

# On the greenish-blue glazed pottery jug unearthed from the Eastern Han tombs at Liaowei in Hepu County, Guangxi

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## Abstract

This paper made comparative studies on the greenish-blue glazed pottery jug unearthed from a tomb in the Liaowei Cemetery of the late Eastern Han Dynasty with the green-glazed potteries of the same time produced at home and abroad in the aspects of typological features, making techniques and chemical compositions, and drew the conclusion that this pottery jug was made in the present-day southern Iraq or southwestern Iran around 43-200 CE, which was at the time and territory of the Parthian Empire (247 BCE-226 CE), or the Anxi in the historic literature of the Han Dynasty. The studies further pointed out that this jug was transported into Hepu through the maritime route as a utensil for daily use. Because there have not been records about the maritime communication between China and Parthia, the discovery of this pottery jug in Hepu expanded our understanding to the maritime communication in the Han Dynasty, so it has important academic values.



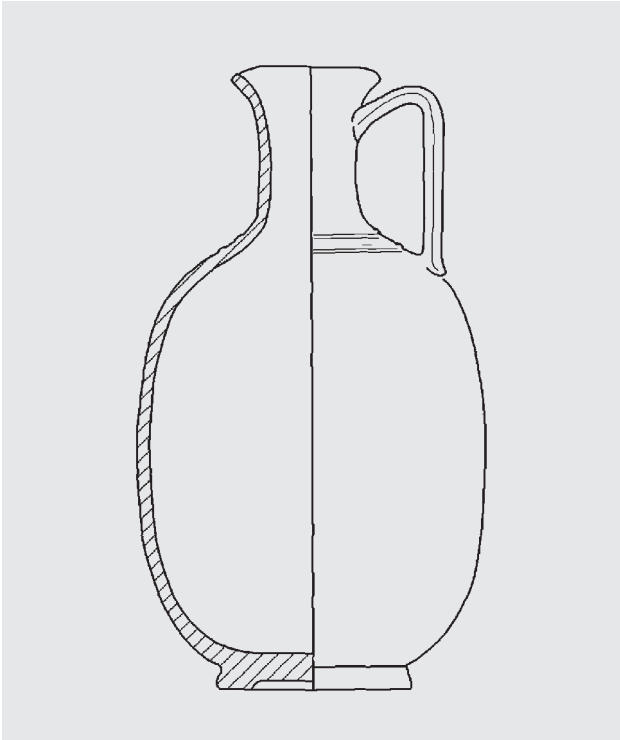
**Figure 1** The location of the greenish-blue glazed pottery jug (M13b:47) unearthed from the Eastern Han tomb at Liaowei in situ (NW-SE).

**Keywords:** Ceramic glaze–history; Liaowei Cemetery (Hepu County, Guangxi); maritime communication–Han Dynasty; Parthia (former nation/state/empire)

## The discovery and features of the Liaowei pottery jug

Hepu County in Guangxi Zhuang Autonomous Region was an important port for the maritime traffic in the Han Dynasty. Recently, a greenish-blue glazed pottery jug (Figure 1, numbered M13b:47, and “Liaowei Jug” hereafter) unearthed from a tomb (numbered M13b) of the late Eastern Han Dynasty provided important information on the maritime communication of the Han Dynasty with the abroad. This jug has a small and flared mouth, round rim, short spout, thin and long neck, oval belly and short ring foot. A curving handle is attached between the neck and the upper belly; the section of the handle is flat and wide with two parallel ribs. Around the shoulder is a ring of wide belt pattern. Its diameter at the mouth is 6.5cm and at the ring foot is 10.6cm, the full height is 34cm (Figures 2 and 3). The outer surface, outer bottom and the inner side of the rim are all glazed in greenish-blue color similar to that of turquoise and the glaze, which is about 0.02cm thick, is in vitreous phase but severely cracked and flaked off; no clear trace of slip is seen. The body of the jug, which is about 0.5cm thick, is in light yellow color, the texture of which is loose and some fragments show layers; the paste is fine without large granular tempers (Figures 4, 5 and 6).

