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BELLS of Bronze Age CHINA

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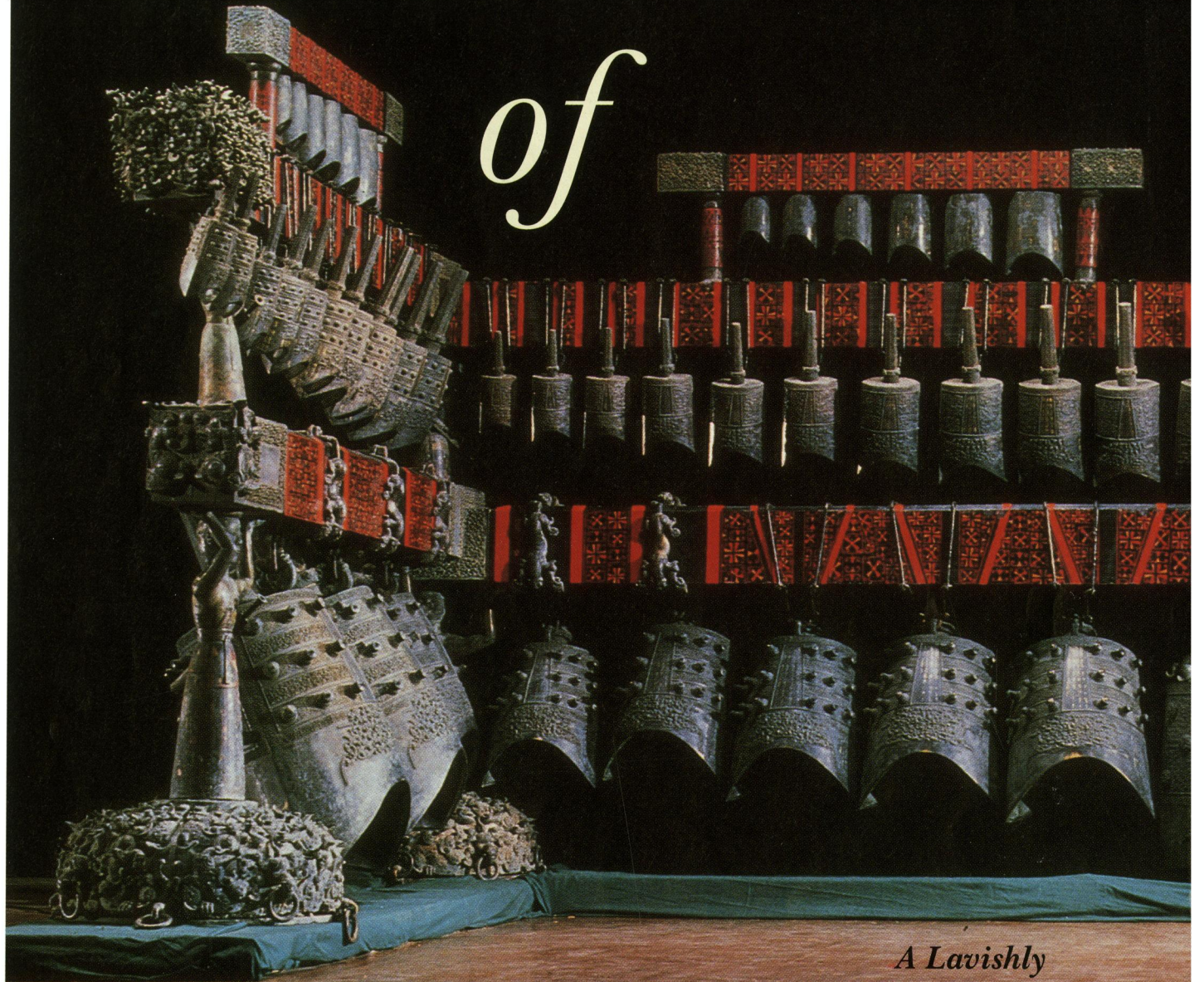


