

## Authentication Report

*Pair of bronze  
cheek pieces from a  
horse harness  
Western Zhou Period  
100-771 BC*



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*Priceless Past*

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### Item Description:

This is a pair of ancient Chinese bronze cheek pieces from a horse harness. They are strikingly similar to ones excavated in Fufeng County, Shaanxi Province, and currently on display at the Shaanxi Provincial Zhouyan Museum.

Cheek pieces such as these are generally attributed to the Western Zhou Dynasty (1100-771 BC). The pieces are decorated

with simple linear decorations. The circular holes in the center are where the now-missing mouthpiece would have been attached. (see "Imperial China The Art of the Horse in Chinese History", Harmony House Publishers, 2000, p.88)

Both pieces were cast with two semicircular attachment loops on the reverse. One of those loops on Cheek piece 1 is now missing. There are some obvious losses to the metal on both pieces that appear as amorphous perforations visible in the above photos. There are three such perforations in Cheek piece 1 and one in Cheek piece 2.

Examination of both pieces leads me to conclude that they are authentic as described, based on the following analysis.



Cheek Piece 1



Cheek Piece 2

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## *Photos, Weights and Measurements*



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Cheek piece 1 reverse showing soil encrustation and broken attachment loop.

Cheek piece 2 reverse showing soil encrustation and both intact attachment loops.



*Above:* Cheek piece 1

*Below:* Cheek piece 2



### Analysis:

Analysis for this report consisted of visual inspection, microscopic inspection, solvent and UV testing. Visual inspection of both pieces under magnification showed no signs of modern production. The reverse of both pieces had heavy soil encrustations which is likely

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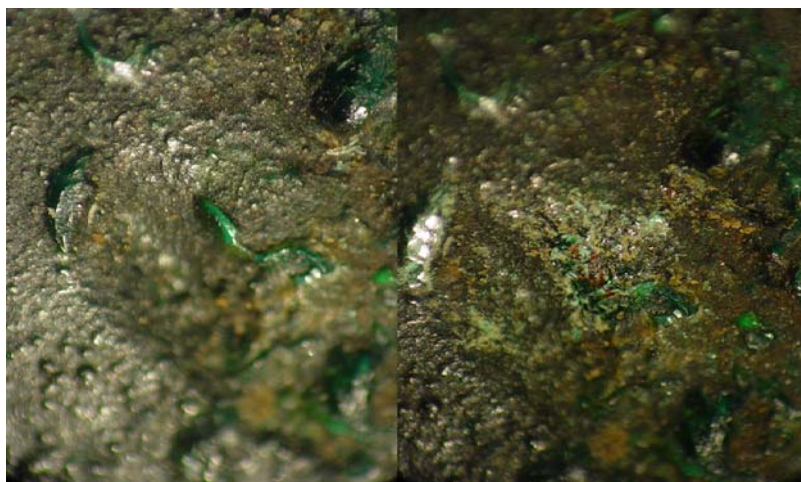
the reason for the large difference in the weight of the two pieces.

The patina on both pieces is composed primarily of what appear to be malachite crystals ( $\text{Cu}_2(\text{CO}_3)(\text{OH})_2$ ) in various forms. There are several areas on both pieces where there are also azurite ( $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$ ) crystals appearing both intermingled with the malachite and independently. Areas on both pieces were selected at random where the crystals, both malachite and azurite, were removed mechanically. The crystals appeared to grow out of the base metal as expected. In the photos below you can see where there is cuprite ( $\text{Cu}_2\text{O}$ —red in color) beneath the malachite.

Small plant fibers also appear throughout the soil encrustation and across the surface of both pieces.

Solvent testing on the surface of both pieces yielded no reaction as would be expected on an authentic bronze. Patina material removed from each piece was also solvent tested and flame tested. Results were positive for the presence of copper.

Ultraviolet examination also yielded no results inconsistent with previous findings.



Area on Cheek piece 1 magnified 40X.

Left side shows natural malachite crystal in situ and right side shows the same area after the crystal was removed.



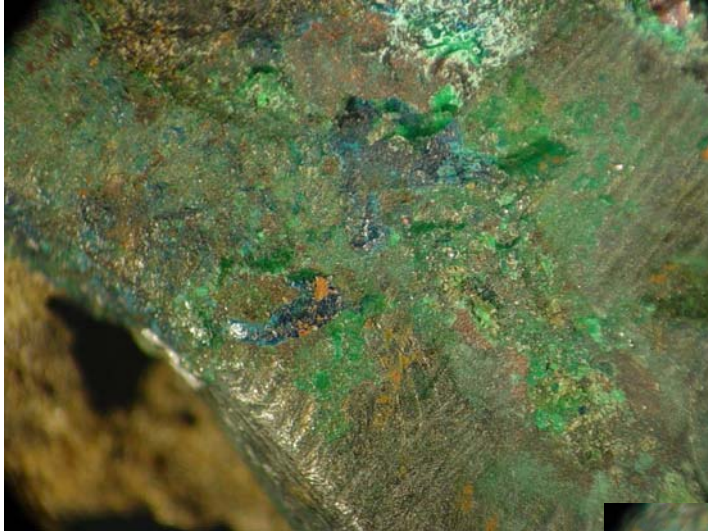
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## *Micro photos*



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**Left:** Areas of malachite and azurite crystals on Cheek piece 2.

**Right:** Botryoidal malachite crystals and small plant fibers viewed at 20X magnification.



**Left:** Same as above at 40X magnification

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## Maps



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**Left:** Overview of Asian Continent

**Right:** Enlargement of mainland China with an overlay of province names and boundaries. Shaanxi is shaded in red.



Authorized signature Richard A. Nable owner/operator of Priceless Past Authentications

Date

All the information contained in this document is true and accurate to the best of my knowledge.

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