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Editor's Note: The following is part two of Tong Kin-Woon's major study of music during the Shang Dynasty in ancient China. Part one appeared in XIV-2, and the conclusion, part three, will appear in XV-2.



CHAPTER FIVE
BELLSINTRODUCTION





A typical bell is a hollow vessel with an overall shape similar to a cylinder. Its top (crown or shoulder) is sealed while the mouth widens. When a bell is struck, preferably on the mouth, the walls vibrate and produce the sound of the bell while the crown is mute. However, all known Shang bells and most Zhou bells differ from this pattern; instead of having a round cross-section, they have a leaf-shaped cross-section (), and most of them have a concave mouth profile () rather than a straight mouth profile ().

The origin of bells is unknown. Primitive people might have produced sounds by hitting a hollow piece of bamboo, a tree trunk, bone, or an earthenware vessel; from this experience, they might have invented some sort of bell. "Bells" may have been made of other materials before metal, though it is not necessarily true that all nonmetallic bells precede metal ones. Some might have been imitations of metal bells.

Recent archaeology shows that the ancient Chinese used different metals as early as 5000 B.C.¹ Copper was used before the Bronze Age, which began not later than 2000 B.C. in China. After that, bronze, an alloy of copper and tin, predominated because it has a lower melting point and makes stronger objects than copper. Except for some rare examples made of earthenware, wood, and "pure" copper, bells of the pre-Shang, Shang, and Zhou periods were mainly made of bronze.²

Chinese bells can be classified into roughly two types: bells with and without a clapper. Bells with an internal clapper are usually small. They are called ling () if they have a loop at the top (), or duo () which are slightly larger. The common name for bells without a clapper is zhong (). Zhou zhong-bells usually have a solid shank with a ring () for

suspension. Some Zhou zhong-bells are equipped only with a large loop (). The Shang zhong-bells, however, always had a hollow shank, and were either held or mounted with the mouth facing upward when used (). This

special type of bell was occasionally used in Zhou times, but there is confusion about its name.³ In this work, such bells will be called "shang-bells" (hyphenated) because my study shows that the OBG shang ( = ) depicts this bell () mounted on a stand ().

In recent years I have found that in OBG the clapper bell (Δ) and the shang-bell (∇) are often represented by triangular shapes (Δ and ∇ respectively). From this I came to new interpretations of several OBG which will be discussed in this chapter (金 , 金 , and 金 in II.A; 金 , 金 , 金 , 金 , and 金 in IV).

It seems that the shapes and characteristics of Shang bells might have been passed down from pre-Shang bells. Some pre-Shang examples are therefore presented here.

I. PRE-SHANG BELLS

A. Earthenware clapper bell

Recently two broken earthenware clapper bells were recovered at Da He Cun, Zheng Zhou, He Nan Province (河南省鄭州大河村). They are described as "earthenware grey pottery, oval in shape, with a mouth like a trumpet. There are two round holes on the flat top" (KGXB 1979.3:332

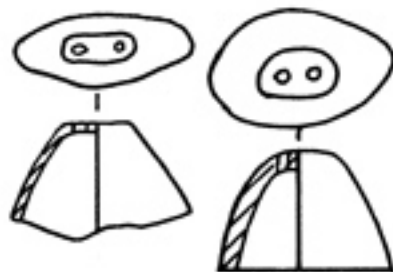


Figure 54 -- Drawings of two earthenware clapper bells unearthed in Da He Cun, Zheng Zhou, He Nan Province. 河南省鄭州大河村
Ca. 2500 B.C.?⁴
Height: 4.5 cm.

(From KGXB 1979.3:330, Fig. 22)

No clappers were found in these bells, but another bell recovered at the pre-Shang site at Er Li Tou clearly shows that earthenware bells could have clappers.



Figure 55 -- Earthenware clapper bell unearthed at Er Li Tou, Yan Shi, He Nan Province. 河南省偃師二里頭. Ca. 19th-16th century B.C.

(From KG 1965.5:pl. 5, no. 4)

B. Bronze clapper bell

The Er Li Tou site also produced a bronze clapper bell with a loop and a decorative flange. The tapered body is not decorated, thus making it look more primitive than the similar Shang and Zhou clapper bells which also have one or two flanges on the sides.



Figure 56 -- Bronze clapper bell with a flange. Unearthed at Er Li Tou. 二里頭. Ca. 19th-16th century B.C.

(From KG 1965.5:pl. 5, no. 20)

C. Earthenware shang-bell

Shortly before 1957, an earthenware bell similar in shape to the shang-bells of Shang times was unearthed at a late neolithic site belonging to the Long Shan Culture (龍山文化) at Ke Xing Zhuang, Chang An, Shaan Xi Province (陝西省長安客省莊). Li Chun-yi (李純一) reported that it has a "hollow oblong body, and a solid handle" (Li 1964:19). Measurements are not given.

If this object is in fact a bell, and if the date is correct, it might be considered the prototype of the shang-bell of the Shang Dynasty.

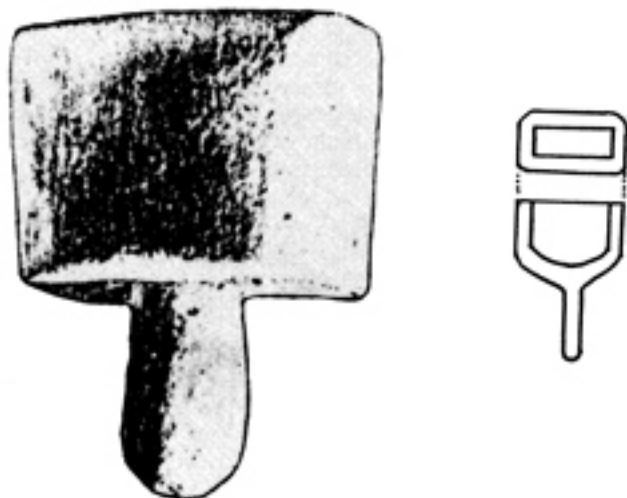


Figure 57 -- Earthenware bell unearthed at Ke Xing Zhuang, Chang An, Shaan Xi Province. Collection of the History Museum, Beijing. Ca. 2100 B.C.?

(From Li 1964:19, and pl. 1)

In the following sections in which bells of the Shang period are depicted, it can be seen that the characteristics of these pre-Shang bells--namely, the oval body section, concave mouth profile, upward-facing mouth, and decorative flange--were all inherited by the Shang people.

II. SHANG BELLS

Bells of the Shang Dynasty will be presented according to the classification: clapper bells, sets of small shang-bells, and large shang-bells.

A. Clapper bells

Perhaps a thousand small clapper bells have been recovered from Shang sites within this century. However, only a few will be depicted in this chapter. As far as I know, the unearthed Shang clapper bells all belong to the ling (鈴) type, with a loop at the top. However, it is possible that some examples with a rotted-away top portion may have been of some different shapes. with a handle made of wood, bone, or leather.

It seems that the clapper bell was used more for signalling purposes than for music in Shang times, even as it is today. The bells were often unearthed with the remains of chariots (KGXB 1955.9:62, 65), and with the skeletons of horses and dogs (KGXB 1979.1:51). Sometimes the ramp of a large tomb reveals two bodies, the guardians of the tomb, equipped when buried with a ge-halberd and a clapper bell respectively (Hu 1955:130). The Zhou classics mention that in ancient times the bell was rung to convey orders, and I have found that the OBG 令 (令:ling, "order") shows a person (人) kneeling under a clapper bell (A; see section II.A.3 for more discussion). Perhaps the clapper bells were not made to give particular pitches. In other words, they were not used as melodic instruments. In Chinese folk music, they are struck as percussion instruments, sometimes marking the beats (雙星碰鈴).

There is no OBI which can be cited to show how clapper bells were used in musical performances. Considering that there are many similarities between Shang and Zhou cultures, it is possible that bells were used in Shang settings comparable to those cited in the Zhou classics. In Zhou times clapper bells were rung during major sacrifices.⁵ Tiny ones were attached to flags so that they would sound in the wind.⁶ On the battle field, the duo (clapper bell of large size) was used along with drums and other bells to encourage and control the actions of the army.⁷ This evidence, together with the fact that the names of some late Zhou large loop-suspension bells are inscribed as "clapper-bell-type bell" (Rong 1941:501. 自作鈴鐘), indicates that the clapper bell was in fact a musical instrument.

The early Shang clapper bells are similar to the pre-Shang ones. For example, the one unearthed at Da Dun Zi, Fei Xi, An Hui Province (安徽省, 肥西, 大墩孜) looks equally plain.



Figure 58 -- Bronze clapper bell with a single flange, unearthed at Da Dun Zi, Fei Xi, An Hui Province, 1972. Early Shang -- ca. 16th-15th century B.C.?

(From WW 1978.8:2)

Eighteen clapper bells were found among the many treasures in the royal tomb of Lady Hao excavated in 1976. The report remarks that the bells have leaf-shaped (扁槌) cross-sections, straight or concave mouth profiles, and clappers made of bronze or bone. Some bells are open at the top, and in those cases, the clappers may have been tied to the loop with a string originally (Tomb of Lady Hao 1980:113). Three samples are shown here, one with a single flange, one with two, and one with a ⊕-shaped hole on each side of the body, surrounded by a trapezoid frame of raised lines, perhaps indicating a more developed stage in technical and artistic maturity in bronze casting:



Figure 59 -- Photo and drawing of three clapper bells found in the tomb of Lady Hao at Xiao Tun, 1976. 小屯. 婦好墓
Ca. 12th century B.C. or earlier.
Heights: 5, 6.7, and 5.8 cm.