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# BELLS

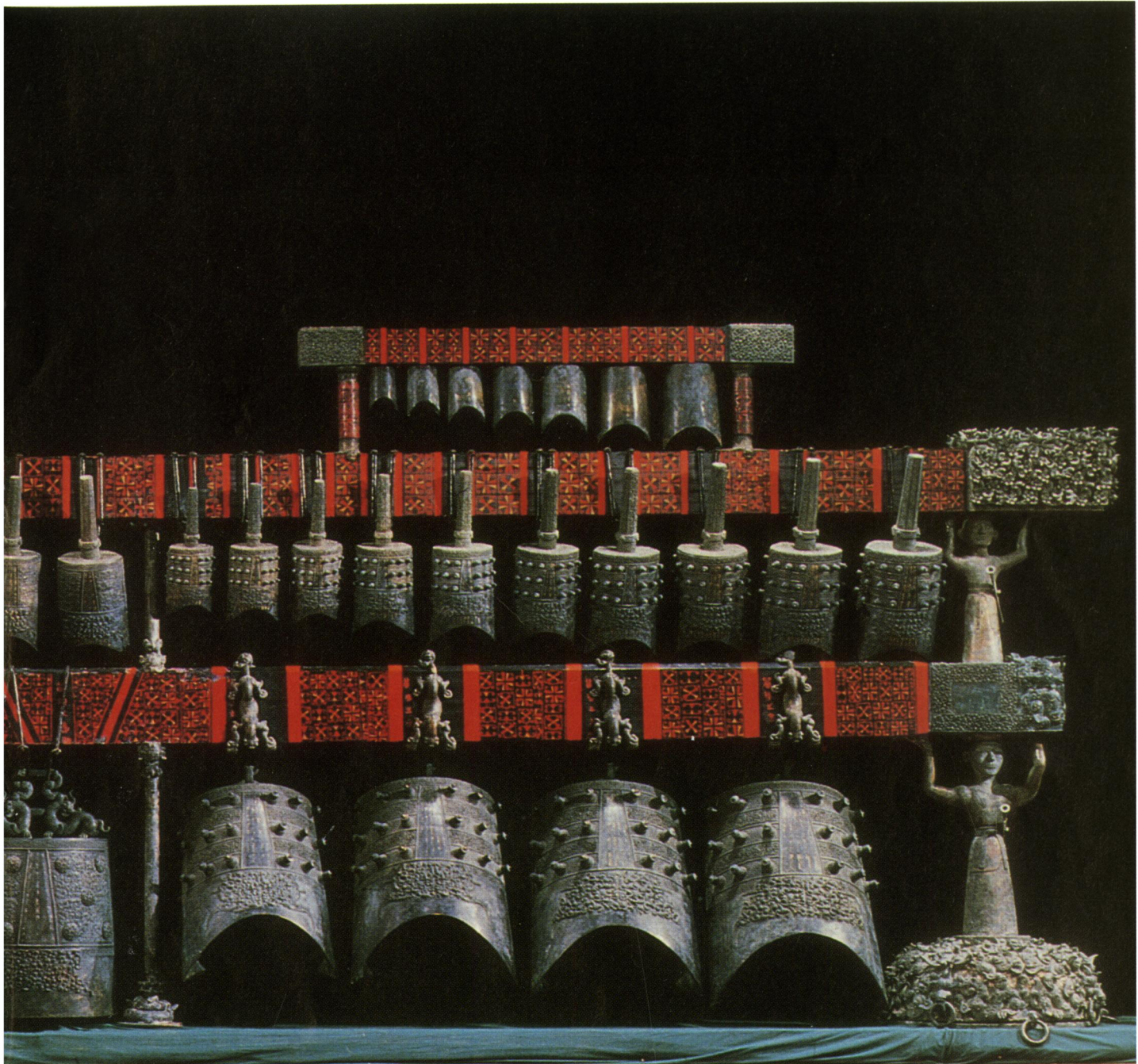
*of*



*The largest assemblage of bronze bells ever recovered hangs from its restored wooden L-shaped rack.*

*A Lavishly  
Furnished Tomb  
Yields a Stunning  
Cache of Musical  
Instruments*

