

Since its earliest appearance, gold has fascinated virtually every culture on Earth. Its reflecting light, perpetual luster, unfading and invariable distinctiveness, and its connotation linked to the sun's eternity have until today been most likely at the quintessence of its symbolic value. "The sun itself, it is of pure gold" (Goethe, *Faust II*).

In Egypt, more than for its material value, gold played primarily a key role in the religious cult, as it was considered the "flesh of the gods". Statues of gods, well-guarded inside the temples' holiest of shrines were in fact made from pure gold. In the same vein the gilt peaks of high-standing obelisks warranted direct contact with the sun, as for instance illustrated by an inscription on an obelisk dedicated by queen Hatshepsut inside the temple at Karnak: "... then my heart incited me to fashion for him (the God Amun) two obelisks from electrum, whose peaks reach up to the sky ... thus I covered them ... with electrum, for my name to last eternally inside the temple, for always and forever."

Whether opulent death masks from pure gold like that of Tutankhamen, or the common private ones covered with leaf gold, the imperishable and insinuation associated with this metal reflected the determination of the deceased to safeguard his existence in the hereafter.

The earliest known gold objects from Predynastic Egypt come to us in the shape of small beads, which occasionally appear on necklaces, together with ones from other materials like carnelian and bone. A closer examination of their slightly amorphous shapes and structures

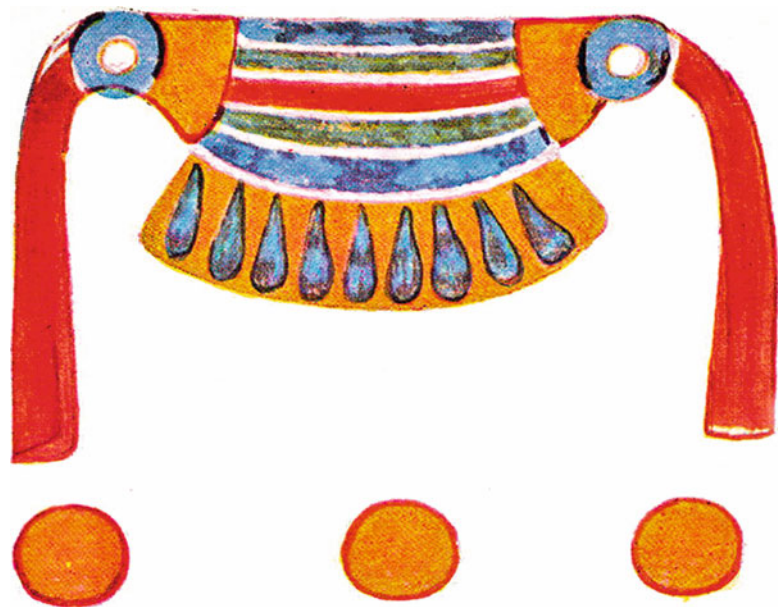
reveals a manufacture by hammering rather than casting, thereby attesting that these are actually small nuggets formed by nature over a lengthy period through constant relocation of tiny gold particles contained in the debris of the wadi sediments. In such humid environments the silver contents tend to diminish as it is gradually washed out, thus increasing the relative gold content of the nugget. Therefore nugget gold is generally purer than that extracted from a mine.

In funerary contexts these early nugget beads were laden with spiritual significance and therefore rather associated with concepts of eternity than mere material values. Although the latter aspect became steadily more important with the progression of time, both aspects cannot be separated from each other in a social or political perspective.

From the Predynastic Period and the early Old Kingdom onwards, especially in northern parts of the Eastern Desert, acquisition and possession of gold had already been taking place through prospecting and mining rather than fortuitous discoveries of nuggets by nomadic populations. At first however, mainly copper ore deposits had been sought for, and it was probably only with the processing of these ores that inherent gold particles had been found, which at some later stage resulted to genuine prospecting for gold occurrences.

