Gold in the Ancient World

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The British Museum
• Methods of research on gold objects at the British Museum
• The earliest uses of gold
• Evidence for early gold refining and assaying
Scientific Research at the British Museum dates back to 1920. Now in new laboratories.

Using analytical methods which do not cause damage to Museum objects.
Gold model chariot from the Oxus Treasure
5th - 4th centuries BC
Tajikistan

Length: 19.5 cm    75.5 g

Mongiatti et al 2010
http://www.britishmuseum.org/research/publications/online_journals/technical_research_bulletin/bmtrb_volume_4.aspx
• SEM-EDX for element analysis and study of surfaces at high magnification
X-radiography –

‘Mold Gold Cape’
This restored sheet gold ‘garment’ was found over 100 years ago, crushed and broken, in a Bronze Age tomb (c. 1900-1600 BC) in north Wales, UK.
• XRF
X-ray fluorescence analysis

Iron Age (150 - 50 BC) from Snettisham, Norfolk, England
The neck-ring is made from 64 wires in eight separate coils with decorative terminals cast-on.
• Early use of gold –
Gold in graves at Lake Varna, modern Bulgaria alongside copper and stone tools and weapons
4250 – 4000 BC
• The earliest gold exploitation is thought to be from alluvial sources.

• These are often impure with variable amounts of silver.
Rein-ring made of electrum (gold with about 25% silver). It was fixed on the pole of a sledge pulled by oxen.

From a Royal Tomb at the city of Ur, Mesopotamia (modern day Iraq)
2600 BC

Height: 13.5 centimetres
Gold coin from Lydia, Turkey
c. 550 BC

Electrum coin minted in
Lydia, Turkey
(weight 3 grams)
Gold coin minted in Lydia, Turkey circa 550 BC.

*(weight 8 grams)*
Earthenware pot, blackened by heat – from excavations at Sardis, Lydia (modern Turkey)
Reconstruction to show how it was used as a parting vessel

Diagram of how the pot is thought to have been used to refine impure alluvial gold, beaten into thin sheets, packed between layers of salt parting cement, heated for many hours below the melting temperature of gold, removing the silver as chloride.

(Ramage and Craddock 2000, King Croesus' Gold: Excavations at Sardis. fig. 4.31)
Specific Gravity measurement

The Roman writer Vitruvius tells the story of how Archimedes (281-212 BC) used his discovery that displaced water was a measure of volume to calculate the silver content of an impure gold crown.
Fire assay and specific gravity
Illustrated in:-
‘The Laws of Art and Nature of...Assaying...Metals’
by Sir John Pettus, London, 1686
TOUCHSTONE

‘for although the assay made by fire is more certain (than by touchstone), still, since we often have no furnace, nor muffle, nor crucibles, or some delay must be occasioned in using them, we can always rub gold or silver on the touchstone, which we have in readiness. Further, when gold coins are assayed in the fire, of what use are they afterwards?’ (Agricola, 1556)
Wall painting showing Nubians bringing gifts of gold to the court of Thutmose IV, Thebes, Egypt 1400 BC