BY JENNY F. SO



*Bronze Age*

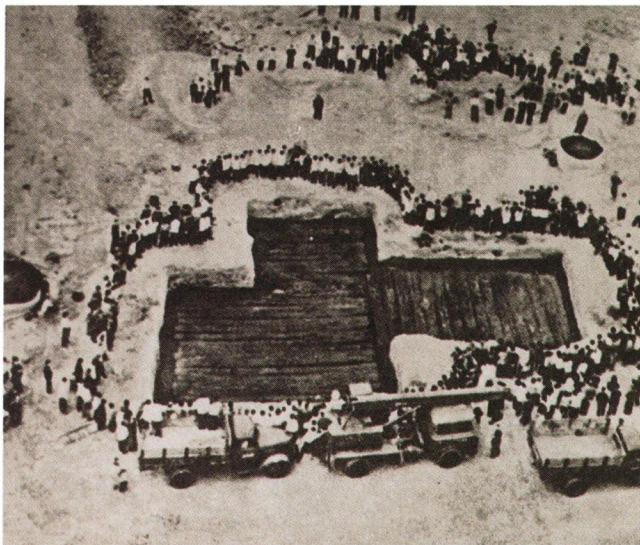
CHINA

One of the most significant archaeological discoveries of the twentieth century—the tomb of a fifth-century B.C. Chinese ruler containing percussion, string, and wind instruments, including the largest assemblage of bronze bells ever recovered—is providing unprecedented insights into pre-Imperial aristocratic culture. Found in September 1977 near the city of Suizhou in Hubei Province in central China, the tomb has only recently been fully reported in Chinese scholarly literature. Study of the instruments has revealed a sophisticated appreciation of music and knowledge of musical principles. The

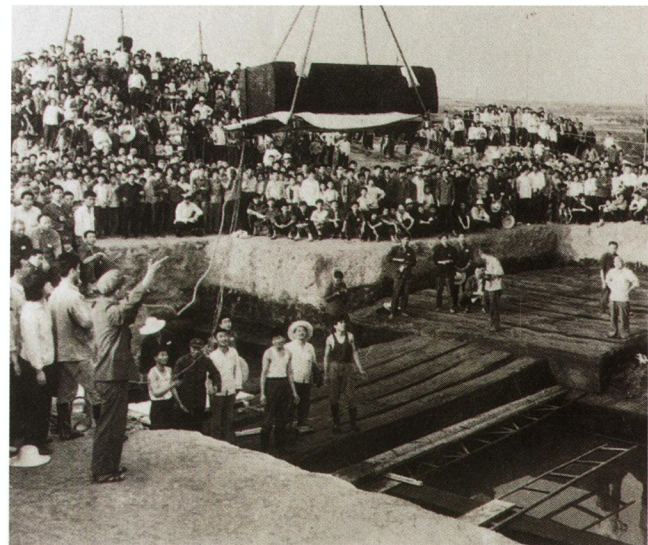
range of instruments recovered, their remarkable state of preservation, and the wealth of musical information supplied by the inscriptions on the bells have surprised both Chinese and Western musicologists. Physicists have marveled at the acoustical properties of the two-tone bells and the technical and musical expertise that went into their production. In fact, the discovery has led to an entirely new understanding of the history of ancient Chinese musical instruments, music, and musicology.

an irregularly-shaped pit, roughly 69 by 53.5 feet, lined with rows of massive timbers. Cranes were brought in to remove the timbers from the top of the tomb, which was divided into four chambers. By the end of May the entire burial was exposed. Water had flooded the chambers, and the contents were mired in knee-deep mud.