殷墟婦好墓
(From Tomb of Lady Hao 1980:pl. 79)

During the period from 1969 to 1977, a graveyard for some common people of the Shang kingdom to the west of Xiao Tun was excavated. 939 tombs were opened, and more than 200 clapper bells were recovered (KGXB 1979.1:97), four of which are illustrated here:



Figure 60 -- Photo and drawing of four clapper bells recovered from tombs of common people of the Shang Dynasty, Xiao Tun, 1969-1977. Ca. 11th century B.C. or earlier.

(From KGXB 1979.1: pl. 15.6, and p. 93)

From the pictures above, it can be seen that some bells are open at top, the mouth profiles are either flat or concave, and all the bells are leaf-shaped in cross-section. The third example shows that the clapper has a ring at the top, to be attached to a half-ring inside the bell near the crown.

Occasionally bells are inscribed with the name of the tribe or the family of the owner. The following is a typical example from Xiao Tun:



Figure 61 -- Photo and rubbing of a Shang bronze clapper bell with inscription. Ca. 13th-11th century B.C. Overall height: 4.8 cm.

(After Yang 1980:diag. 5)

Clappers could be made of horn, in addition to bronze or bone (Gao 1962:pl. 181).

1. Pictographs for the clapper bell: 𠄎

No one has yet found a pictograph that represents the clapper bell in OBI.⁸ In the classics, the word meaning "clapper bell" is 鈴 (:ling). The Shuo Wen defines the left part 金 ("metal") as the semantic radical, and the right part 令 (:ling, "to order") as the phonetic element (Shuo Wen, Juan 14.1:15). However, I believe that the right part, written 𠄎 in OBG (Sun :375), actually shows a person kneeling next to a clapper bell. The original meaning of this graph 𠄎, as seen in all OBI, is "to order." The radical "metal" on the left of the modern word 鈴 (clapper bell) was probably added in the Zhou period, to emphasize that the bell was made of metal.

No one has ever succeeded in explaining the meaning of the triangle in the graph 𠄎.⁹ To me it seems to be a clapper bell, symbolizing a leader, while the person kneeling next to it represents someone receiving an order. The side view of many clapper bells from Shang times is close to triangular; this might be why the bell is







represented by a triangle in the graph. Furthermore, my interpretation of the graphs  (a bell on a stand) and  (a bell being struck) supports this theory (see section IV). Correspondingly, there is at least one Zhou clapper bell bearing an inscription which uses this graph  to mean "clapper bell":



Figure 62 -- Drawing of an imperial clapper bell of the Zhou king.
Zhou Dynasty, ca. 9th-7th century B.C.?
(Based on Rong 1941:pl. 941)

The inscription reads "King's clapper-bell (at the capital) Cheng Zhou" (王成周金 = 王成周鈴). In this inscription, the word for "clapper bell" is written , without the radical "metal," and again the bell itself looks like a triangle.

2. Clapper bell and "order"

There are many possible explanations for the clapper bell's development into an instrument to convey orders. In Chapter Three (section I.C), I explained how the ancient people used the gong to summon others, to call for attention, and so on. I think it likely that the king might have used a clapper bell to summon a servant who would then come and kneel to receive his orders. This could be the source of the graph , and the basis of its meaning, "to order." This also clarifies the structure of a later word which means "the order":  (:ming). In this word the radical "mouth" (口) is added to express the articulation of the order by the mouth.

The clapper bell, therefore, could have developed into an instrument to announce the king's intention to give orders to his people. This is clearly reflected in the Zhou Li: "Announce (new orders and law) with a wooden-tongued

clapper bell" (Juan 3, section "Tian Guan, Xiao Zai."

周禮. 天官. 小宰: "徇以木鐸"). The commentary of Zheng Xuan is even more informative:

In ancient times, when there was a new order or law, a wooden clapper bell would be sounded (by someone walking around in the country) to notify the public, so that they would hear it clearly. "Wooden clapper bell" means that the clapper is wooden (while the bell is bronze). For daily affairs, the clapper would be bronze.

古者將有新令,必奮木鐸以警衆,使明聽也。木鐸,木舌也。文事奮木鐸,武事奮金鐸。(鄭註)

One remark in the Li Ji in fact connects the clapper bell specifically to the king:

It is the king's function to shake the wooden clapper bell in the court.

振木鐸於朝,天子之政也。

禮記. 明堂位
(Li Ji, ch. "Ming Tang Wei")

During battles, the soldiers' advances and retreats were controlled by drums and hand-bells, but these instruments in turn were controlled by the clapper bell.¹⁰ This arrangement is reasonable, because the bell could be heard more easily than the commander's voice. Since the late Zhou period, the original meaning of the graph 𠄎 (clapper bell) has been lost, but the tradition of announcing orders with this bell has not become obsolete. In ancient China, the office of a general was often known as the "clapper bell chamber" (Jin Shu, Juan 34, "Biography of Yang Hu."




晉書卷34羊祜傳: "鈴閣之下") Moreover, guards

and servants there were called: "(people) under the clapper bell" (Hou Han Shu, Juan 107, "Biography of Zhou Yu"

後漢書周紆傳注: "鈴下主威儀之官.") All




these classical texts strongly support my interpretation that the graph 𠄎 shows a person kneeling under a clapper bell.



3. Other graphs related to the clapper bell

The structure of two graphs,  and , and one later word , has never been successfully interpreted, though the meanings were understood. Now their graphic and semantic values may perhaps be defined:








a. or (:jin, "now")

Scholars agree that these graphs mean "now" or "this (month, day, night)" in OBI, but no one could convincingly explain why (OBD:1777). I believe the meaning has something to do with the clapper bell.



"Now" is an abstract meaning which cannot be shown by a pictograph, and has to be shown by a "borrowed" graph. When a clapper bell was rung to summon servants or guards, it meant "come now." For this reason, I am convinced that the graph , which represents the clapper bell, evolved the meaning "now." This is similar to the use of the graph  ( :zhen), showing a person hitting the qing (at a special time), to mean "time," as explained in Chapter Three (I.C). Even today it is still common to ring a bell to summon people.

Often an extra stroke was added to the original graph when it was used for an evolved meaning, to avoid confusion. This would explain why the graph for "now" was written , although it was occasionally written  (Sun :239).

b. or (:jin, "bronze, metal")

In this bronze graph, the lower part  includes "earth" ( →  →  :tu) and "metal" ( :lu, "pieces of metal"), suggesting an underground mineral. The upper part  was usually explained as a phonetic element (Shuo Wen, Juan 14.1:1). This might be correct, but why was this particular graph chosen to be the phonetic element. I think it depicts a clapper drum which is made of that metal. In other words, "" has both phonetic and semantic functions.

c. (:ling, "musician, servant")

Traditionally the left part of this word "" (person) is explained as a semantic radical, and the right part of a phonetic element (Shuo Wen, Juan 8.1:24). I think both meanings have evolved from the use of the clapper bell, and that the right part serves both phonetic and semantic functions. The right part is the graph  which shows a person kneeling next to a clapper bell, as explained above.

In Shang and Zhou times, musicians were of the lower stratum of society and were regarded as servants. With the radical "person" added, it means "bell-player" or "servant." This also explains why the word became a common surname for musicians in Zhou times.

In the following story, in which the Zhou king had to consult the ling-musician about pitches when he wanted to cast bells, it is clear that the word 伶 originally meant "bell-player":

The king was going to cast a (set of bells in the scale of) wu-yi; he asked Ling Zhou-jiu about the theory of pitches. . . . In the twenty-fourth year the bells were made. The ling-musicians reported that they were harmonious.

王將鑄無射. 問律於伶州鳩。
..... 二十四年鐘成, 伶人告成。

(Guo Yu, Juan 3,
"History of Zhou")
國語. 周語

There is yet one more term which deserves attention: ling-lun (伶倫). This term, often seen in Zhou classics, is said to be the name of one of the musical officials of the Yellow Emperor of the pre-Shang period. "Ling" is the generally accepted surname of the musician, while "lun" was his personal name. One story says that Ling-lun was sent to fix (calculate) the twelve pitches. He cut some bamboo pipes and blew on them (imitating the call of the phoenix), and thus fixed the twelve half-steps in one octave (Lu Shi Chun Qiu, ch. "Ancient Music"). However, many names of the twelve pitches involve the word "bell," such as "Yellow Bell" (黃鐘 :huang zhong), "Lin Bell" (林鐘 :lin zhong), and "Ying Bell" (應鐘 :ying zhong).

Scholars have been puzzled as to why the pitches calculated from pipes are named after bells (putting aside the questions whether there were bells at the time of the Yellow Emperor, or even whether there was such a person in history). A simple explanation might be that bamboo does not last long, therefore bronze bells were utilized to record the twelve absolute pitches--hence the names. However, there might be a more complicated answer.

To me, the term "Ling-lun" could be understood as "musicians," or more precisely as "bell player and pipe player," instead of being the name of one person. The right part of the word lun (倫) is comparable to the OBG meaning mouth-organ: 𪛗 (Ning 1.73). In this graph, 𪛗 symbolizes the pipes in a mouth-organ. It is also comparable to the OBG 𪛗. In my opinion, this graph 𪛗 shows the double pipe tied together, and has evolved into three modern words: 倫, 倫, and 管

(see Chapter Six, III.A). In modern Chinese, the word "lun" means "to arrange, to put in good order," or "arrangement" when it is used as a semantic element in other words (e.g. 論, 倫). These meanings could

have evolved from the idea of arranging the pipes, the pitches, and finger holes on a pipe instrument. Thus it is not difficult to understand why the word "lun" could originally have meant "pipe player."

The above information supports my opinion that the term "ling-lun" originally meant bell and pipe players. Since it was these two kinds of musicians who fixed the pitches, it is understandable that the pitches calculated on pipes could have been named after bells. Furthermore, the same chapter in the Lü Shi Chun Qiu mentions another story in which the Yellow Emperor ordered Ling-lun to cast twelve bells. This might also be a hint that one of the two persons, Ling, was a bell player.