The statuses of the paste and glaze of the Liaowei Jug showed that it was not baked in very high temperature. The result of the chemical composition analysis to the fragments of the jug showed that the glaze contained almost no lead, but the oxides of the alkali metals and alkali earth metals, such as magnesium, potassium, sodium, etc., took as high as more than 20% in terms of weight percentage. The glaze contained two coloring elements which were iron and copper, but the proportion of ferric oxide was somewhat low, the weight percentage of which was 0.764%, while that of cupric oxide was 1.02%, because of which we think that the main coloring agent of the glaze was cupric oxide. The body has a water absorption of 30.48%; the water absorption is in an inverse proportionality with the density of the body texture, and this water absorption meets the loose appearance of the jug body (Table 1).



**Figure 2** The greenish-blue glazed pottery jug (M13b:47) unearthed from the Eastern Han tomb at Liaowei.



**Figure 3** The greenish-blue glazed pottery jug (M13b:47) unearthed from the Eastern Han tomb at Liaowei.



**Figure 4** The mouth and handle of Liaowei Jug.



**Figure 5** The outer bottom of Liaowei Jug.



**Figure 6** The glaze of the fragment of Liaowei Jug.

**Table 1** The chemical compositions of the three glazes of the green-glazed potteries (%)

Chemical formula	Material name	Liaowei Jug	Seleucian glazed pottery	Eastern Han glazed pottery
SiO <sub>2</sub>	Silicon dioxide	67.77	56.32	33.88
Al <sub>2</sub> O <sub>3</sub>	Aluminum oxide	4.92	7.56	6.20
CaO	Calcium oxide	3.31	12.12	-
MgO	Magnesium oxide	4.46	5.53	-
K <sub>2</sub> O	Potassium oxide	2.48	2.84	-
Na <sub>2</sub> O	Disodium oxide	14.07	9.44	-
Fe <sub>2</sub> O <sub>3</sub>	Ferric oxide	0.764	0.80	2.31
TiO <sub>2</sub>	Titanium dioxide	0.08	0	-
P <sub>2</sub> O <sub>5</sub>	Phosphorus pentoxide	0.305	0	-
MnO	Manganese oxide	0.021	0	-
CuO	Cupric oxide	1.02	3.97	1.26
PbO	Lead oxide	0.045	0	46.89
NiO	Nickel oxide	-	1.03	-
CO <sub>2</sub>	Carbon dioxide	-	0.85	-

**Figure 7** The bluish-green glazed pottery jug of the Parthian Period collected in the British Museum (number: 92008).

### The abroad discovery and collection of relevant pottery vessels

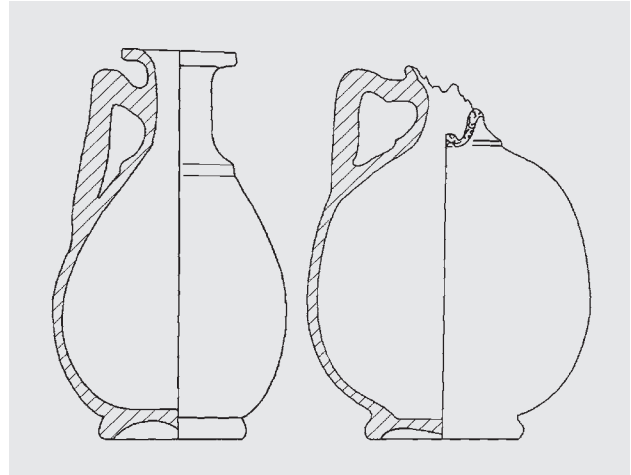
The intuitive appearance of the Liaowei Jug is far from the green-glazed pottery vessels of the Eastern Han Dynasty in the shape and the features of paste and glaze,