Along one end of a large central room stood an L-shaped three-tiered bell rack (24.5 feet by 11 feet and up to 8.7 feet high) made from massive lacquered wooden



*A crowd gathers to witness the removal of timbers from the exposed tomb of the Marquis Yi of Zeng.*



*A crane hoists one of the 22 coffins found in the tomb. Twenty-one of the coffins held the bones of women.*

The tomb was found by a detachment of the People's Liberation Army sent to level a low hill for use as a factory site. The soldiers came upon a layer of gray earth under reddish sandstone. Wondering whether the soil marked the earth fill of an ancient burial, the troops reported their discovery to a provincial cultural relics bureau. Little was made of their report, and the troops continued their work until February of the following year, when they hit upon large stone slabs, clearly laid down by human hands. Once again, the find was reported to the local authorities. This time, archaeologists were sent to the site where they identified a large stone-lined burial pit dug into the hill. Formal excavations began in May of that year. After removing the topmost covering of stone slabs, excavators had to dig through protective layers of brown and gray earth, fine white clay, and charcoal before reaching the tomb,

beams, capped and reinforced by bronze sheaths and supported by bronze figures on domed bases. Sixty-four bronze bells on the rack were in graduated sizes, and most still hung on bronze suspension armatures attached to the rack. Two wooden poles, used to strike the large bells on the bottom frame, were propped against the rack. A large drum lay in the mud, its 11.3-foot support post having snapped in the middle. Near the bell rack was a two-tiered bronze stand from which hung 32 chime stones, also in graduated sizes. Many of them had crumbled or shattered. Two smaller drums, seven 25-string zitherlike instruments, four mouth organs, two panpipes, and two flutes were also found elsewhere in the central chamber.

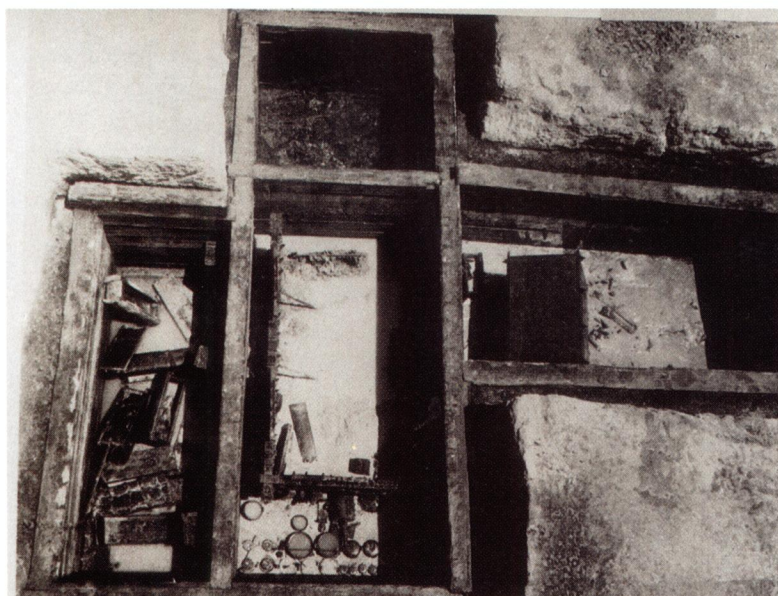
The bones of a middle-aged male, the principal occupant of the tomb and presumably the owner of this elaborate group of musical instruments, were found in

a lacquered wooden coffin in a large side chamber. Eight smaller coffins, containing the skeletons of women, lay next to the master coffin. Thirteen more caskets, also containing the bones of women, were grouped in another side chamber. The 21 females, presumably consorts and attendants, were probably strangled so they could be buried with their master, a custom prevalent throughout much of Bronze Age China. A fourth chamber held layers of chariot fittings, weapons, armor, and other articles of war. According to textual accounts of the period, such an assortment of grave goods was intended to identify the deceased as a member of a particular lineage and to serve him in the world beyond.

Several inscriptions on the bells indicate that they were made for the Marquis Yi of Zeng, a petty state in central China during the Warring States period (481–221 B.C.), a time when smaller principalities were being absorbed by their bigger and more powerful neighbors. A long text on a dedicatory bell notes that it was presented in 433 B.C. by the king of Chu, a

amounts of bronze. (China's Bronze Age extended from 2000 B.C. to 220 B.C.)