B. Sets of small shang-bells

As far as I know, all the shang-bells unearthed at or near Xiao Tun are small ones, only a few inches high. They usually come in sets of three, though there has been a recent discovery of a set of five.¹¹ All large ones have been recovered from late Shang sites south of the Shang capital. In the past centuries several dozen small shang-bells were recovered and have been passed from one collector to another. Many are now in collections in the West and in Japan; few are still in sets. Those that do not bear inscriptions or special decorations might never be re-grouped into their original sets. In this section, only a few sets--mainly those found in official excavations--will be depicted. Some samples illustrated singly in art books, but which could have been originally in a set, are also included if they show special inscriptions or shapes. The bells could be older than the suggested dates, which are usually the dates of the tombs. One problem is that many tombs do not yield bronzes or other objects bearing datable inscriptions, so the dating of some tombs is debatable.

In most cases, therefore, the bells will be loosely dated to the 13th-11th centuries B.C., corresponding to the period when Xiao Tun was the last Shang capital.

1. Zhong shang-bells


Between 1969 and 1977, 939 small graves in a Shang cemetery west of Xiao Tun were excavated. In grave No. M699, reportedly the tomb of a noble, a set of three bells was found (KGXB 1979.1:98, 118). They show the conventional shang-bell characteristics: leaf-shaped cross-section, concave mouth, tao-tie decorations on both sides, hollow handle (of uneven diameter), and gradual decrease in dimension and thickness. On the handle of each bell is the inscription  (中 :zhong, "large flag erected in the center of a village or tribe"), which represents the name of the tribe or family that owned these bells:



Figure 63 -- Photo of the set of shang-bells unearthed in the small tomb No. M699 in a Shang graveyard west of Xiao Tun, 1969-1977. Ca. 11th century B.C. or earlier.

Overall height: 14.3, 18, 21 cm.
Width at mouth: 10, 12.3, 15 cm.

(From KGXB 1979.1:98 and pl. 14.1)

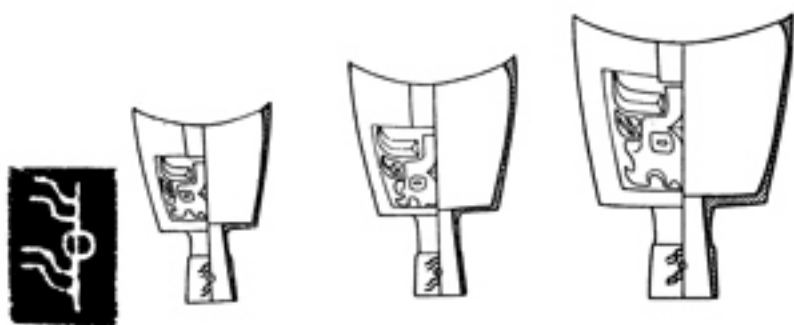


Figure 64 -- Drawings and rubbing of the inscriptions on the above bells.

(From KGXB 1979.1:83, 97)

On the handles, near the lower end, there is a sudden increase in diameter. On other samples, this becomes either a bulb, a hole, or two rings.

2. One set of shang-bells with simpler decorations was recovered at Xiao Nan Zhang, Wen Xian, He Nan Province (河南省温县小南张). The bells have the typical shape, but the decoration is limited to two trapezoidal raised-line frames.



Figure 65 -- Set of bells unearthed at Xiao Nan Zhang, Wen Xian, He Nan Province. 13th-11th century B.C.

商 周 考 古
 (Photo from *Shang Zhou Kao Gu* 1979:pl. 15)
 (Pitch information from *YYLC* 1978.1:201)

On each side of the bell, there is a small raised square at the center of the lip, perhaps signifying where it should be struck.

3. Ya-bi shang-bell

A set of five bells was found in the royal tomb of Lady Hao at Xiao Tun, in 1976. The bells share the common features of the other bells described above. The handles are also tube-shaped and open at both ends. The three smaller ones are corroded, but the larger ones show two trapezoidal frames of raised lines on each side. Two graphs indicating the owner are inscribed on the inside of the bell:

(亞 孛 孛 :ya bi. 孛 孛 = 必 ,

see OBD:3850).

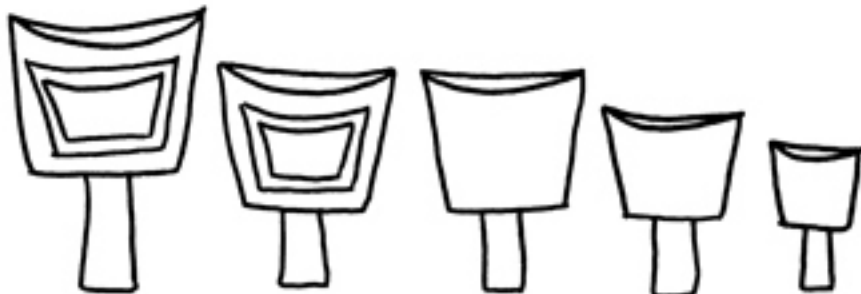



Figure 66 -- Drawing of the set of five bells unearthed in the tomb of Lady Hao at Xiao Tun, 1976. 12th century B.C. or earlier.

	a	b	c	d	e	
Overall height:	14.4	11.5	11.7	9.8	7.7	cm.
Width at mouth:	10.3	9.2	8.7	8.0	5.2	cm.
Approx. weight:	0.6	0.4	0.4	0.2	0.15	kg.

(Based on Tomb of Lady Hao 1980:100, and pl. 62)

4. Zhu shang-bell

One shang-bell with the graph  (貯 :zhu, "to store") is similar to the other bells, but has a hole in the handle (Figure 67):



南=貯

Figure 67 -- Photo and rubbing of a shang-bell, perhaps the largest of a set. Provenance unknown; possibly unearthed at Xiao Tun. 13th-11th century B.C.

Overall height: 18.7 cm.

Width at mouth: 17.3 cm.

(Photo after Yang 1980:diag. 1)

(Measurements from Shang 1935: "Zhu" 3)

5. Ya-yi shang-bell

One shang-bell with the name

亞

(亞矣=疑:ya-yi)

of undocumented provenance was included in a book compiled by an antique dealer (Huang 1936:1.10). There are two rings on the handle. Its shape and decoration coincide with those of similar bells from Xiao Tun. In fact, one clapper bell unearthed at Xiao Tun also bears the same name (Rong 1941:489); see Figure 61 above.

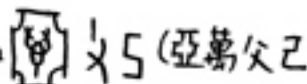


Figure 68 -- Photo of Ya-yi shang-bell, of undocumented provenance, but probably excavated at Xiao Tun. Ca. 13th-11th century B.C.

(From Yang 1980:diag. 12)

6. Fu-ji shang-bell

One shang-bell bears the inscription



:ya wan fu ji, "ya wan (made this for the late) Father Ji" inside the bell (Rong 1936:no. 18).¹² Traditionally this bell is dated simply to the Shang period, but in my opinion, it can be more precisely dated to the first half of the Shang period. Its angular lower profile and the comparatively short and thick handle give it a primitive look, comparable to that of some bronzes of the early Shang period (see examples included in Fang 1980:no. 4-7, 11). Its abstract ropy tao-tie design in thread relief on a plain background, typical of early Shang bronzes of the Zhang Zhou (鄭州) phase, supports my opinion. The

"Resume of the Five Styles of Shang Bronze Ornament," by Robert W. Bagley, considers this a design of the early Shang period:

Style I

Thread relief; technically the simplest of relief modes, since it is produced by incising lines directly in the clay of the mold surface. The designs, which quite early include recognizable taotie patterns,

appear in thin raised lines on a plain background.

(Quoted by Fang 1980:182)

If my understanding is correct, this bell could be dated to the mid-2nd millenium B.C., making this the earliest Shang bell known. The fact that no other bell bearing similar decorations has ever been found at Xiao Tun may also be evidence that it is from other Shang sites earlier than the Xiao Tun site.

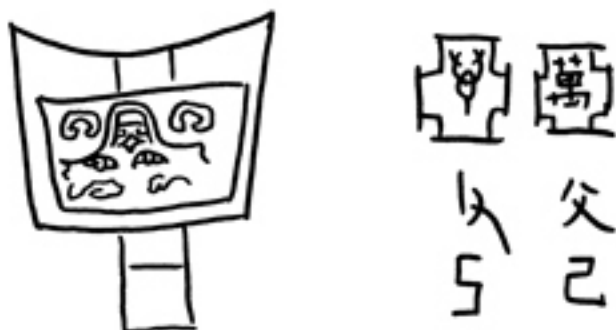


Figure 69 -- Drawing and rubbing of Fu-ji shang-bell of undocumented provenance. Ca. 1500 B.C.?

Overall height: 25 cm.

(Based on Rong 1936:no. 18)

7. Li shang-bell

One bell bearing the name (= 離 :li, "(bird) caught"¹³ has a particularly long handle on which is a bulb-shaped device. This bell of undocumented origin has tao-tie decorations similar to those on bells recovered at Xiao Tun, depicted above, suggesting that it could be dated accordingly. This style, and the presence of the bulb, are proof that it cannot be too early an instrument; other large shang-bells dated to the 13th-11th century B.C. bear the same bulb.



Figure 70 -- Photo and rubbing of Li shang-bell of undocumented provenance, but possibly recovered at Xiao Tun. 13th-11th century B.C.

Overall height: 17.6 cm.
Length of handle: 9.6 cm.

