Kyushu, as found at the Yoshinogari site (Ota 1989). So we can say that Korea took the role of intermediary in cultural exchanges between China and Japan.

Potash glass, having the same composition as Han Dynasty Chinese glass, prevailed from the prehistoric period until the early Three Kingdoms period (3rd-7th c. AD) (Lee 1989). But we cannot yet identify its exact place of manufacture or the trade route by which it was distributed. We can only say that it was probably produced somewhere in Southeast Asia.

In the Proto-Three Kingdoms period (AD 0-300), many kinds of beads enjoyed great popularity among the people of southern Korea, as recorded in Chinese historical sources. During this time, people often substituted glass beads for precious stones. An extraordinary abundance and widespread distribution of glass beads throughout the southern Korean Peninsula may imply some special socio-cultural meaning or cultural background. Glass objects may have played an economic role, such as being used as currency; and owning special kinds of beads was probably an indicator of social status or privilege.

Soda-lime glass, from the West or from Southeast Asia, is presumed to have been first introduced to Korea in the early Christian era by trading in the southern seaside area (Kim 1987). Thus cultural exchange was facilitated by the maritime Silk Road as well as by the steppe route across northern Eurasia. This sea trade contributed to the increasing availability and popularization of glass objects. Thus, glass manufacturing in ancient Korea may have been stimulated by the introduction of glass products of distant origin.

Stages 2 and 3: Glass vessels (4-6th c., 7-10th c. AD)

From the 4th century, the glass trade and glass-making in Korea became more active and flourished in more varieties than ever before. Not only were glass beads available in many colours, shapes and chemical compositions (Figure 3), but glass vessels were also accessible through trade or local production (Lee 1990). Furthermore, Korean artisans attempted to make special kinds of glass objects such