but its similar counterparts can be seen in the collections and excavated artifacts abroad. For example, the bluish-green glazed pottery jug of the Parthian Period collected in the British Museum (1st–3rd century CE, Figure 7), the bluish-green glazed pottery jug of the Parthian Period unearthed in Susa Site and collected in Louvre Museum (3rd century CE, Figure 8), and so on. Through observation, search and discussion with international scholars, we suggest that the Liaowei Jug is a product of the southern Iraq or southwestern Iran during the Parthian Empire (247 BCE to 226 CE). Among the potteries unearthed in the sites of the Parthian Empire, the green-glazed vessels with flatly flared and ridged rim, long neck, bulging belly, single handle on the shoulder and ring foot at the bottom were a typical category.

From the end of the 19th through the mid 20th centuries, the universities and other institutions of the United States, France, Germany and the Great Britain have conducted excavations to the relevant sites in Iran and Iraq, from which large amounts of potteries of the Parthian Period were unearthed, and some of them are very similar to the Liaowei Jug (Figures 9 and 10). At present, almost half of the Parthian potteries are collected in the National Museum of Iraq located in Baghdad; the richest collection of Parthian potteries outside Iraq is in the Kelsey Museum of Archaeology, University of Michigan in the United States. In addition, many museums in the U. S., Great Britain, Germany, Syria, France, Turkey, etc. also have collections of or related to Parthian potteries.



**Figure 8** The bluish-green glazed pottery jug of the Parthian Period unearthed in Susa Site and collected in Louvre Museum (number: Sb 3500).



**Figure 9** The pottery jugs unearthed in Seleucia Site, Iraq. Left. No. 353 (Debevoise 1934: 117); right. No. 259 (ibid.: 93).

### The comparative studies on the making technique and chemical composition of Liaowei Jug

1. The comparison with the green-glazed potteries of the Han Dynasty.

The glazed potteries of the Han Dynasty mainly included vessels such as *ding*-tripods, boxes, vases and models such as granaries, ovens, wells and architectures. Of them, the shapes of the vases, such as the one unearthed from the Shaogou Cemetery of the Han Dynasty in Luoyang (Figure 11), were similar to that of the bronze vases of the Qin and Han Dynasties but sharply different from that of Liaowei Jug.

The basic agent of fusion of the green glaze of the potteries of the Han Dynasty was lead compound; in Table 1, the weight percentage of lead oxide in the green glaze of the pottery samples of the Eastern Han Dynasty is as high as 46.89%, which makes a sharp contrast with that of the glaze of Liaowei Jug, which was just 0.045%, almost ignorable. At about 700° C, lead glaze begins to melt; under high temperature, its viscosity is low, fluidity is high and its melting temperature range is wide. Therefore, the green glaze of the potteries of the Han Dynasty usually showed a kind of flowing effect, which is also different from the glaze status of the Liaowei Jug.

As for the glaze color, that of the green-glazed potteries of the Han Dynasty was generally dark green without blue tint; the main coloring elements were copper and iron baked in oxidizing atmosphere. However, seen from Table 1, the weight percentage of ferric oxide in the glaze of the potteries of the Han Dynasty is much higher than that in



**Figure 10** The glazed pottery jug unearthed in Seleucia Site, Iraq (no. 276, Debevoise 1934: Plate IV, figure 1).

the glaze of the Liaowei Jug, which used cupric oxide as coloring agent and showed a blue tint in green color.

The testing results of pottery samples showed that the water absorption of the paste of the green-glazed potteries of the Eastern Han Dynasty is about 12.6%, which is much lower than that of Liaowei Jug. This reflected that the density of the texture of the paste of the Liaowei Jug was not as high as that of the green-glazed potteries of the Eastern Han Dynasty.