(Photo from Yang 1980:diag. 13)
(Rubbing from Rong 1936:no. 19)

C. Large shang-bells

As early as the twelfth century A.D., large shang-bells were occasionally discovered, some of which could have been made in the early Zhou period. The Bo Gu Tu Lu (博古圖錄), a voluminous book compiled soon after 1123 A.D., contains the drawings, weights and measurements of nine examples originally in the collection of the Song court (Juan 26:36-46). Additional shang-bells have been found during this century. In typology, these are simply enlarged versions of the small bells unearthed at the Shang capital. However, these large bells bear no inscriptions, and some people think they show regional styles in decoration (WW 1975.8:88). Those found before 1940 are of undocumented provenance, and those recovered after 1940 were all found outside the Shang capital. They come from Zhe Jiang, An Hui, Jiang Su, and especially Hu Nan provinces, all of which are in southern China (KGXB 1981.1:131). Moreover, they were not found in tombs or house sites; rather, they were either found buried singly (WW 1975.8:87), or in caches (WW 1966.4:2). They were usually found on

hillsides (WW 1975.8:88), but there are at least two reports of finds in pits on the tops of small hills (WW 1966.4:2; WW 1975.8:87).

These facts have puzzled many scholars (WW 1975.8:88). Xia Nai (夏鼐), a leading archaeologist of China, suggested

that the many caches of Shang bronzes in south China might be a result of some Shang nobles moving southward shortly before the dynasty was overthrown (KG 1972.1). Zhang Chang-shou (張長壽) denied the observation regarding

"regional styles"; he thought that the bronzes look exactly the same as those unearthed at the Shang capital, and might have been brought from the north by the nobles shortly before the empire collapsed, or they might have been accumulated there by Shang nobles who lived in the south (KGXB 1979.3:288).

At present, it is impossible to conclude that the large bells were not brought from the north. Even if they were really cast in the south, it does not mean that the kings did not have large bells in the capital. The fact that no large bells have been recovered there can be explained: most of the royal tombs at the capital were robbed before the official excavations, and the large bells would have been among the first objects taken by grave robbers. If Zhang is correct about the similarity in bronze decorative styles, who can deny the possibility that some of the many large bells of unknown provenance found before 1940 might have been recovered at the capital?

Even if no large bells are ever found at the Shang capital, there are historical reasons for it. There are records that when the last Shang king became increasingly wicked, rejecting the advice of his censors and often killing them, his officials eventually "took the (king's) sacrificial vessels and musical instruments (i.e., the symbols of the country) and fled to the Zhou state" (Shi Ji, Juan 3, "History of Yin" 史記.殷本紀:"殷之太師少

師乃持其祭器樂器奔周"). The Zhou king in western China, recognizing the hatred of the Shang people for their king, took the opportunity and conquered the empire. It is natural that after the war the Zhou king would have moved all the precious bronzes to his own capital. Coincidentally, there was one chapter in the Shang Shu, entitled "Bestow Vessels," recording that the Zhou king bestowed the vessels taken from the Shang on the generals who helped him in the war. Unfortunately this chapter has been lost and only its title survives (尚書.分器). This may be one of the reasons

why no large bells have been found at the Shang capital sites.

Moreover, my research shows that the OBG 𠄎 (商 :shang) actually depicts the shang-bell mounted on a stand. It might be argued that the graph does not show the actual size of the bell, and that it could be a small bell on a stand. I agree that the latter statement is possible, but it is unreasonable to think that the Shang people who could cast huge bronze vessels weighing 875 kg. (Du 1980:13) could not cast large bells. The Li Ji remarks: "The Shang people emphasize music (in their sacrifices)" (section 11, "Jiao Te Sheng" 禮記郊特牲: "殷人尚聲"),

and the Lü Shi Chun Qiu says, "The Shang king Zhou made luxurious instruments, thinking that the louder the large drums, bells, qing and pipes, the better, and the more instruments used, the more pleasing to the eyes" (Juan 5, "Luxurious Music" 呂氏春秋侈樂: "殷紂作為侈樂. 大鼓鐘磬管簫之音. 以鉅為美. 以眾為觀"). It seems unlikely that the small bells which are a few inches tall would be the only bells used with the large qing and the large drums in the Shang capital. It should be noted that the graph 𠄎, besides representing the shang-bell, also represented the name of the Shang tribe, the Shang city, and the Shang empire. These names in fact came from the bell (see section IV.B).

Below are some examples of large shang-bells. Presently it is possible to date them only to the second half of the Shang period (ca. 1300-1030 B.C.). It is not known whether they were once used in a set or singly. All large shang-bells of documented provenance were found singly, with the exception of the five bells found in a pit in 1959. It is not certain whether those five belong in a set, for although they bear similar decorations, there are differences in detail. Until their pitch relationships are studied and found to form a set, they should be regarded as individual instruments. It should be realized that in addition to being used as a set of melodic instruments arranged according to pitch, bells might have been used as a group of percussive instruments, regardless of pitch.

1. Elephant shang-bell

This is one of a group of five bells found in a pit on top of a hill at Lao Liang Cang, Ning Xiang, Hu Nan Province (湖南省. 寧鄉縣. 老糧倉) in 1959

(WW 1966.4:2). They were buried with mouths up, four in two rows at the bottom, and the fifth on top. They are of different sizes, but are decorated with similar abstract tao-tie motifs on the sides. Two are decorated with elephants on the mouth, and two with tigers; the fifth has neither. Each handle is hollow, open at both ends, and has a bulb at the mid-point. Like other large shang-bells, they are leaf-shaped in cross-section, and have concave mouth profiles. One of those decorated with an elephant is shown in Figure 71.



Figure 71 -- Photos of the front and side views of one of the five large bells found at Lao Liang Cang, Ning Xiang, Hu Nan Province, 1959. 湖南寧鄉縣老糧倉
Collection of the Hu Nan Provincial Museum. Ca. 1300-1030 B.C.

Overall height:	70 cm.
Length of handle:	26 cm.
Width at mouth:	46.5 cm.
Weight:	70 kg.

(From WW 1966.4:2)

2. A similar bell in the collection of the Palace Museum in Beijing does not have a bulb on the handle. The end of the handle seems to be broken, but it is not. Such bells were mounted on a stand, and the handle did not have to be very smooth at the end. As usual, the bell has a leaf-shape cross-section and a slightly concave mouth profile (the mouth seems to be straight in the photo, due to the camera angle)--Figure 72.



Figure 72 -- Large bell in the collection of the Palace Museum, Beijing.
Ca. 1300-1030 B.C.

Height: 65.2 cm.
Width at mouth: 49.3 and 32 cm.

(From Yang 1980:diag. 14,
and Yang 1954.1:5)

III. CONSTRUCTION AND PITCH

As can be seen from the above information, Shang bells generally share the following features: a flattened oval or leaf-shaped cross-section, a concave mouth profile, a hollow handle open at both ends, and either a hole, two rings, or a bulb on the handle. Recently Ma Cheng-yuan pointed out that the leaf-shaped cross-section of Shang and Zhou bells is a special design enabling the bell to produce two frequencies on one instrument (KGXB 1981.1:131-146).

Archaeologists have long been aware of the fact that bells with a round cross-section can only produce one pitch no matter where they are struck. On the other hand, two pitches can be obtained from bells with a leaf-shaped cross-section, one by striking the center of the lip and one by striking the left or right sides of the lip (see striking positions 1 and 2 in Figure 73). The second pitch is always higher than the first one.



Shang bell



Zhou bells

Figure 73 -- The two striking points on bells with leaf-shaped cross-sections (concave or straight mouth profile)

Traditionally, however, it was believed that bells, like qing, were meant to have just one pitch each; thus only the center-pitch was tested and published, if the bells were tested at all. In the past 30 years, due to the lack of funds and equipment, the majority of instruments unearthed has not been tested; the data from those which were tested could be inaccurate.

In 1977, when the disruptions of the Cultural Revolution (1966-1976) were over, the work of testing the unearthed instruments was renewed, and the ability of one bell to produce two frequencies was clearly recognized (KGXB 1981.1:133). At first there was no evidence to prove that it was by conscious design, though Huang Xiang-peng (黄翔鹏), a scholar in Beijing, did write an

article in 1977 in which he discussed the side-pitches of some Shang and Zhou bells as part of his study of ancient Chinese pitches and scales (YYLC 1980.3:126-161). But in 1978 a set of 64 bells with leaf-shaped cross-sections, plus a large one with a round cross-section, was found hanging on a huge stand in the tomb of Marquis Yi of Zeng, at Sui Xian, Hu Bei Province (WW 1979.7:4-5). Each of the 64 bells is inscribed with the name of the two notes it produces, thus verifying the notion that the two pitches were used consciously, at least by the fifth century B.C.

Inspired by this discovery, Ma Cheng-yuan tested 107 bells and clapper bells with leaf-shaped cross-sections.

These bells belong to the Shang, Zhou, and later periods, and are in the collection of the Shanghai Museum. He reported that each bell can produce two pitches (KGXB 1981.1:133-134). He took laser holographic photographs (激光全息攝影) of bells of different shapes to observe

their vibration patterns. He found that it is the cross-section and not the mouth profile or decorations that determine the vibrations of a bell. Round bells vibrate in one way and give one pitch no matter where they are struck. Bells with a leaf-shaped cross-section vibrate differently when struck on the center or on either side of the lip, resulting in two pitches (KGXB 1981.1:133-137).

A chart which Ma made to show the interval relationships of the two notes on each of 84 Shang and Zhou bells is included here:

Table 2: Interval relationships of the two notes on 84 Shang and Zhou bells in the Shanghai Museum -- after KGXB 1981.1:134.