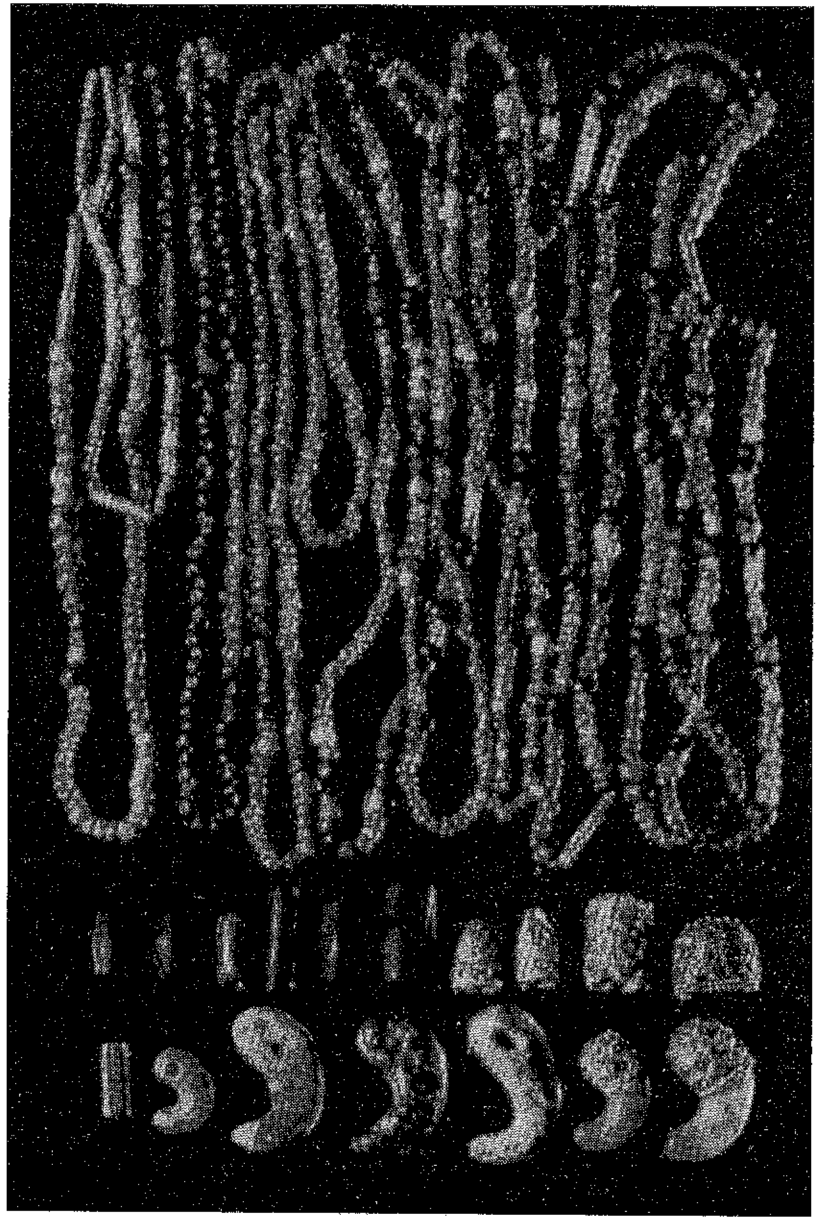

Figure 3 *Glass beads from King Muryŏng tomb, Puyŏ.*

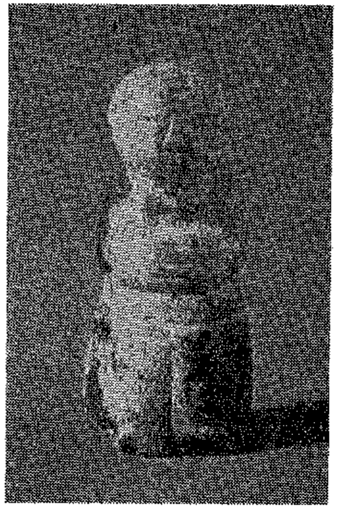

Figure 4 *Glass amulet from King Muryŏng tomb.*

as horse harness ornaments, girdle pendants, and small amulet sculptures (Figure 4)—some being unique to Korea (Lee 1990). In particular, Old Silla played a major role in the development of technical and creative features of glass craftsmanship as a result of direct trade with the West and with Central Asia—traceable through many Western elements found only in Old Silla culture (Kim 1991; Kwŏn 1991; Lee 1988). Similar circumstances, resulting from Korean influences, emerged in Tomb-period Japan (AD 300-710) (Yamasaki 1974).

Glass vessels excavated in Korea are thus of two kinds: imported vessels from the West and local Korean products (Figure 5). The former can also be broken down into two categories: Late Roman glass from the Syro-palestinian area (Figures 6, 7, 8), and Sassanian glass (Figure 9). No Islamic glass has yet been found in Korea.

Around AD 400, lead glass without barium began to be made in Korea (Lee 1990). In China, barium-free lead glass prevailed from the 6th century, so it was Korea that led the rebirth of lead glass. Thereafter, lead glass-making continued and flourished, the main product being sarira bottles during the Unified Silla period (AD 668-935).

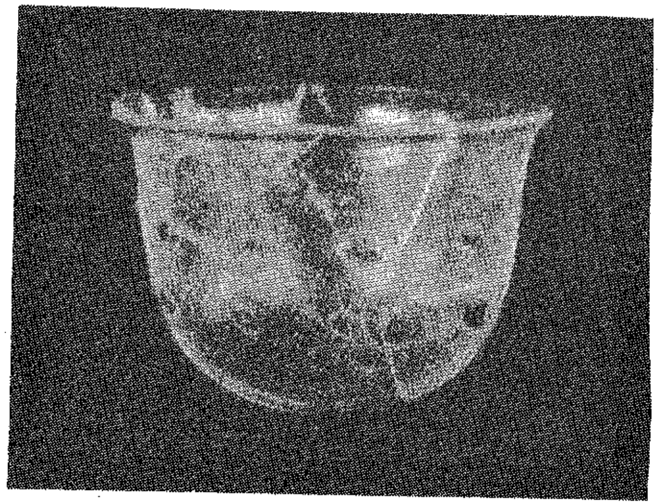

Figure 5 *Korean-made cup with blue dot decoration from an Okjŏn tomb, Hapch'ŏn.*

