

DOUBLE SPIRAL NOSE RING

COMPOSITION: Copper-gold alloy (approx. 90% Cu, 10% Au).

MICROSTRUCTURE

SECTION A: Transverse section through the join between the two spirals

Photomicrographs

A -The section reveals that the nose ring is made of four pieces, joined at the location of the section: (1) spiral with hook; (2) spiral; (3) a flat disc; (4) an ornamental wire on the side opposite the flat disc.

Each piece is made of a similar, binary alloy of copper and gold. In the polished section, the copper-rich metal (dark) has corroded badly, while the gold-rich metal (white) is better preserved. The original cast, dendritic structure of the metal in each of the 4 pieces is heavily distorted, indicating that each piece was worked (hammered) to shape it.

The 4 individual pieces have been joined by a metal which, acting like a solder, was introduced between the pieces in a molten state. This solder wet the surfaces it contacted and solidified between them. The cast structure of the solder is just visible in the section.

In photomicrograph A, the roughly circular individual loops of the wire ornament are at the top; the round, flat disc is at the bottom; the two spirals are in the middle, sandwiched between disc and wire ornament. [x15; Etchant: none-polished condition].

DOUBLE SPIRAL NOSE RING

INTERPRETATION OF MICROSTRUCTURE

Each of the four parts of the nose ring was made individually and later joined to produce the object. The metal is a binary copper-gold alloy (tumbaga), though the composition of the four pieces may vary somewhat. Each piece has been hammered to shape, and the join was achieved with a solder made of a ternary Cu-Au-Ag alloy.

Electron microprobe analysis of the metal revealed its composition as close to 90% Cu and 10% Au. Analysis of the solder showed it to contain approximately 80% Cu, 18% Au, 2% Ag. Such an alloy will melt at a temperature considerably lower than that of the metal used to fashion the pieces of the nose ring. Thus it was a good choice as a soldering material.

The molten solder filled the spaces between the 4 pieces of the nose ring, wetting their surfaces, and solidified there. Thus the join was achieved. The wire ornament and flat disc served both as mechanical aids in holding the two spirals in a fixed position during soldering and to hide the join itself.