Interval Period	Minor Second	Major Second	Minor Third	Major Third	Perfect Fourth	Aug- mented Fourth	Minor Sixth
Shang	1	4		2			1
Early & Middle Western Zhou		3	2	2		1	
Late Western Zhou	1	5	14	5	1		
Spring & Autumn Period	2	1	11	5	3		
Warring States Period	4	4	8	4	3	1	

There is no doubt that the later Zhou bells were made to produce two pitches, but it is hard to prove that the ability of Shang bells to produce two notes was the result of a conscious decision. It could be that the Shang people simply inherited the leaf-shaped cross-section bell from pre-Shang people, not knowing or caring about the second pitch. Perhaps it was the Zhou people, famous for enlarging and standardizing objects, who started to use the second available pitch on the bells.

Even if the Shang people did use the second note, more data on Shang bells are needed before their scales can be understood. The notes available on any one set of instruments do not necessarily reflect their scale and music, and it is possible that there were developments during the five centuries of the Shang reign and that there were simultaneous regional differences. In short, I think the Shang instruments should be more accurately dated and classified before they can be used to rebuild the scale and music of the Shang period. The testing of ancient instruments carried out in 1977 under government auspices has recently been criticized as unreliable (Pan 1980:53-59); there are also misprints in some reports.¹⁵ As noted earlier, the occasional pre-1977 reports on the pitches of Shang bells concentrated only on the center-note. Therefore, a thorough study of the pitches, scales, and musical developments of the Shang period based on Shang bells will have to await further testing of bells in other museums. At the present, I shall not attempt to discuss these matters. The pitches of the ocarinas, qing, and bells are supplied in this work, if available, just for reference.

IV. OBG RELATING TO THE SHANG-BELL

No one has successfully pointed out which graph in the OBI shows the shang-bell.¹⁶ In my opinion, the following OBG are concerned with the shang-bell:

𠄎, 𠄎, 𠄎, 𠄎, and 𠄎.

A. 𠄎 (設 :she) To play the shang-bell, performance

This graph has been misunderstood since the discovery of oracle bones. Li Xiao-ding, after examining the opinions of several scholars, concluded that it could not be understood (OBD:4464). Recently Yu Xing-wu correctly equated it with the modern word 設 (Yu 1979:103). However, he came to this conclusion merely because he observed the outward similarity of the graph and the modern word, but he did not realize that the left part of the graph shows a bell. Consequently his translations of the related OBI are wrong.¹⁷

In my opinion, this graph shows a shang-bell on one side (𠄎), and a hand holding a mallet on the other (𠄎). Its original meaning of OBI is "bell" and "to play bell(s)." 18 A picture in a Han Dynasty tomb may help to explain the structure of this graph:



Figure 74 -- Rubbing of a tomb picture showing the playing of a hand-bell. 1st-2nd century A.D.

(From WW 1973.6:23)

The following is one of the many typical OBI inquiring about playing this bell:

OBI 93 (He 286)

𠄎

貞

Divine: (Should the)

大

王

King

𠄎

設

play bells (for)

父 乙

(ancestor) Father Yi?

Several other OBI containing this graph were translated in Chapter Two (OBI 22, 37, 38, 41, 42, 43).

The Zhou people had probably forgotten the original meaning of this graph, but its evolved meanings--"to set up instruments" and "to perform"--were kept. For example, one Zhou poem clearly relates this word she (設) with the bells: "(When) bells (and) drums are already set up (設), one morning (or, soon) we serve the feast" (Shi Jing, section "Xiao Ya," poem no. 175. 詩經·小雅·彤弓: "金鐘並支 既設。一朝饗之。")¹⁹ In fact, the evolved meaning is not too

different from the original meaning, since the purpose of setting up the bells is to play them.

Why is it that the graph ∇ , so pictorial and so close to the modern word 言 in appearance, has not been understood in the past eighty years?

The first reason is that the left part of the modern word 言 means "flute" (Er Ya, section "Instruments"; see Chapter Six, section II). Scholars who wished to equate the graph ∇ with the modern word 言 saw the incongruity of a flute being struck by a mallet. The second reason is that "V" and "A" were not recognized as the OBG for shang-bell and clapper bell respectively.

Why has the bell in the graph ∇ become 言 ("flute") in the modern word? This can be explained easily. The OBG for "vertical flute" is also written ∇ (言 :yan), which looks exactly the same as the component for the shang-bell, ∇ . To avoid confusion, the Shang people sometimes wrote the graph "flute" as ∇ or ∇ (Shima :124), with an added mouth. In the Zhou period, however, most bells were suspended with mouths down, so people forgot that "V" originally meant a bell with the mouth up. Naturally people mistook the left part of ∇ for a flute, and this is probably why the OBG ∇ became 言 in modern Chinese.

B. 𠩺 (商 :shang) The shang-bell

This graph could also be written 𠩺 (Sun :93), with a stroke added to the middle. In late Shang OBI, it is usually written as 𠩺 or 𠩺 (Sun :92-93), with a mouth added to the bottom. Sometimes the top part was simplified: 𠩺 (Sun :281). An artistic version cut on a decorated piece of bone is 𠩺 (Yi Cun 518). On Zhou bronzes, its versions are 𠩺 , 𠩺 , and 𠩺 (Rong 1959:103).

It has long been known that these graphs represented the names of the Shang people, their city, and their empire. However, no one has convincingly deciphered what the graphs depict (OBD:693-696; Zhou 1975:1178-1182). I think the graph 𠩺 shows a bell with its mouth up mounted on a stand.

Its original meaning must have been "the shang-bell" (𠩺). The short additional stroke on the upper half is a pin to keep the bell in position when mounted (see the interpretation of the graph 𠩺 in the next section; also, see the discussion of the pin in V.B). The following is a typical OBI in which this graph refers to bells:





Should (we)






perform (the)








shang-bells?



There is an oracle bone on which are inquiries about the performance of the feather dance, the flag dance, and the shang-bell (OBI 2, Chapter Two), which strongly suggests that the graph  refers to an instrument, the shang-bell.




I believe that the Shang people were named after this bell probably because they invented it, or because they were famous for having many of these bells--it should not be forgotten that it was the Shang people who raised the technology of bronze casting to its peak.




It is not surprising that people receive their names from things closely connected with them. For instance, the Zhou people occupied the fertile land of northwest China; their name "Zhou," written  in OBG (OBD:43), ,


, , or  in bronze inscriptions (Rong 1959:57),




seems to show square fields and the crops (signified by the dots). I have also found that the name of the first Shang king--Tang,  (唐)--depicts a pole drum at the


top (=  = , see Chapter Four, section V.F). Traditionally, large and metallic musical instruments are very positive symbols. This might be why the Shang people and their first king were named after bells and the pole drum. The reason for adding a "mouth" to the bottom of the graphs

, , and  is not known. I think it does not

signify a stand, because the stands for the bells () and the pole drum () are already represented by 

and . Perhaps it is an element to signify proper names.

In Zhou times most bells were suspended, but bells of the Shang type (with mouths upward) were still made. There is one such late Zhou bell with the inscribed name "Shang-type bell" ("   " Guo 1954:84). This

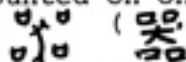
is evidence that the graph  originally referred to a bell with mouth up.

The reason for adding circles and the four mouths to the upper part of the graph in the late Shang and Zhou periods is not exactly known. They might have been added for

decoration, or to symbolize a group of bells mounted on one stand (it would be unsuitable to have a particularly long graph to show several bells mounted on one stand:



). The bronze graph 𠔁 (器 :qi,



"vessels") shows a dog (𤝵) guarding four vessels (Rong 1959:101). In the Zhou classics, this word often means musical instruments. Hence it is not impossible that in the graph 𠔁, the mouths might represent several bells.

In my opinion, several similar graphs showing two bells and a stand-- 𠔁, 𠔁, 𠔁, and 𠔁--are just different versions of the graph 𠔁 (see next section).

C. 𠔁, 𠔁 (= 𠔁 = 商 :shang) The shang-bells

Many OBI belonging to the reign of the 22nd Shang king, Wu-ding (武丁), record the activities of one person called 𠔁. There is no modern equivalent for the

second graph, but since it looks like the graph 𠔁, it is sometimes tentatively equated with 𠔁 and the name is

pronounced Zi-Shang (子商 "Prince Shang"), believed to be a son of Wu-ding. However, the graph 𠔁 is never seen

written as 𠔁 when referring to the Shang people or the Shang city, therefore scholars are not sure about their relationship. Li Xiao-ding listed them as two different graphs in his dictionary (OBD:693 and 4235), remarking that these two graphs are not interchangeable.







Fortunately I have found evidence that they are interchangeable. There is one OBI inquiring about the childbearing of a concubine of Zi-Shang:




OBI 95 (Jin 548)




𠔁	𠔁	𠔁	𠔁	𠔁
子	𠔁	妾	𠔁	冥(媿)....
Prince	Shang's	concubine	(name)'s	childbearing....

The same question was repeated on another piece of bone, but with the name of the prince 𠔁 written as 𠔁 (Cui 1939). This may be evidence that they are the same graph.

The graph 𠔁 could be written 𠔁, with short strokes added to the upper half to signify the pins which


keep the bells in position when mounted (see section V.B). In my opinion, another graph--  --is also a different version of  . In the version  , the two bells are not fitted into the stand, though the center part of the graph () in fact includes a stand (), a pin and a pole () on which the bell is mounted.

It is not impossible for the stand which usually looks like "  " to become "  ." For example the graph showing the ding-caldron ( , a cooking pot) can be

written  (Sun :148). The stand, the pin, and the pole for mounting instruments are also seen in another graph meaning "to set up instruments" ( , explained in Chapter Two, I.B). Moreover, with these graphs understood, the graph showing the shang-bell and a leaf of a door--  -- can also be understood (see Chapter Two, OBI 40).

