



# The construction of a Sican gold ornament: a sculptural bat head

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Sican ceremonial mask  
with the restored bat plate

**Abstract:** Amongst the nearly 1.2 tons of diverse grave goods from the Middle Sican Huaca Loro shaft tomb, excavated by the Sican Archeological Project in 1991-1992, was a singular representation of a bat head in gold with amber and turquoise eyes. A close examination reveals unique construction involving chasing, along with very experimental but successful clipping, tucking, stitching and gathering. The size and sculptural quality will show this piece is one of the most extraordinary finds in the long history of North Coast Peruvian archaeology.

**Resumen:** Entre las 1.2 toneladas de diversos bienes excavados por el Proyecto Arqueológico Sicán durante 1991 - 1992 en la tumba Huaca Loro, se encontró una singular representación en oro de una cabeza de murciélago con ojos de ámbar y turquesa. La observación detallada del método de manufactura, muy experimental pero exitoso, permitió saber que éste incluyó: cincelado, repujado, recorte, ensamblaje con dobles, hilos y pestañas. Así, lograron un tamaño y calidad escultural en la pieza, que la convierten en uno de los hallazgos más extraordinarios en la larga historia de la arqueología del Norte de la Costa Peruana.

**T**he scientific excavation of a 40 to 50 year old male member of the Sican elite, between October 1991 and March 1992 by the Sican Archeological Project at Huaca Loro, located in the Poma Reserve, yielded an astonishing 1.2 tons of grave goods. Nearly three-fourths of this total were metal objects and scrap.

In addition to a 16" x 19" ceremonial mask found on the skull of the principal burial figure, along with three pair of ear ornaments; there was an interesting array of personal objects surrounding the body of the man.

Photo credits: Figures 1-16 - Jo Ann Griffin, Dallas, Texas

Figure 17 - Yutaka Yoshii, Photo courtesy of PAS.

One of the most intriguing pieces was the sculptural representation of an animal, originally thought to be a peccary based on a cursory look at the nose on the piece, but, later study identified it as a bat head. The head was mounted on a rectangular plate whose surface was covered with circular bossed dangles with pierced round centers. The size was 17" (40.17 cm) wide X 6" (15.25 cm.) tall X 3-3/4" (9.55 cm.) deep. The thickness of the sheet gold in the piece was a very consistent 0.13 mm. Neutron Activation Analysis by Dr. Adon Gordus, fixed the alloy at 53.3% Au., 35.1% Ag., 11.8% Cu. (This is roughly the equivalent of a modern 14 kt. yellow gold alloy).

It is the sculptural representation of the bat's face that commands one's attention. Even the dirt encrusted condition in which it was found (photograph 1) in the burial could not hide the singular and experimental artistry lavished on this piece.

When found on the floor of the burial chamber (photograph 1) the amber and turquoise eyeballs were still in place although they were skewed; this fact will be seen to be important as we analyze the probable manufacturing technique used for production of the entire object. The tongue

Photograph 1





Photograph 2

was found adjacent to the piece and in several fragments. The half circle top knot was also separated from the top of the piece. All of these carefully plotted discoveries during the excavation of the tomb will ultimately allow the careful reassembly of the whole and *also* aid us as we delve into the manufacture of the piece. The entire head was slightly deformed and leaning to the proper right (photograph 2). No doubt the deformation occurred from the enormous weight of soil above it in the burial. We can see the results of the rise and fall levels of the water table that affected the tomb over the centuries. These left varying thicknesses of silt on and in the piece and discolored the metal, the greenish tinge is the result of copper in the alloy.

In photograph 2, we see the main face removed from the back plate and both eyeballs and turquoise iris had been removed from the sockets, however, the proper left amber eyeball has been set back in to show its position when found. Some of the loose dirt has been cleaned away and an area along the front bottom of the chin cleaned to reveal the gold in excellent condition. We began to appreciate some of the unusual manufacturing techniques. Note the "seam" with its strap and slot join on the proper left jaw contiguous to the corners of the mouth (photograph 2) (there is a seam on the proper right, also) which secured the lower jaw to the head, a significant detail in the manufacture of the piece. There are also very unusual folded gathers inside the roof of the mouth, and again at both sides of the mouth opening.



Photograph 3

The forehead and eyebrow arches, as well as the eyeball sockets are compelling because of their sensitive sculptural modeling (photograph 3). Again, we observed "gathering" of the metal, either side of the nose on the forehead. The same "gathering" occurs on the side of the proper right and left area of the forehead.