Expeditions were sent out to extract the gold from beforehand explored mining areas where under strenuous conditions and deprivation mining could then begin. Gold production soon became a matter of the pharaoh and his administration. This

Fig. 2.1 Representation of a golden, bead-studded pectoral. The three-dot determinative for minerals below, denotes the sign as the hieroglyph for gold with the reading “nub” (after N. M. Davies, 1958)



same administration was also in charge of delivering, counting, and weighing the recovered gold as well as recording these actions in written documents. As a rule the delivered gold was kept in treasuries attached to the kingdom's most influential temples. Such lists, no matter their state of preservation, are known from all periods and state the amounts of gold delivered in the annual balances. In many cases they also contain information as to the origins and the quality of the gold.

Hence, any ruler was able to keep record over his kingdom's gold possessions and it was he who had the power to dispose over it.

An inscription on the so-called Palermo Stone (Schäfer 1902), an approx. 6 cm thick basalt slab of which other fragments are kept in Cairo, had probably been carved some time during the fifth dynasty as a copy of a much of older text. Reaching back to the Predynastic Period the inscription lists in chronological order the reigns from Aha (first dynasty, about 3000 BC) to Neferikare (fifth dynasty, about 2460 BC). In addition, the list gives important events attached

to the respective reigns. For as early as the second dynasty it reads “the counting of gold and fields”. With the beginning of the fourth dynasty (about 2630 BC) the list then continues with repeated donations dedicated to the gods and their land-possessing temples, but also large quantities of gold, which according to findings in the field may now be viewed as gold extracted from mines.

The hieroglyphic sign “nub” for gold depicts a gold collar (Fig. 2.1) and is encountered as an engraving as early as on prehistoric clay and stone tablets from the sites of Hierakonpolis, Nagade and Ombos, of which all are located in the mouth area of the ancient route leading to the Eastern Desert with its gold deposits (Vercoutter 1993).

Only approximate statements can be made as to the actual amounts of gold in circulation in Ancient Egypt. With regard to the quarried mines, one would need to measure them up accurately in order to get some idea about their respective yields. Beyond that, it seems however impossible to attempt any assessment concerning



Fig. 2.2 Scene from the tomb of Huy, viceroy of Kush, dated to the period of Tutankhamun (1333–1323 BC). It depicts Nubians delivering large quantities of ring-shaped gold ingots and gold dust in bags, each respectively marked with the gold hieroglyph

the yields of the countless mining pits, known wadiworking sites, let alone the unknown or partly-buried extraction sites, while keeping in mind that these date to diverging, yet undated periods in history.

In addition, especially for the New Kingdom we know of substantial gold imports and booty from conquered countries. From his campaigns in Syria for example, Thutmose III brought home the gilt battle chariot of the kings of Megiddo and Qadesh, and “ten gilt carriages whose shafts were of pure gold”, and even a princess covered in gold. Inscriptions inside the tombs of the monarch’s high officials report tribute payments consisting of cast gold ring ingots from Syrian rulers. This was the most common form of natural gold. In addition, there are illustrations of deliveries in bags containing gold dust (Fig. 2.2). The gold was weighed carefully with specific gold weights,

generally figures in the shapes of cattle (Fig. 2.3). In the New Kingdom gold (and silver) and copper were weighed with among others, simpler shapes identified as weights by their inscriptions (Fig. 2.4).

In order to get some idea about Egyptian gold reserves, it seems adequate to consult the delivery lists from administrative and temple treasuries.