Unlike most Western bells, which are round and have attached clappers, many ancient Chinese bells, including those from the Marquis Yi's tomb, were pointed oval in cross-section and clapperless. They were hung mouth down, usually tilted at an angle to facilitate striking from the outside with wooden hammers or poles. The positions of the Marquis' bells in the tomb and the number of wooden hammers and posts recovered suggest that perhaps five musicians played the set. Two would have been responsible for the largest bells on the lowest tier, each standing in front of the L-shaped rack and wielding a lacquered wooden pole seven feet long. Three other musicians, standing behind the rack with the bells tilted toward them, would have used smaller lacquered wooden hammers to strike the bells on the second and third tiers. The large, lower bells would have produced deep sonorous tones to accompany the lighter and higher pitches of the bells on the second and third tiers, which most likely carried the



*Removal of protective timbers exposed a four-chambered tomb containing twenty-two coffins, two groups of musical instruments, and layers of chariot fittings, weapons, and armor.*



*The tomb's central chamber yielded the bell rack with two striking poles, a mass of chime stones, top, and a pole drum, right.*

powerful neighboring state to whom the Marquis presumably owed allegiance. The instruments in the tomb's central chamber would have constituted an orchestra of 20 percussion, string, and wind instruments. The pristine condition of the bells allows them to be played, and frequency measurements obtained from them have allowed musicologists and acoustical scientists to study their musical properties.

The largest bell in the set weighs almost 410 pounds; at least nine other bells weigh more than 200 pounds each. (The total weight of the bells comes to 5,647 pounds.) Archaeologists estimate that about 10.5 tons of bronze were used in the manufacture of the musical instruments in the tomb. Not even the tombs of China's Bronze Age kings have yielded such large

melody. The musician would strike the bells either in the center at the highest point of the concave curve of the mouth, or at one side toward the right pointed tip. The sound produced by striking each bell at either of these two locations would have produced the equivalents of an interval approximating a major third or minor third.

Based on the decoration and inscriptions cast on the face of each bell, it would appear that the 64 bells were composed of at least six different chimed sets, made over a period of time, but combined with consideration for their musical properties. The inscriptions on two chimes in the middle and lower tiers reveal two different but complementary tonal concepts; the central chime in the middle tier, showing different surface



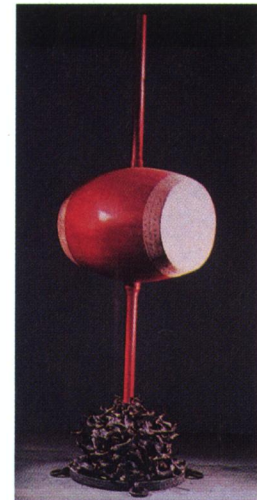
decoration, appears to have been made last to complement the distribution of tones. Considering that each bell was cast to produce the particular pitches inscribed on it, the level of acoustical and technical control in its manufacture is astounding, as most of the actual and inscribed tones match with astonishing accuracy. The bells could be fine tuned when necessary by removing small amounts of metal at strategic points in their interior walls.

A lithophone of chime stones cut from gray lime-

stone was found suspended from a two-tiered bronze rack supported at each end by a fantastic winged creature. Two small wooden hammers, probably handled by a single musician, were recovered nearby. Three lacquered wooden boxes designed to cover the chime stones when they were not in use were also found. The lid of each box carries the numbers of those chime stones it was designed to hold. Only 32 of the original 41 chime stones, indicated by the boxes, were found. A reconstruction of the set, based on the surviving chime stones and the inscriptions on the boxes, indicates that they formed a continuous chromatic scale extending over three and a

half octaves.