An overall view of the proper right side of the face (photograph 3) shows all of these points in context. Looking from the rear and focusing on the same details as seen from the front we observed how deeply the eye sockets were driven into the surface of the face so they could contain the almost round eyeball. We were particularly attracted to the lack of tool marks on the interior back of the face even in its uncleaned condition.

From the front, the eye sockets reveal even more (photographs 3, 4, 5). Observe how tightly the amber fit into the recess made for it. There was only a thin line of silt left around the top edge of the socket, when the eyeball was removed. Actually, it wasn't removed. The dirt loosened from the handling of the piece allowed the eyeball to fall out quite easily, a fact that puzzled at the time as we expected to find some sort of mastic in the bottom of the recess that held the eyeball, however, there was none (photographs 4, 5), all that was there was drifted silt in the proper left of the recess because the eyeball did not quite reach the bottom of its gold cave.



Photograph 4

Photograph 5



Partially cleaned the recess clearly showed two horizontal holes and two vertical holes (photograph 5), and we note the complete absence of mastic, or a stain to suggest where it had been in either eye socket; however, we do observe that the four holes must have played a role somehow in holding the amber and turquoise eyeballs in, but what?

Focusing outside the sockets on the side of the forehead area, a partly cleaned view shows two distinct chasing tool marks one above the other (photographs 3, 6); these were driven very hard into the gold as if to clench the metal gather down tightly.

When the face was cleaned of its dirt coat, immediately new details were visible (photograph 7). The recesses in the nose plate showed more of what can best be described as puckering and more than that the puckering had been clenched down into place probably with a hammer driven chasing tool because flats show on top of the puckers where the metal was hit. (We are speaking here of their small handleless hammers usually made of magnetite which they commonly used along with a gold/copper alloy chasing tool of various shapes and sizes.)

Photograph 6





Photograph 7

In photograph 7, a light gray object can be seen protruding from the mouth. This is the substrate to which the fragments of the original tongue were to be attached. This was a piece of heavy acid-free board, that would take and hold a bend. There was no guesswork involved in putting the tongue back together this way as it clearly had been bent at an almost 90 degree angle and not bent on itself straight across, but at an angle (photographs 8, 9).

There were one or two missing fragments which had not been found during the excavation and these areas needed to be in-filled with acrylic modeling paste; after which they were touched up with gouache (an opaque water color) to aide the area's blending with the surrounding metal (photograph 10, 11).

We made special note of the nice finishing of the top arch and side edges of the tongue (photograph 8). The chisel cut marks around the edges had been nicely finished using a stone file; so that they were very smooth. This was a wonderful craftsmanlike touch we thought, especially since, when finished it would never be seen again until worked on by myself; but a further practical reason for the smooth edge finish became evident later. The need for a substrate support for the fragmented tongue is explained by the fact that the metal for the tongue, was a copper, silver, gold alloy, e.g.: 75% copper, plus 12% each of gold and silver, and was very thin and embrittled due to its long association with large amounts of cinnabar (mercurous sulfide) on the floor



of the burial plus other salts in the burial situation. We were unable to take accurate measurements of the, thickness of the tongue due to the minor encrustation of corrosion products, however, we believe that it was slightly thicker than the gold of the face. It was deemed there was no other safe way to handle the tongue but to give it the almost invisible support mentioned. After the metal was installed on the substrate and the in-fills touched up, the underside (the heavy board itself) was also colored to minimize its presence (photograph 9, 11). At this point in the reassembly of the entire piece it was thought that the tongue must attach to the backplate and be, in effect, independent of the head ...the real puzzle here was that there were no holes in the tongue metal, and when finished the tongue did not fit correctly for attachment to the backplate. When flat against the backplate it barely protruded from the mouth and at a strange angle. Further, there were no holes for attachment on the back plate, and because of the angle the tongue had been bent, it did not sit flat in the lower jaw. We are totally certain the bend in the tongue was incident to manufacture and not the haphazard result of the tons of earth on top of it.



Photograph 8

Photograph 9





Photograph 10

Finally, when everything else had been tried and rejected we simply sat the tongue on the agape lower jaw and ...it showed us where it went. Unnoticed as a part of the built in anatomy in the goldwork, there was a neat U-shaped trench in the soft palate of the interior lower jaw which when we sat it there the tongue fit into perfectly (photographs 7, 11). That problem solved, it remained to discover how it was attached to the whole originally.