2. The comparison with the green-glazed potteries unearthed in Seleucia Site, Iraq.

The tests and statistics showed that the sintering temperature of the glaze of the green-glazed potteries



**Figure 11** The green-glazed pottery vase unearthed from the Shaogou Cemetery of the Han Dynasty in Luoyang.

unearthed in Seleucia Site, Iraq was around 1000-1200° C. The chemical composition analyses to their glazes showed that the glazes contained no lead but alkali metal silicate glazes; the glazes contained no cobalt (oxide) which was usually used as blue coloring element and their coloring element for blue tint was copper burnt in oxidizing atmosphere. The glazed pottery sample from Seleucia Site in Table 1 was a fragment of a rim unearthed from Level 2, which showed dark green color and had vitreous phase on the surface and is a representative product of the glazed potteries unearthed in Seleucia Site. The result of the chemical composition analysis of this sample closely coincided with that of Liaowei Jug. What special is that the glazes of both of the samples contained high proportions of disodium oxide. As lead oxide, disodium oxide played the role of agent of fusion in the glaze. The way to use sodium instead of lead as agent of fusion can be compared to the situation of glass, the researches on which have had more achievements. It is well-known that the traditional glass in the Mediterranean and West Asia regions was soda-lime glass, while the lead-barium glass was considered to be produced locally in China. The agent of fusion of the glaze of Liaowei Jug was disodium oxide, but for the green-glazed potteries of the Han Dynasty, the common agent of fusion of the glaze was lead oxide. This phenomenon exactly corresponded to that of glass, and can be also seen as an important evidence for the place of making of the Liaowei Jug.

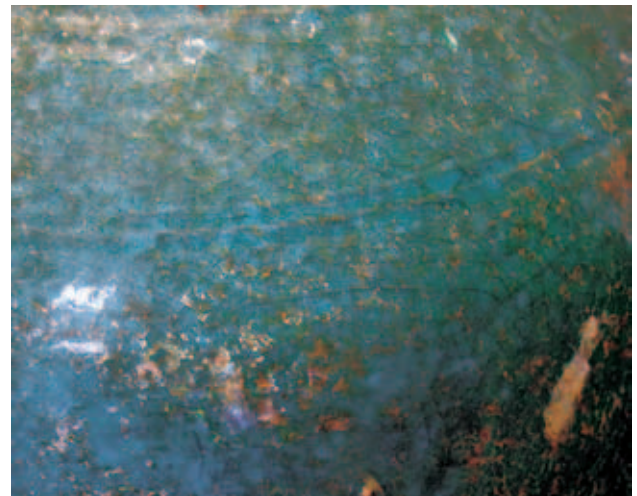
The excavators of Seleucia Site also noticed that because of the difference in expansion between the glaze and the paste, the glaze of the potteries produced fine crackles

similar to the so-called “broken-ice pattern” or “crab-claw pattern” in the Chinese porcelains. This feature can be also seen on Liaowei Jug (Figures 12 and 13).

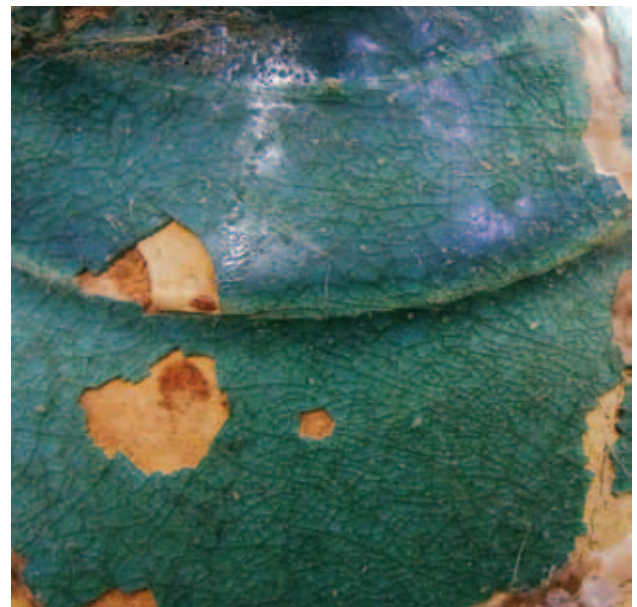
### The origin and importing route of the Liaowei Jug

The above analyses and comparative studies all reflected that the Liaowei Jug was not a product in the territory of the Han Dynasty but shipped in from present-day southern Iraq or southwestern Iran in West Asia.