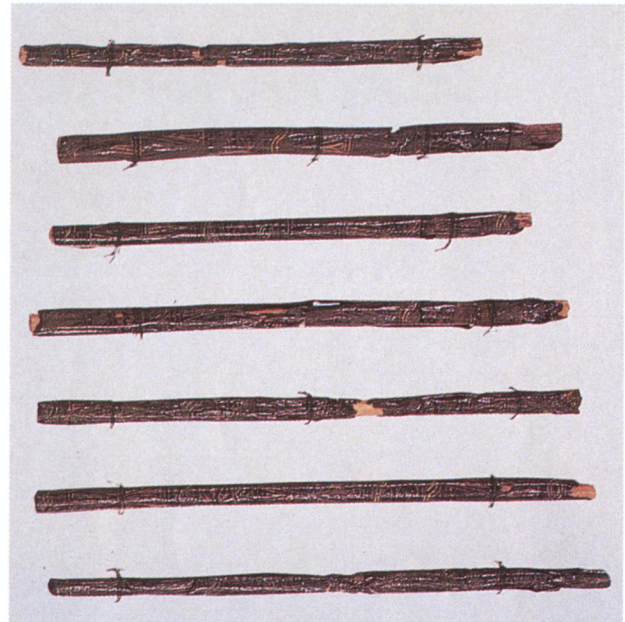
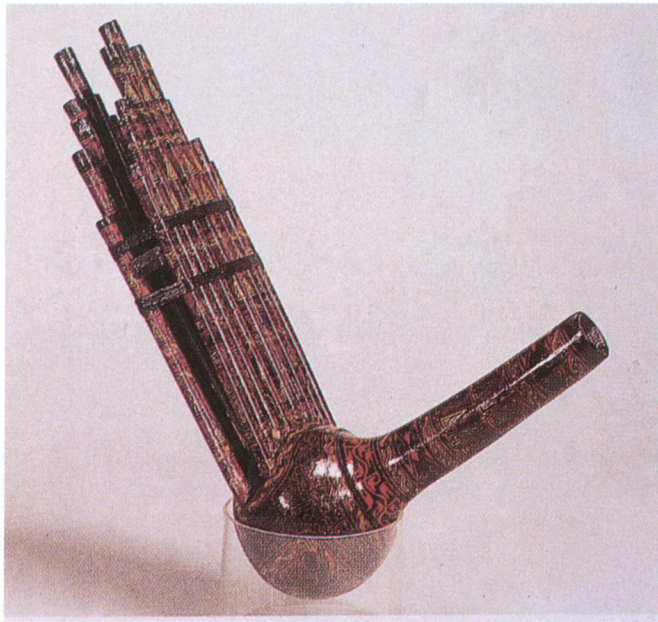
The large pole drum (2.4 feet in diameter) was supported by a wooden pole inserted into a large bronze base and was struck by wooden sticks. The drum wall was made from wood and the ends stretched with skin, now completely decayed, secured by bamboo studs. Two smaller drums were found in the central chamber: a small one (9.4 inches in di-



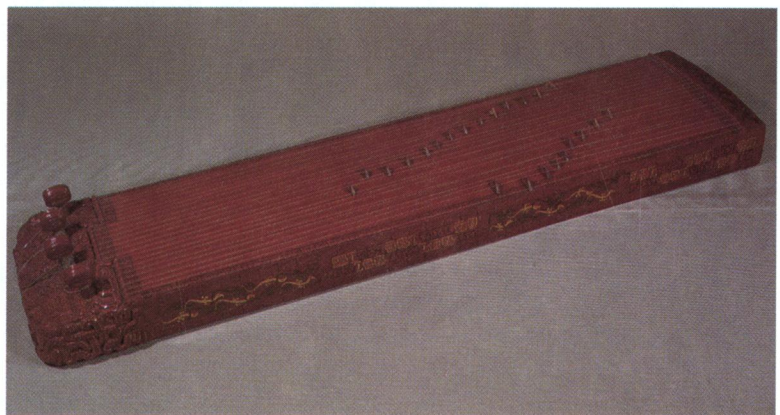
*A restored pole drum stands on a bronze base composed of interlocking serpents.*



*A lithophone of 32 chime stones suspended from a two-tiered bronze rack supported by winged beasts was found in the central chamber. The chime stones pictured here replaced the original ones, which were severely damaged.*



*Reconstructions of instruments from the Marquis' tomb include, clockwise from top left: a mouth organ consisting of a hollowed gourd and bamboo tubes (next to a handful of original tubes); a 25-string zitherlike instrument; and a tambourinelike drum played when suspended from bronze rings attached to a wall.*



COURTESY KENNETH J. DEWOSKIN

ameter) with a handle was probably held and played by hand, while it is unclear how the larger drum (16.5 inches in diameter) was played. All were made with similar materials, and elaborately decorated with painted, lacquered designs in red and black.