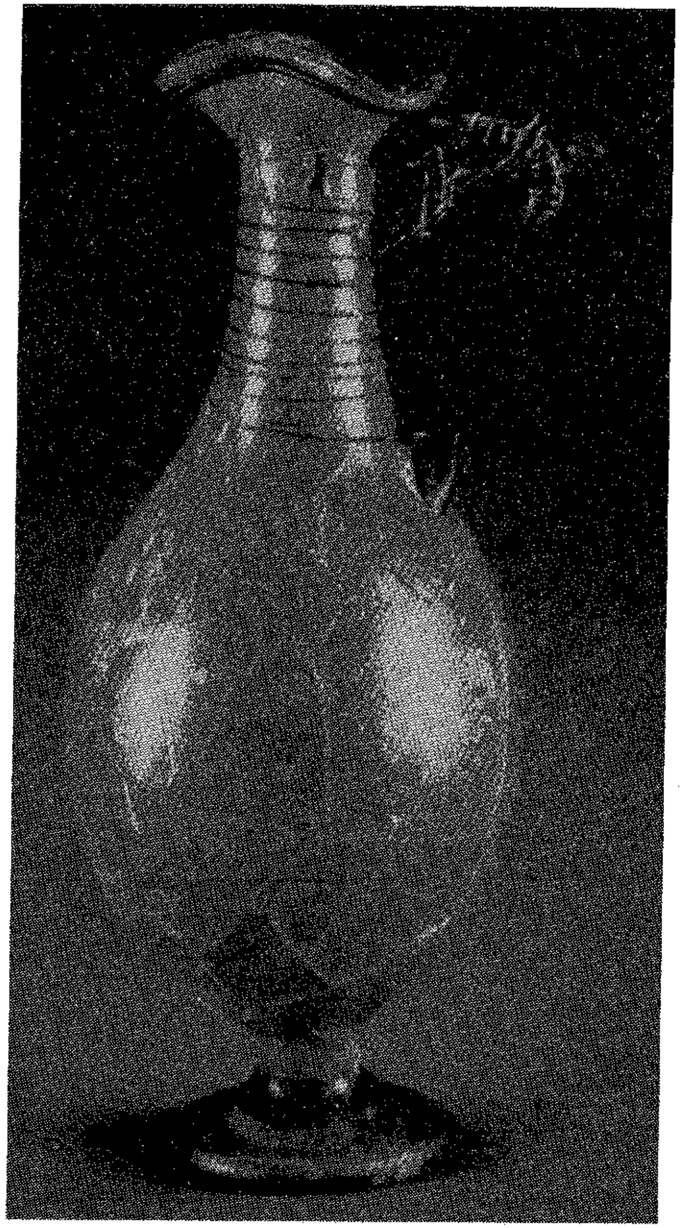

Figure 6 *Syro-palestinian* oinocoe *from Tomb No. 98 (South Mound), Kyŏngju.*

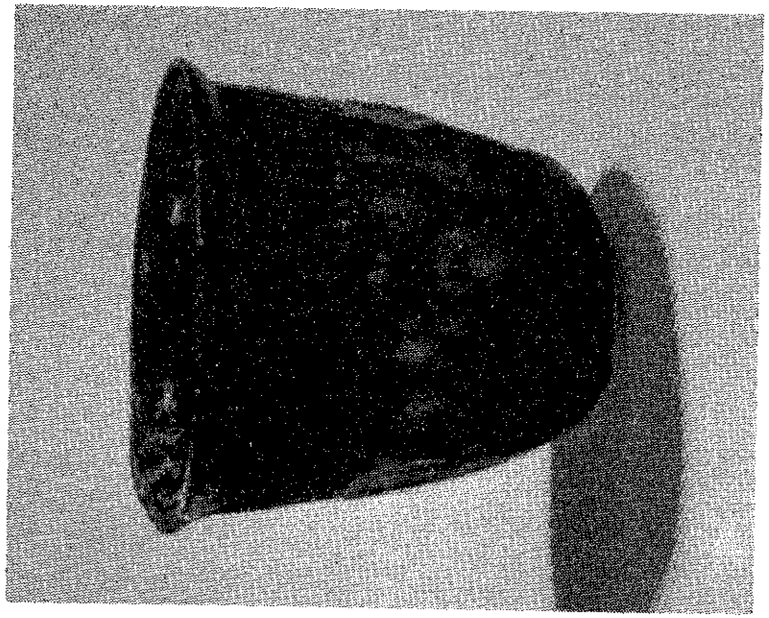

Figure 8 *Syro-palestinian honeycomb patterned cup from the Flying Horse Tomb (Ch'ŏnma-ch'ong), Kyŏngju.*