With continued study of the head back and front, it was noticed that the upright part of the tongue, when placed in the location we had found in the lower jaw, the upright part fit neatly in the space between the back of the eye sockets (photograph 11). It occurred, that one of the conventions so often applied in pre-columbian metalwork is articulation, and what a meaningful place to apply it. This also solved the question of what the four holes were for in the bottom of the eye sockets. The two horizontals (photograph 5) would be for placing string through to attach the amber/turquoise eyes with a finial knot of string in the center of the turquoise. The two verticals were there to make sort of a cat's cradle into which the upright part of the tongue would snuggle intertwined and be held securely but allow the tongue to wiggle in a lifelike manner (photographs 11, 12). Here also could be the reason for the fine edge finishing. The well-finished edges would not fray and cut the string. *Eureka!*



Photograph 11

It remained only to try this and see if their humor and inventiveness would come through one more time. When it was all in place, the tongue fit as neatly as it no doubt had 1,000 plus years ago. More than that, when attached it wiggled, lifelike, at the slightest movement.

The entire head was finished, the cone shaped fangs and the tongue giving the piece an eerie lifelike quality. The last part to be attached was the half circular topknot; fascinating for its eleven tiny articulated bosses and the very tiny holes on the outside edge which were used to lash something to the edge of the piece (photograph 13). Though we'll never know for sure, a good guess would be tiny feathers this would have given a jaunty furry look to the edge. Installed on the top back of the head, we could now see the finished piece cleaned and reunited. Completed, the bat head could now go to its place above the ceremonial mask on the headdress.

One mystery remained to be solved and that was *how* this one-off piece was fashioned. At this juncture, we were sure that this piece was indeed a bat... several items in its anatomy gave no doubt. The eyes when put to right were not the eyes of a peccary which spends its days poking its snout into places where large wide open eyes would be a disadvantage. Peccary do not usually run around with their mouths agape and their tongues hanging out. *And* they don't have fangs! *However*, the common vampire bat does. *Desmodus rotundus* weighs in at about 40 grams or little over an ounce (photograph 14, 15). These bats are quite tiny, and range throughout the Americas feeding

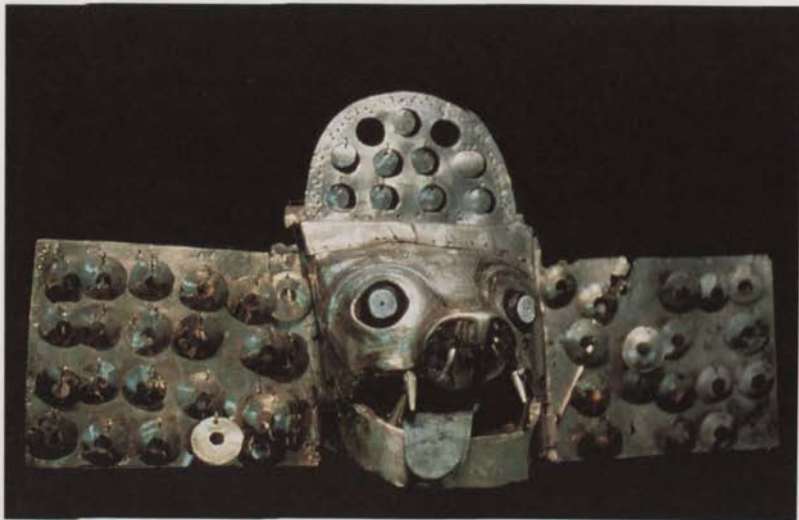
on sleeping warm blooded mammals. They are nocturnal, so large eyes are an advantage at night as well as the large fangs for making the feeding wound. It is interesting that these bats have relatively long wings, which enable them to fly long distances rapidly but consume only small amounts of energy doing so. (It has occurred that the back plate may be the artists rendition of these wings.)

These bats are members of the Leaf nosed bat family *Phyllostomidae* and their heat detecting system is located on the nose leaf (photograph 7); this allows them to locate an area on the sleeping victim where the blood flows closest to the skin. The razor sharp fangs (which are conical, and have no enamel) then make a quick cut ...it is at this point that the tongue comes out and begins to lap up the blood and an enzyme in the saliva keeps the blood from clotting.

The goldsmith must have used a dead bat to fashion his six times larger tribute in gold! We can only surmise what condition the little corpse must have been in when the goldsmith received it. Perhaps condition played a part in the why's of artistic license here. Dead things are often quite different from live things!