V. SETTING

Scholars generally agree that in Shang times the small shang-bells were hand held, though the handles seem to be too short (about 4-7 cm.) for convenient holding. In 1930 Luo Zhen-yu suggested that the hollow handle might have been extended by a piece of wood (Luo 1930.1:24), and this has been verified by later discoveries (Rong 1958:72). However, the inference of Chen Meng-jia that the bells were therefore always held (KGXB 1956.3:124) is debatable. I think small bells with extended handles could also have been mounted on a stand so that several bells could be played by one person.



Scholars have different opinions as to how the small shang-bells with a hole or rings on the hollow handle were used. Guo Mo-ruo said the hole in the handle of one bell (Figure 67 above) might have served two functions: a beater might have been tied to the hole with a string, and the hole could have served for hanging or mounting purposes (Guo 1957:"Tu Shuo" p. 4 ). Li Chun-yi argued that if a piece of wood were inserted into the handle, the hole would then be blocked and no string could pass through (KGBX 1975.3:47). Rong Geng thought that the hole might have been designed for driving a nail into the inserted wooden handle (Rong 1941:487), thus keeping the handle firm. This may or may not be correct. A piece of wood can fit firmly inside a hollow handle without being nailed.

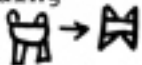
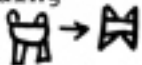
Concerning the bell with two rings on the handle (Figure 68), Rong Geng thought that the rings could be used for suspension (Rong 1941:487). As for the bell with



a bulb on the handle (Figure 70), Li Chun-yi thought that the bulb was designed to prevent the body of the bell from touching the stand (KGXB 1975.3:47), which is reasonable.





I think instruments might have been handled differently in different situations. In this section I shall discuss the possibility that shang-bells were mounted or suspended.




A. The stand

Theoretically the lower part of the graph  could represent the front view of a bell stand, and the stand might have looked like , with a hole in the center.

However, considering that the round legs of the ding-caldron (cooking pot) become triangular in OBG--  → 

( =  :zheng)--the bell stand might also have looked

like . In this discussion, instead of making a complicated diagram, the stand will just be given as , and only one bell will be represented. Some stands might have been shaped like , as suggested by the graph 

(pole drum on a stand) and  ( :yong, "to use instruments"). It can also be written  (Sun:152). The extra short stroke represents a pin used to adjust the length of the middle stick (see next section).


B. Mounting

Since the handles of the small bells are too short, they would not be inserted directly into the hole of the stand. With a short handle the bell might not stay in position when struck, and the resonance could be affected if the bell came into contact with the top of the stand.



Figure 75 -- Unsuitable way of fitting the handle of a small bell directly into the stand.

(Author's drawing)

One possible way to mount the bell would be extending the handle with a stick and fitting the stick into the stand (Figure 76a), as suggested by one version of the graph for shang-bell:  (Sun:93). If the

player changes from a kneeling to a standing position, the height of the bell can be altered by using sticks of different lengths, or simply by making holes of the lower end of the stick, and using a pin to control how far the stick fits into the stand (Figure 76b):

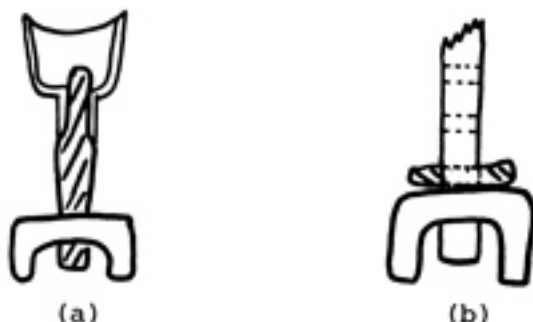



Figure 76 -- a. Possible way of mounting the bell on a stick.
b. Controlling the length of the stick with a pin.

(Author's drawing)

However, considering that the graph  often shows a horizontal short stroke right below the bell, and far away from the stand, I think that the pin might have been inserted into holes drilled on the upper end of the stick (Figure 77a). The hollow handle of the bell would allow the stick to reach into the body of the bell, thus adjusting the height of the stick as required (Figure 77b). On the bell with a hole in the handle, the pin could pass through the hole, thus affixing the bell more securely on the stick (Figure 77c). In this case, the player could move the bell around easily, for example, in a procession (in which case the stand is not needed).

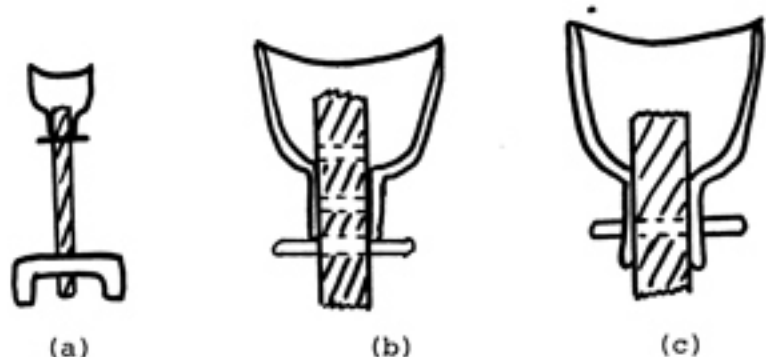









Figure 77 -- a. Mounting the bell on a stick.

- b. Adjusting the length of the stick with a pin.
- c. For bells with holes in the handle, the pin can pass through the holes.

(Author's drawings)

The above design is illustrated not only by the graph , but also by other graphs which show that the pin is always on the upper end of the stick:  (置:zhi, "to set up instruments"), and  (=  = , "bells").

These graphs give the impression that the vertical stick is part of the stand rather than of the bell. Another graph meaning "to use (instruments)"--  (用)--also supports this idea. Perhaps the stand and the stick could be used for other instruments, which is why the stand and the stick are often shown without the instrument. For instance, a drum could also be mounted on such a stand, as revealed by the bronze graph  (Rong 1959:917).

One small bell depicted above (Figure 70) has a comparatively long handle, and there is a bulb situated about 7 cm. above the lower end of the handle. This bell could have been mounted directly on a stand without using an extended handle. The bulb helps to keep the body of the bell from touching the stand (Figure 78).



Figure 78 -- Possible way of mounting the small bell with a long handle and a bulb.

(Author's drawing)

As for the large shang-bells, those with a bulb on the handle could also have been mounted directly on the stand. The weight of the bell and the several inches of the handle below the bulb are sufficient to keep the bell in position when struck (Figure 79a). Those large bells without a bulb could have been mounted in many ways, tentatively suggested by the following figures (Figures 79 b-e).

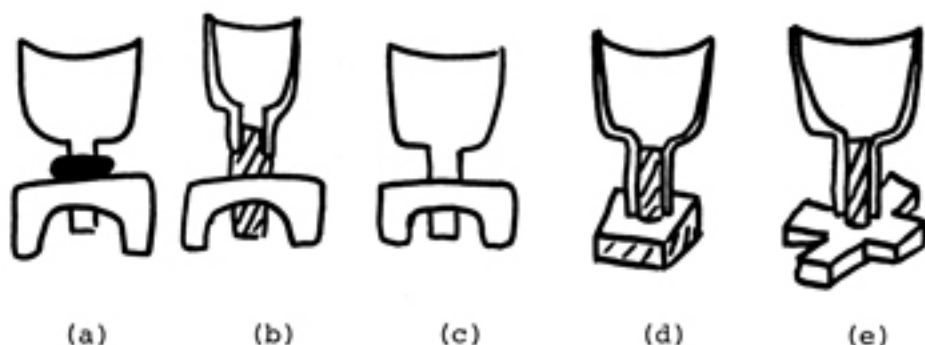


Figure 79 -- a. Possible way of mounting a large bell with a bulb.

b-e. Other ways of mounting large bells without bulbs.

(Author's drawings)

C. Suspension

No one has yet convincingly pointed out any OBG showing a suspended bell. There are two graphs which seem to do this: 尙 (南 :nan, "south"), 尙 (尙 :ke, name of a diviner), but they cannot be verified (OBD: 2079-2098; Zhou 1975:3939-3942). They are never seen associated with the verb "to perform" or with the names of musical instruments. However, this does not prove that they did not originally represent a bell. The fact that they represent "south" and the name of a person respectively shows that they are "borrowed" terms, and there could be original meanings as yet undiscovered. "Suspended bell" is a possibility, judging from their graphic structure. Guo Mo-ruo has found an interesting clue. In the Zhou court, the large bells were often placed on the southern side of the ensemble (Yi Li, Juan 7, "Da Shi" 儀禮大射: "其南笙鐘其南鐃皆南陳"). Perhaps it was because the large bells were always on the south side that the pictograph for the suspended bell, 尙, evolved the meaning "south."

Presently there is no definite evidence that the shang-bells were also suspended in the Shang period. If the small bells with two rings or a hole in the handle were suspended (Figure 80 a, b), they look like the graph 尙 :

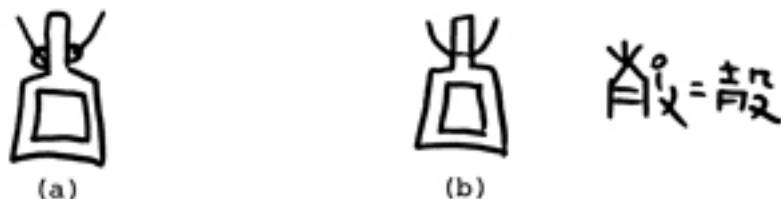


Figure 80 -- Possible ways of suspending small bells with two rings or a hole in the handle.

(Author's drawings)

No large shang-bell yet found is equipped with a hole or two rings on the handle. Since the handles are hollow, the large bells might have been suspended by using a rope and a pin, as shown in Figure 81a. The bell simply sits on the pin which is tied to the end of the rope. Large bells with a bulb on the handle could perhaps be suspended by fastening a rope under the bulb. In this way the bell

would not be perpendicular, but there is no evidence that it had to be. In fact, archaeological finds show that the Zhou people did suspend bells (still having handles) at an angle (WW 1979.7:pl. 1). A ring is always cast on the bulb so that the bell could be securely suspended (Figure 81b). It is not impossible that the Zhou people learned this from the Shang people, and improved it by adding the ring on the bulb.