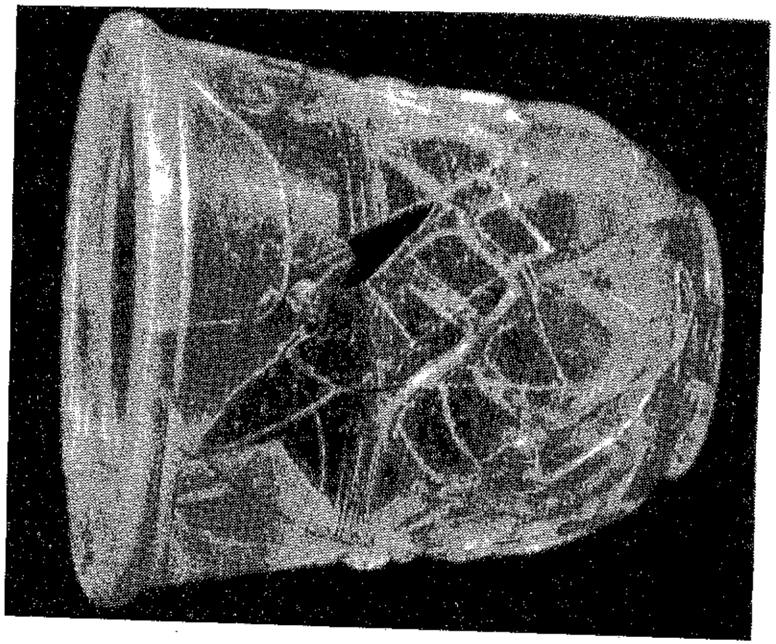

Figure 7 *Syro-palestinian glass beaker with trailing decoration from Sŏbong-ch'ong, Kyŏngju.*

Figure 9 *Sassanian cut glass cup from Tomb No. 98 (North Mound), Kyŏngju.*

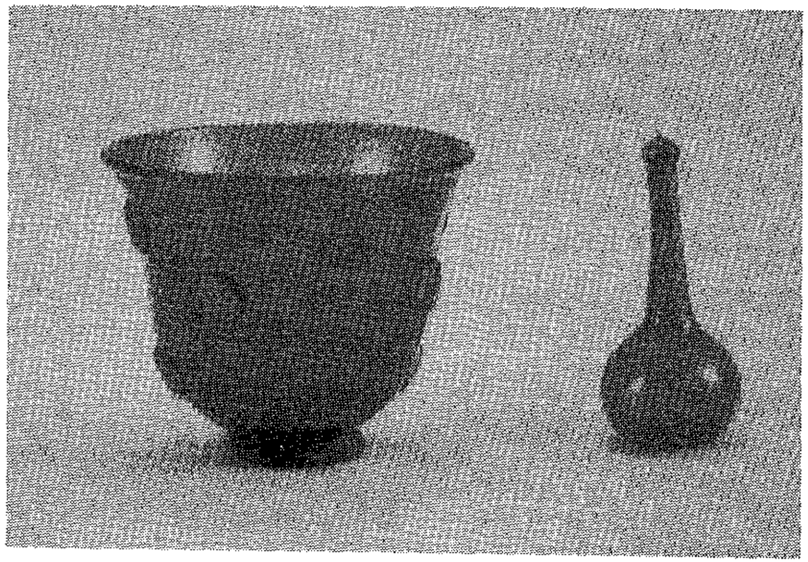

Figure 10 *Sassanian glass cup and* sarira *bottle from Songlim Temple, Ch'ilgok, N. Kyŏngsan..*

The glass trade in ancient Korea

As we have seen above, potash glass and the Asian type of soda-lime glass were both present in ancient Korea, though they were probably made in Southeast Asia or India. In addition, some special types of glass beads—such as *mutisalah* beads (wax red opaque glass beads), gold-foil glass beads, eye beads, and cornerless cube glass beads—which were manufactured mostly in India or Southeast Asia were also rather common in Korea from about AD 0 to 300 (Lee 1989; Basa 1988). Thus, we cannot deny that there was a close relationship between ancient Korea and Southeast Asia from the beginning of early Christian era or earlier. There seems to have been much more active trade, most likely by sea, between East and Southeast Asian countries than we had imagined.

