

# "Amazing 17th Dynasty Necklaces from Qurneh."

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## Introduction

The Egyptian collection of National Museums Scotland includes a 17th Dynasty burial of an adult female and child excavated by Petrie in 1909 at Qurneh. The adult coffin is painted and gilded and there are extensive grave goods. In contrast the child was buried in a simple wooden box, but also containing personal jewellery of extremely fine construction.

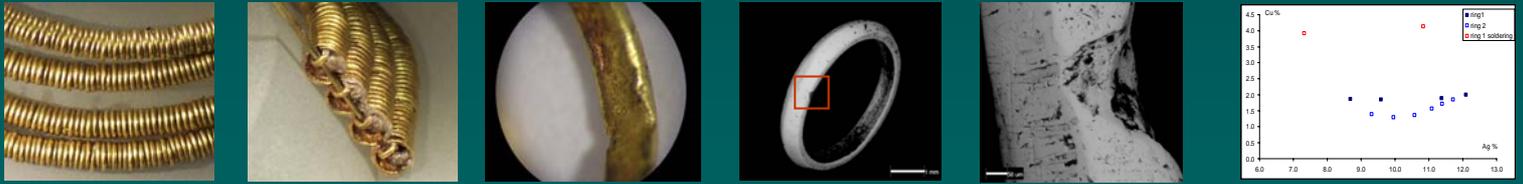
## Scientific Investigation

Recent conservation provided the opportunity for the technological examination of some of this jewellery using binocular microscopy, Scanning Electron Microscopy (SEM-EDX) and PIXE analysis. SEM-EDX analyses at NMS used a Camscan MX2500 microscope coupled with a Noran Vantage EDX system. PIXE analyses at C2RMF used an external micro-beam of protons (3 MeV - 30µm diameter) with a 75 µm Cu filter (AGLAE Accelerator).

## The adult jewellery

The adult jewellery includes 4 plain gold bracelets, 2 large ear-rings and an impressive gold necklace made of 1653 ring beads, strung in four rows and often been described as one of the earliest *shebiu* collar. The rows are linked by a pair of terminals, each terminal consisting of four tubes made of eight ring soldered together.

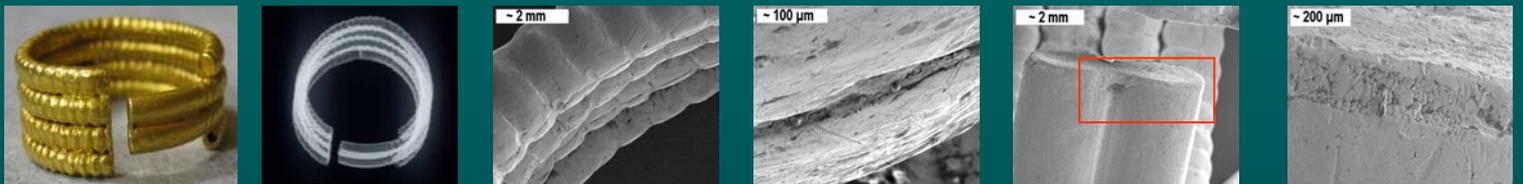
Below: Binocular images of the four rows, terminal and single ring with SEM-BSE microphotographs of a single ring, with detail of the joint area and PIXE Results.



All the rings show remarkable uniformity with almost invisible joints. Each ring is 4.5mm diameter and presents an average composition of gold (87,6%), silver (10,5%) and copper (1,9%). Both SEM and the PIXE micro beam were used to scan across the joint area. The graph shows the PIXE results for one ring where the copper content in the joint area is about 2.5% higher than elsewhere. How the beads were made is still not completely clear and is still being investigated. However, the appearance of the internal surface suggests that they were cast, possibly as a band, that was then cut and worked up to form the individual rings and closed by soldering.

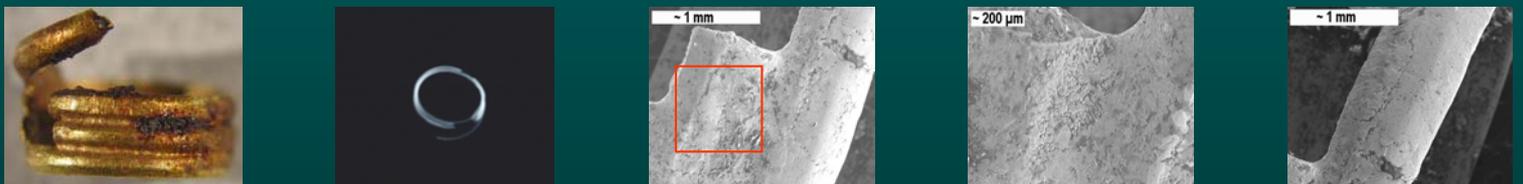
The earrings were also examined. The adult earrings were made from a sheet which was shaped by hammering, rolled to form a cylinder and then worked to form a ring. Four cylindrical rings were then soldered together complete with circular plates to close the open ends.

Below: Binocular image and X Radiograph of the earring with SEM-BSE microphotographs of rolled tube with detail of soldering and overlap of the rolled sheet and some detail of the end soldered plate.



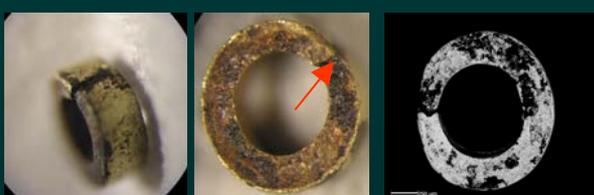
## The child jewellery

These are simpler and smaller than the adult pieces. The earrings are 4 rings, very similar to those of the adult necklace, soldered together. Below: Binocular image and X radiograph of the child earring with SEM-BSE microphotographs of the rings with soldering area and detail of surface morphology.



The child necklace is also much smaller, again made from individual rings. Each ring is <1,5mm diameter but with more variable dimensions and composition. Although as yet uncleaned, SEM-EDX and PIXE analyses suggest that the rings are made from electrum with an average composition of gold (67,6%), silver (29,4%) and copper (2,0%). Similar compositions were found for gold objects from the Levant (Nahal Kana Cave) dating from the Chalcolithic [Gopher, Tsuk, Shalev&Gophna 1990, *Earliest Gold Artefacts in the Levant, Current Anthropology* 31:4, 436-443]. Interestingly the adult burial also contains an electrum girdle.

Below: Binocular image and SEM-BSE microphotographs of a single bead showing the joint, where the bead is slightly flattened.



These beads have a simple, often open, joint. They also show a slight border, possibly suggesting wear or adjustment to an adjacent round stone or glass bead, although this was not recorded in Petrie's report.

Study of composition and technology of the jewellery assembly will continue following cleaning and possible sectioning of one of the child necklace beads.

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