If shang-bells were suspended, the tao-tie (animal face) decorations on the bell would be upside down. However, there is no evidence that the Shang people considered it bad luck to put the tao-tie upside down. One of the tao-tie motifs on a drum is in fact upside down (see Figure 53 in Chapter Four). Moreover, the tao-tie motif had become so abstract and diffuse that it is hard to tell whether it is upside down or not.

For a possible shape of the frame for hanging bells, see the tentative restoration of the wooden stand for hanging qing (Chapter Three, Figure 36).

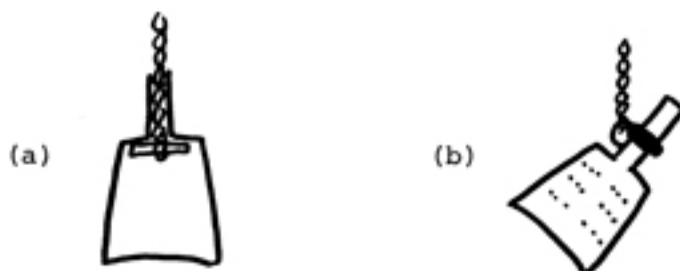


Figure 81 -- a. Possible way of suspending a bell by passing a rope through the hollow handle. The bell rests on a pin tied to the rope.

b. Zhou bell with a ring cast on the bulb.

(Author's drawings)

VI. USE

Shang-bells were often used for religious functions. In Chapter Two, I translated some OBI to illustrate that shang-bells were played for ancestors (OBI 2, 33, 36, 39), for River (OBI 41), for direction (OBI 22), in the temple (OBI 37), and at the door (OBI 39, 40). No OBI mentions that bells were used for recreational purposes. However, considering that the same instruments are often used for

both religious and recreational activities, and that religious performances frequently became a form of entertainment, it is highly probable that bells and other instruments were used to entertain the kings and nobles in Shang times. In fact, one of the crimes of which the last Shang king was accused was that he enjoyed too much wine, immoral music and erotic dancing (Shi Ji, Juan 3, "History of Yin," see Chapter Eight, section III).

No OBI mentions that bells were used in military activities, but there is evidence that percussion instruments were used for signaling. For instance, I have pointed out that the graph 𠄎 (長 :chen) shows a person holding

up both hands (𠄎) to strike a triangular object (𠄎 stone, qing) to indicate approaching dangers or enemies (see Chapter Three, I.C). The graph "alarming news" (𠄎 = 𠄎 :jian) shows a person and a drum; probably

the drum was struck to signify the coming of enemies (see OBI 70 in Chapter Four). The fact that the graph "to order" (令 = 令 :ling) shows a person kneeling next to a

clapper bell is strong evidence that the Shang people did use bells for signaling (see my interpretation in section II.A.1). There are OBI showing that the army of Shang times involved as many as 10,000 (ku 310) to 30,000 people (Cui 1171). It is natural that drums and bells would be used to control such a large troop. The complicated ways of directing an army with flags, drums and bells practiced by the Zhou people might also have existed in the Shang period.

The forward movements of the Zhou army were controlled by different drumming patterns on several types of drums. The drumming was punctuated by the zhuo-bell (鑼 𠄎) and stopped by the nao-bell (鈔 𠄎), both of which were held with mouths facing up. The bells, when struck in a special pattern, also controlled the army's retreats. These instruments were in turn controlled by the commander's duo-bell (鈸 𠄎, a clapper bell of larger size).¹⁰ There are pictures on Zhou bronze vessels showing the soldiers on two double-decked warships fighting. At the end of the ship, there is one soldier striking a pole drum, with a bell (mouth up) attached to the drum stand:

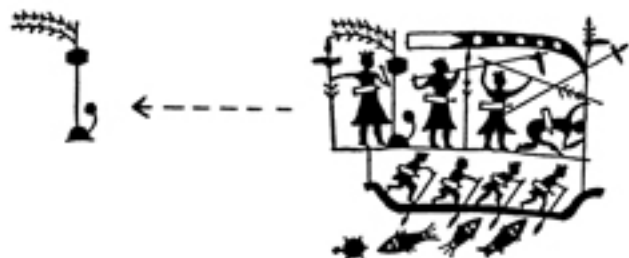



Figure 82 -- Part of a picture on a Zhou bronze showing a pole-drum and a bell used on a warship. Ca. 5th century B.C.

(From WW 1979.3:77)



Considering that the pole drum was mounted on chariots in Zhou times, the drums and large shang-bells might also have been mounted on chariots.



The military function of the small hand-held shang-bell (under the name zheng 鉦) continued until the 19th century A.D., but this bell was not used in normal Chinese folk music. There are tomb pictures from the Later Han Dynasty (25-220 A.D.) showing that in the army this bell was played with panpipes, leaf-trumpet (加 :jia), and pole drum. The musicians all ride on horses; the pole drum is mounted on the neck of the horse (WW 1981.7:86). A later picture dated to 357 A.D., besides showing musicians playing the zheng bell, leaf-trumpet, panpipe, and small pole drum on horseback, also depicts people playing a large suspended bell (A) and two large drums. The bell and the drums are each suspended on a long pole resting on the shoulders of two people on foot, and a third person does the striking (WW 1981.7:85). Because many wind instruments were used, this type of performance was called gu-chui (鼓吹 "drum-winds") in Han classics. The instruments were used not only in marching and training, but sometimes on the battlefield as well, while two armies fought (San Guo Zhi, Juan 55, "History of Wu," no. 10, biography of Gan Ning 三國志,吳志,甘寧傳). It is not known whether the

Shang people used wind instruments on the battlefield. However, I believe they played the vertical flute with the drum after the battle. Some OBI seem to show that after they captured some Zhou soldiers, they played the drum and performed the zhi-dance ( = 箛) in which







the dancers held verticle flutes (see OBI 69 in Chapter Four, I.A).

VII. CONCLUSION

Basically, there are two types of bells in China: bells with and without a clapper, or, bells struck from the inside or on the outside. The general names for them in Chinese are 鈞 (:ling) and 鐘 (:zhong) respectively. Most Shang bells known are made of bronze. The pre-Shang bells, made of earthenware and bronze, seem to have been the prototype of Shang and Zhou bells. Pre-Shang and Shang bells (and even most Zhou bells) differ from the later "normal" bells in that, instead of having a round cross-section () and a straight mouth profile (), they

have a leaf-shaped cross section () and a concave mouth profile ().

The known Shang clapper bells are small, usually 5-8 cm. tall, with a small suspension loop at the top which is sometimes open. They are often decorated with tao-tie (animal-face) motifs and a flange on one or both sides. Some are inscribed with the name of the owner. There is no OBI to prove that clapper bells were used as melodic instruments. Most Shang clapper bells were unearthed along with the remains of chariots and the skeletons of horses and dogs. Some people buried to guard the royal tombs were equipped with a clapper bell. Obviously it was used more for signaling purposes than for music in Shang times, as is also true at present. Some Zhou texts mention the use of clapper bells in sacrifices and on the battlefield, together with drums and other bells. It is possible that it might have been used similarly in the Shang period.

I have found that the OBG meaning "to order,"  ( :ling), depicts a person () kneeling next to a clapper bell (). This verifies the statements in some Zhou texts which say that the clapper bell was rung to convey orders to people. My discovery that the clapper bell was represented by a triangle helps to explain some other graphs containing the triangular shape. When a clapper bell was rung to summon servants, it meant "come now," hence the meaning "now" of the OBG  ( :jin). People who responded to the clapper bell were servants, and musicians in the old

days were regarded as servants, hence the creation of the Zhou graph 伶 (伶 :ling), meaning "servant," "musician,"

and "bell players." Clapper bells were often made of metal, hence the creation of the bronze graph "metal" 金 (金 :jin).

The zhong type of Shang bell has a hollow shank rather than a loop. It was either held or mounted with the mouth facing up when played. In my opinion, the OBG 𠔁 (商 :shang) depicts this bell (𠔁) mounted on a stand (𠔁), and the other problematic graphs 𠔁, 𠔁, 𠔁, 𠔁,

are just different versions of this graph, but showing two bells. This graph shang had become the name of the Shang people, their city, and their empire, probably because they had invented or developed this bell.

Bells of this type were called nao (𠔁) and zheng (𠔁) in Zhou texts; however, these names are not seen in OBI, and in this work I call them shang-bells. Small shang-bells were used with three or five in a set. They are usually less than one foot in overall height and were made with sequential sizes and pitches. These are believed to be the prototype of the Zhou bian-zhong (𠔁 𠔁 𠔁, "arranged bells," "a set of bells"), which have from 3 to 64 bells in a set.

Small shang-bells are also often decorated with tao-tie motifs or other images. Some are inscribed with names of the owners and the ancestors for whom the bells were made. Scholars believe that the short hollow handle was extended with a stick to be held when the bell was played. Judging from the graphs 𠔁 and 𠔁, and from the fact that

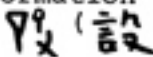
some bells have either a hole, a bulb, or two rings cast on the handle, I believe that they might sometimes have been mounted on stands or even have been suspended. Some possible ways of mounting and suspending shang-bells are tentatively suggested in this chapter.




Typologically the large shang-bells are merely enlarged versions of the small ones, and are dated to the late Shang period. However, the large ones, weighing 200-300 lbs. each, have never been found in any Shang sites at or near Xiao Tun, the last Shang capital. Those of documented provenance come from Zhe Jiang Province, An Hui Province, Jiang Su Province, and Hu Nan Province, all of which are in south China. Moreover, they were found buried singly or in caches, usually on hillsides or on hill tops, for reasons yet unknown. However, this need not mean that originally there were no large shang-bells in the Shang capital.