The preliminary statistics showed that the samples found from the Seleucia Site most similar to the Liaowei Jug were all unearthed in Levels 1 and 2 of the site, the dates of which were around 43 to 200 CE. This meant,



**Figure 12** The glaze detail of the pottery jug of the Parthian Period collected in Louvre Museum.



**Figure 13** The glaze detail of the Liaowei Jug.

the dates of these two levels belonged to the Parthian Period in this place, which corresponded to the Eastern Han Dynasty and the terminating time was a little earlier than the late Eastern Han.

It is more probable for the Liaowei Jug to be shipped in via the sea route; according to *Dili zhi* 地理志 (the Treatises on Geography) of *Hanshu* (the Book of Han), Hepu was an important port for the maritime traffic during the Han Dynasty; the personnel recruited and dispatched by the government started from Xuwen and Hepu to trade with the nations overseas.

This issue still has space for further discussion and exploration. During the Eastern Han Dynasty, the farthest foreign guests coming via the sea route were Romans, as recorded in the *Account of the Western Regions* of *Hou Hanshu* (Book of the Later Han) that “in the ninth year of Yanxi Era (166 CE) during the reign of Emperor Huan, the king of Da Qin named Andun (Marcus Aurelius Antoninus), sent envoys from beyond the frontiers through Rinan (Commandery on present-day central Vietnamese coast), to offer elephant tusks, rhinoceros horn, and turtle shell”, which was “the very first time there was (direct) communication (between Han and Da Qin).” This has been confirmed by archaeological discoveries. In 1942 through 1944, Louis Malleret, a French archaeologist, directed large-scale archaeological excavations in the Oc Eo area at the south end of Mekong Delta in Vietnam, where the Roman coins of Emperors Antoninus Pius (138–161 CE) and Marcus Aurelius (161–180 CE) were unearthed (Figure 14), as well as the Roman marbled glass made in the 1st century BCE and seal peculiar to the Roman Empire.

Among the nations in West Asia, the ones having frequent contacts with the Han Dynasty seen in Chinese historic literatures are mainly Anxi and Tiaozi, and Anxi has been generally believed as the Parthia in the Western historic literatures. However, during the entire Han Dynasty, the knowledge of the Han people about Anxi was mostly got through the land communication. It is recorded in the *Accounts of Dayuan* of *Shiji* that “the Great Yuezhi lives some two or three thousand *li* west of Dayuan, north of the Gui (Oxus) River. It is bordered on the south by Daxia, on the west by Anxi (Parthia), and on the north by Kangju (Trans-Oxiana) [大月氏在大宛西可二千里, 居妣水北. 其南则大夏, 西则安息, 北则康居. English translation adopted from Watson, Burton, with slight modification].” Anxi was to the west of Da Yuezhi, this undoubtedly is the description of the land communication and geographic situation. The Anxi described in *Hou Hanshu* seemed to be a role of pursuing profit as an in-between by hindering the direct communication between the Han Dynasty and Da Qin: Anxi people dissuaded Gan



**Figure 14** The coins of the Roman Empire unearthed from Oc Eo Site, Vietnam. Left. Malleret 1962: PL XL, middle row, left; middle and right. Brun’s lecture presentation.

Ying from going to Da Qin; Da Qin got contact with the Han Dynasty just by the sea route to detour Anxi. At least in the textual history, the interaction between the Han Dynasty and Anxi was mainly through the land routes. However, that this pottery jug coming from Anxi emerged in the key port of the maritime communication of the Han Dynasty vividly demonstrated the prosperous foreign communication at that time both by land and by sea, and also presented us an infinite room to estimate the identity of the occupant of the tomb yielding this jug.

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## Postscript

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