Photograph 12



Photograph 13

After poring all this for a great length of time and adding in the clues given up by studying the piece and then studying the slides made while working on the piece, we now believe that a likeness of the bat was carved roughly 8 times actual size as we see it now, probably in wood, with great verisimilitude and a touch of artistic license. This, then, became the substrate over which the gold sheet was to be worked.

A number of clues called to your attention earlier in this account support this. To begin, the gold would have been laid against the nose leaf area (photograph 4), chased, tucked and clenched against the substrate. Moving outward, upward and down from the nose, the gold was worked out over the wood causing most of the gathering and puckering mentioned. (If the face had been raised in the manner of the gold cups famous from this area, none of these strange phenomena would have showed because the metal in those instances stretched and worked from both sides.) This shaping of the gold over the wood substrate was continued using small hammers and chasing and cutting tools. This gathering, tucking, clenching, cutting all indicate that there was a solid, very solid object behind the gold (photograph 3, 7, 12). The marks were made by the chasing tool being hammered driven into the gold only, which in turn presumes something to drive it against. The

purpose of the sharp blows was to set and get the gold to hold a the position wanted. The side of the forehead on both sides of the face show distinct chasing tool marks of this type (photograph 3, 6, 12), a stroke made to clench the gather (the tool itself, based on my measurements was 4.01 mm wide X 1 mm thick; and the effective tool impact area was 5.3 mm wide X 2.00 mm). The sensitive chasing of the nose and eyebrow arch are such a delight and; given the open backed rather tentative nature of the mark also presumes a very solid substrate to work against, otherwise this thin metal would have been nearly impossible to deal with.

Remember we mentioned there were no evident tool marks on the back of the face to indicate that repousse was done before chasing on the front (photograph 11!). This, of course, is another confirming argument for a substrate. There are often places in goldsmithing where chasing is done without the concomitant use of repousse from the back side first and the technique as it shows here is one of those instances. If this is not convincing, observe the way the gold was folded back into the mouth, curved and tucked and gathered in the roof of the mouth (photograph 7); making fairly clear to this observer that something was beneath the gold as it was worked, hence, the wood substrate. We feel the lower jaw was carved separately and the gold for it fitted separately. When finished the two halves were put together by the strap and slot method. Note: there was also a plate fitted inside the jaw area simulating the under chin, this added strength to an otherwise rather flimsy part.

Though the argument might be made that they likely used a stake as a modern silversmith would today, we must keep in mind that there has been no evidence whatsoever of any specialized stakes with arches and saddles or even a common "T" stake; or any other stake such as we use today, ever having been found with other tools. Aside from that, most techniques can be justified within the parameters of the tools that have been found or of those possibly made from organic materials such as wood, horn and bone which have not survived.

Photograph 14



Photograph 15





Photograph 16

We must be mindful that since this was such a singular piece, the goldsmith would probably work from known parallels whilst still branching out with his creativity. There were parallels of this technique in their sheathing of ceramic vessels, and spear throwers which were sheathed over wood; also, there was sheathing on the wooden litter from this burial. It would seem likely to us that this familiarity with using wood as the substrate for gold sheathing, could well have led to this solution for manufacturing such a complex and unique shape. In fact, it is quite a brilliant solution! The apparent tentativeness of the execution comes from the complexity of the face ... a spear thrower *is*, after all, just a rod of wood, and the litter basically a larger version of that!

All of this piece was done with an expertise that passes mastery, but still in raking light one can see how this master wielded his chasing tool and hammer to drive the gold against the substrate thereby achieving the sculptural effect he was after. Particular attention should be given to the magnificent modeling around the eye sockets; (one can almost imagine the eyelid ready to slam shut after a night of hunting!). Then there are the bulges on either side of the upper lip to allow the lips to cover the fangs inside, this is not the work of an apprentice or first-timer.

When all of the modeling was complete; the substrate could be easily removed to be saved for another use someday or thrown into the fire, if this was to be a one of a kind piece, as it most certainly seems to have been. Though it would appear that the west tomb we excavated in 1995 had a low karat gold head ornament of a sculptural animal much like the bat head, it was quite simple and the eyes contained no amber or turquoise.

There are a number of depictions of bats on ceramics, and there are also bat depictions on textiles, most are more nearly the size of a life-size bat and none seem to have had lavished on them the detail, creativeness and craftsmanship brought to bear by this master goldsmith of the Sican Culture.