They may have been taken from the capital by Shang nobles who left the capital shortly before the downfall of the Shang dynasty, or by the Zhou king who conquered the Shang, or by later grave robbers.

Some large shang-bells also have a bulb cast on their hollow handles, but there is as yet no known example with a hole or two rings on the handle. Whether this means that the large shang-bells could only be mounted on a stand, but not suspended, is not certain.

Scholars have long known that two pitches can be obtained from bells with a leaf-shaped cross-section, by striking on the center and on the left or right side of the lip respectively. Recent discovery of late Zhou bells inscribed with the names of the two pitches each bell produces verifies that this was a conscious design. If the Shang people also knew about and used the second pitch available on their bells, then their sets of three and five bells might have produced more notes, including semi-tones, than we previously expected. When more pitch data of Shang bells (and also of qing and ocarinas) become available, the scale systems of the Shang people will become clearer.

Besides the graphs mentioned above, I have also interpreted other graphs related to bells, and have successfully derived new information concerning Shang musical culture. The graph  (設 :she, "to play bells"),

for instance, depicts a hand holding a mallet to strike a bell. The graph  seems to refer to a ritual at which bells were played by the door of a temple. The graph  (置 :zhi) shows two hands () fitting a pole on a

stand () , hence the meaning "to set up instruments." The graph  (用 :yong) shows the pole and the stand, hence the meaning "to use (instruments)." My discovery that the small horizontal stroke on the pole () in the above two graphs represents a pin gives clues as to how shang-bells might have been mounted.

The OBI do not mention that bells were used in military activities. But considering that several types of bells were used in the Zhou period to direct the army, it is highly possible that the clapper bells and shang-bells might have been used similarly. The OBI reveal that bells were often used in religious performances. However, it is not impossible that they were also used for recreational purposes.

See a recent article by K.C. Chang (in Fang 1980:36-37).

Discovery of wooden bells is reported in KGTX 1958.11:80. Though most Shang metal vessels are made of bronze, some are made of "pure" copper (less than 2% tin). One large Shang bell contains 98.22% copper; the small amount of tin and lead could have been in the original copper ore (WW 1966.4:2). The percentage of tin used varies with the type of vessel (Rong 1958:123).

In Zhou texts, the bell with the mouth up is called nao (鈔), and zhuo (鑄), both seen in Zhou Li, Juan 29, section "Da Si Ma" (周禮地官大司馬). It is also called zheng (鉦; Shi Jing, section "Xiao Ya," poem no. 178 詩經小雅採芣) and ding-ling (丁寧; Guo Yu, Juan 11, History of Jin, part 5. 國語晉語五). It is not yet clear which name refers to the small one and which refers to the large bell, though the Shuo Wen claims that the nao is small (Shuo Wen, Juan 14.1:15). These names are not inscribed on Zhou bells. Zhou bells with mouths upward are called zheng-cheng (鉦鉦) in bronze inscriptions (see Rong 1941:487; Guo 1954:88-91; Chen 1940, vol. 1:40), or zheng-cheng (征鑿; Guo 1954:84-88), or gou-diao (句鑿; Du 1980: 56). Such confusing terminology may be the result of regional language differences. Some names are, in my opinion, onomatopoetic: e.g., ding-ling, zheng (possible archaic pronunciation: deng, see note 5 in Chapter Two), zheng-cheng (possible archaic pronunciation: deng-deng, see note 5, Chapter Two).

The report did not date these bells. Considering that other items from the same site were dated to between 5040 ± 100 B.P. (before the present) and 4500 ± 140 B.P., it seems safe to date them to ca. 2500 B.C.

Zhou Li, Juan 27, "Jin Ju." 周禮春官巾車: "大祭祀, 鳴鈔以應, 維人."

Er Ya, section "Heaven." 爾雅釋天旌旗: "有鈔曰旌."

Guo Yu, Juan 19, History of Wu. 國語吳語: "王乃秉枹... 振鈔."

There are two OBG which seem to depict a suspended bell: 南 (nan, "south") and 𠂔 (ke, the name of a diviner). In 1931 Guo Mo-ruo tried to equate 𠂔 with the

modern word 鈴 (:ling, "clapper bell"). However, neither 尙 nor 尙 look like the clapper bell, and a clapper bell does not need a mallet. His interpretation was rejected (OBD:2079-2098). Whether these two graphs show a large suspended bell is also not certain; see section V.C in this chapter.

9. Early in this century Ding Fo-yan (丁佛言) said that shows the roof of a temple, and Lin Yi-guang (林義光) said that it shows an inverted mouth (Zhou 1975: 5585-5586). Other graphs involving a building show the roof and walls: 尙, 尙, 尙 (Shima: 269-278).

There is no other evidence that the human mouth is represented by an inverted triangle in OBG.

10. Zhou Li, Juan 12, "Drummer": "Use a chun-bell (𨮒) to sound with the drum. Use a zhuo-bell (𨮒) to punctuate the drumming. Use a nao-bell (𨮒) to stop the drumming. Use a duo-clapper bell (𨮒) to signify the start of drumming." 周禮地官封人鼓人: "以金鐃和鼓,以金錫節鼓,以金鏡止鼓,以金鐸兩鼓."


11. Chuang Pen-li illustrated a set of four shang-bells in the collection of Academia Sinica, Taipei (Chuang 1968b:9). However, the tomb may have been disturbed by grave robbers before the official excavation. Professor Rong Geng claims that one of the four makes a set with two in his collection (Rong 1941:486).



12. The graph 𨮒 was traditionally equated with the modern word 蠍 (:chai, "scorpion," Rong 1941:486). I think it should be equated with 萬 (:wan), also meaning "scorpion."

13. The graph 𨮒 was traditionally equated with the modern word 畢 (:bi). In fact, it should read 離 (:li, OBD: 1269-1274).

14. Another bell with elephant images is found in WW 1960.10: 58; it has a broken handle. One of the two with a tiger motif is depicted in WW 1960.10:57, and the other has not been published. The one decorated only with the tao-tie motif is found in WW 1978.6:42; details and a color plate are in Fang 1980:no. 19.

15. For example, in Ma's report, a flat note (b) is left out for the second bell in the collection of the Palace Museum (KGXB 1981.1:137).


16. Recently Qiu Xi-gui thought that the OBG  represents a large bell (鐘; Qiu 1980:67-70). My study shows that this graph depicts the pole drum; see Chapter Four, V.B.

17. Scholars often think that the graph  refers to some natural phenomenon. In 1960 Gao Hong-jin (高鴻緝) said that it depicts a hand holding a hammer () to strike an object. He equated it with the modern word (:zhen), meaning "to strike by lightning and thunder" (震) (Zhong Guo Zi Li 1966:286. 中國字例). He was perhaps influenced by the old belief that the god of lightning and thunder holds a hammer which he strikes on a chisel to cause lightning and thunder. In 1976, David Nivison commented that "it might have referred to striking a drum; and in the case of the natural phenomenon, the drumming might have been a reference to thunder." David Keightley said that "in sacrifices, the word might have referred to striking a ritual blade; and in the case of the natural phenomenon it might have referred to the sparks, hence lightning, so produced" (Keightley 1978:81, note 91). Yu Xing-wu also mistook it as referring to natural phenomena (Yu 1979:104).

For OBI in which this graph is associated with the name of an ancestor or a building, Yu claims that the graph means to set out items to be offered in a sacrifice

(Yu 1979:104 "祭祀時的陳設祭物"). There is a possibility that this second explaining of Yu might be correct. In that case the items to be set out or set up should, in my opinion, refer to musical instruments, and not to the sacrificial items such as grains, wine, meat etc (see also note 18, 19).

18. Considering the fact that in classical Chinese the word 設 often means "to build, to set up" (設立, 設置), and "to display" (陳設), it is also possible that

the graph  might just show a hand holding a hammer to pound on an object (such as a nail, wedge or pole) used in setting up large instruments requiring the support of a pole or a stand, such as the pole drum and the shang-bell. If this interpretation is correct, this graph should be translated as "to set up instruments and to perform", or simply "to perform", "performance". Thus OBI 93 could be translated as:

"Divine: Should the King perform music for Father Yi?" Similarly, other problematic OBI which scholars regarded as referring to natural phenomenon (collected in Shima:94, see note 17), could be understood as referring to music. For example:

凶	出	設	吉	受祐
其	有	設	吉	受祐

Traditional translation

If	there	natural	auspicious	receive
is	phenomenon,	(and we	shall)	blessing?
	(will it be)			

其	有	設	吉	受祐
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Tong's translation

If	perform	bells*	auspicious	receive
we	(or:have	performance)	(and we	blessing?
	(will it be)		shall)	

*The graph could mean "to perform", see Ch. Two, IF.

OBI B. Qian 4.27.8

凶	設	司	室
貞	震	司(祠)	室

Traditional translation
(see note 17, Gao's reading)

Divine:	lightning	(the)	sacrificial	room?
(Will)	and			
	thunder			
	strike			

貞	設	司(祠)	室
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Tong's translation

Divine:	perform	(in	sacrificial	room?
(Should	(or:set up	the)		
we)	instruments)			

19. In classical Chinese it is often difficult to determine whether the word 設 means "to perform" or "to set up (instruments)". This poem could also be translated as "When bells and drums were already performed". That the word 設 could mean "to perform" is often seen in classics. For example the Shui Shu (History of Shui Dynasty, 7th century A.D.) says: "設雅歌五世" ...

設中舞

number 8, Monograph on Music, A. 隋書卷十三, 志第八, 音樂志).

This should be translated as "perform five Elegan Songs, ... perform Handkerchief Dance."