The string and wind instruments are the earliest of their kind to survive. The seven 25-string zitherlike instruments constitute the largest single group ever recovered from this period. They were made from hollow wood frames (ranging from 4.9 to 5.5 feet long), carved with relief decoration, and then painted with elaborate designs in red, black, yellow, and silver-gray lacquered pigments. The 25 strings, almost certainly of silk, were anchored and tightened by large posts at one end and lifted from the surface by movable string posts or bridges, allowing the zither to be tuned to the other instruments in the orchestra. Four gourd-bodied mouth organs, two panpipes, and two flutelike instruments formed the orchestra's wind section. The

mouth organs were essentially the same as those still in use in China today, their main body made from a hollow gourd with an attached mouthpiece. Each bamboo tube contained a reed, and perforations for sound control in the middle and near the top. Many of the bamboo tubes and reeds were severely damaged and decayed, but the preserved components have allowed archaeologists to reconstruct the complete instrument.

The panpipes were also made from bamboo painted with red and black lacquer. Thirteen bamboo tubes of varying lengths were bound and tied together with three strips of bamboo and fine twine. One of the two can still be played. The two flutelike instruments were made from a section of bamboo about 11.8 inches long and decorated with red and black lacquer. Both have open holes for fingering. One instrument is closed at both ends, and the other has a small opening at only one end. This instrument



*Also found in the Marquis' tomb was this six-inch-high, duck-shaped, wooden box, painted in red lacquer, depicting the playing of a bell set.*

is the first of its kind discovered and its musical character is still not fully understood. Based on the arrangement of the holes, archaeologists believe that it was held horizontally like a flute, with the palms facing up for fingering while the player blew into the opening near the top.

This assemblage of bells, chime stones, drums, zithers, mouth organs, panpipes, and flutes apparently made up the Marquis' court orchestra, and the central burial chamber where they were found represented the grand ceremonial hall where he celebrated annual festivals and held banquets to honor visiting luminaries. Scenes painted on the sides of a duck-shaped lacquered wooden box from the Marquis' tomb illustrate how the bells were played and the animated dancing that accompanied them.

In the side chamber where the Marquis' coffin was laid was a second collection of instruments that included five 25-string zithers, a five-string and a ten-string plucking instrument (unknown until their discovery here), two mouth organs, and a tambourinelike drum played while suspended by bronze rings attached to a wall.

The ten-string instrument (2.2 feet in length) is considered to be the ancestor of the seven-string zither, a popular instrument of Chinese gentleman-scholars during the past 1,500 years. This ensemble most likely played lighter music to entertain the Marquis in his private residential chambers. This lighter music was perhaps more melodic and lyrical than the ritual music of larger orchestras, and might even have been accompanied by the dancing of one or two of his favorite consorts.

Interestingly, finds of musical assemblages from subsequent fourth- and third-century tombs, where large numbers of bells are conspicuously absent, indicate that music played in more informal and intimate surroundings seems to have completely displaced the ritual music played in grand settings. In terms of the political conditions of the time, this shift in musical taste may reflect the rapid erosion of the central ruling power

of the Zhou dynasty, which had dictated courtly rules and rituals for centuries. As part of the rise of a new elite, petty local lords like the Marquis of Zeng who

clearly indulged in the luxuries (if not the power) of the time, most likely gave unprecedented attention to local traditions and more relaxed pleasures. One of these expressed itself in the "new" sound of the private chambers, where the music was meant to soothe the soul and cultivate the mind.

The complete array of musical instruments from the Marquis Yi's tomb, including the assemblage of bronze bells, is displayed today in the Hubei Provincial Museum in Wuhan. In an adjoining hall of the museum grounds, replicas of the instruments are used to perform both ancient and traditional music for museum visitors, although the oldest music played dates back only as far as the seventh and eighth centuries A.D., more than a thousand years after Marquis Yi's time. ■



*An inscription on this dedicatory bell indicates that it was presented by the king of Chu, a powerful neighboring state to whom the Marquis presumably owed allegiance.*

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