Both archaeology and ancient literary works attest to early trade between East and West. So-called Roman trade (Stern 1991) was already established at the beginning of the Christian era (Loewe 1971) through the Indian Ocean (Francis 1991). This trade might have reached the southeastern Chinese sea coast (modern Guangdong province) (An 1991) by way of the Indonesian sea route: India > Malaysia > Thailand > Indonesia > Vietnam > The Philippines > China (Basa, Glover & Henderson 1991). Early sea trade routes like this should be considered to have continued further east—that is to say, on a more extended scale to the southern coast of the Korean Peninsula (Lee 1990). This Far Eastern trade in ancient times was probably conducted by Koreans, who were very active in sea commerce as Chinese sources state. From the early historic period, there could have been many predecessors of Chang Pogo (d. 846), who was the most famous general of Silla and who dominated sea trade in East Asia during the early 9th century.

The routes by which glass objects and techniques of glass manufacture reached Korea from the West changed with time. In the Proto-Three Kindgoms period, ancestors of Silla and Kaya people traded glass beads and Roman glass objects by sea via Southeast Asia and southeastern China (Lee 1993). On the other hand, people in the northern part of Korea imported Chinese Han glass together with other cultural materials through the Lelang commandery by the land route.

In the early Three Kingdoms period, glass objects and vessels from Western Asia (Iran, Syria, Syro-palestine and the eastern Mediterranean) were imported to Korea. This trade may have been conducted over the Silk Road steppe route via the Caucasus, southern Siberia and northern China (Lee 1993). In central China, Roman glass vessels of the same age are very rare.

We can point to some cultural elements in the Old Silla Kingdom which prove that there was contact and eastward influence between Silla and Central and Western Asia. Thus, Old Silla and Kaya were in direct contact with these places by sea and through the steppes without China acting as intermediary. This situation changed dramatically in the Unified Silla period when all foreign cultural influences were

transmitted to Korea through the Tang Dynasty, the cultural melting pot of Asia at that time.

Closing comments

I would like to emphasize the importance of ancient glass with three main observations. Firstly, glass is a completely artificial material; secondly it is virtually indestructible over the long term; and thirdly, among many archaeological materials, glass has many hidden advantages which can be verified scientifically, making it the most important evidence and the clearest item with which to investigate society, economy, technology and trade in the ancient world.

More attention should be paid to glass objects in East Asian archaeology. As has been shown here, ancient glass studies have many problems to solve. In the near future, we may throw more light on the history and development of ancient techniques. Furthermore, we can clarify the eastward transmission of ancient civilisation along the Silk Road—which might be renamed with greater accuracy as the "Glass Road."

Acknowledgments

Figure 1 redrawn by Catherine Lawrence. Figures 3-10 courtesy of the National Museum of Korea, Seoul.

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Crowning glory: headdresses of the Three Kingdoms period

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Archaeologically, the Three Kingdoms period in Korea subsumes a span of approximately three and a half centuries, from around AD 300 to the mid-7th century. During this period the peninsula was divided into three distinct cultural and political entities: Koguryŏ in the north, Paekche in the southwest and Silla in the southeast. In addition, a federation of small states known collectively as Kaya occupied territory in the Naktong river basin (Figure 1). Kaya was eventually absorbed by Silla in AD 582; and with the help of Tang Chinese allied forces, Silla succeeded in unifying the peninsula in AD 668.

Study into the material culture of early civilizations such as the Three Kingdoms tends to rely heavily on tomb data. Evidence of mortuary practices constitutes the material residue of intentional behaviour on the part of the living members of society to produce a specific environment for the deceased. In this context, the choice of tomb construction, the inclusion or exclusion of certain types of burial goods, the adornment of the body and so on can be treated as social messages. When decoded, these may provide some of the lost information about any given society concerning outside cultural influence, belief systems, social hierarchy as well as funerary customs.

In this paper, I analyse such external stimuli through discussion of one type of burial object, the crown or headdress, which affected the arts and traditions of each of the Three Kingdoms. In doing so, I particularly hope to highlight the distinctive aspects of Silla tomb culture which set it apart from the rest of the peninsula.

Koguryŏ

Bordering on China, the kingdom of Koguryŏ was strongly influenced by the influx of northern Chinese culture. This was facilitated through the so-called Four Chinese Commanderies to the north of the Han River, which existed between 108 BC and AD 313. Koguryŏ was also the first of the Three Kingdoms to receive Buddhism

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