The most common Egyptian weight unit was the “dbn” equal to 91 g. According to Graefe (1999), however, this unit was divided by two for gold and silver, thus corresponding to 45.5 g. Because some documents cite “large dbn” at 45.5 g and “small dbn” at 13.1 g, the following calculation is based on Graefe’s (1999) small dbn in order to avoid implausibly high figures resulting from a weight unit at 45.5 g per dbn. For reasons of clarity the following figures are given

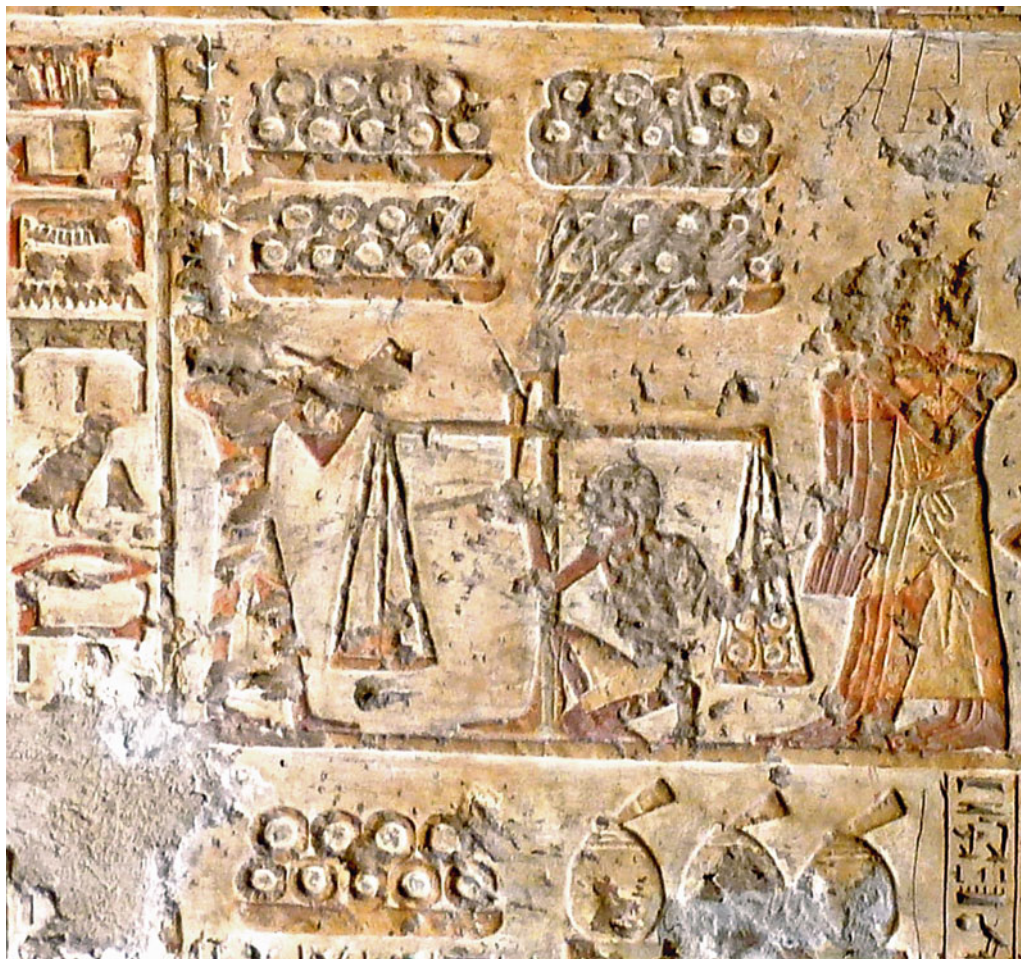


Fig. 2.3 Weighing of gold, displayed as both ring ingots and dust (bags) above and below the weighing scene. The text to the left includes the hieroglyph for gold. Tomb of Paheri at El-Kab, eighteenth Dynasty (Photo credit: C. Hess)



Fig. 2.4 Gold weights of stone with different values. National Museum, Khartoum

kilograms. The large dbn values also appear in kg, in brackets behind the first figure:

Hatshepsut (1479–1458 BC)

Endowment to the temple at Karnak: 480.7 kg (1,669.5 kg)

Thutmose III (1479–1425 BC)

Gold entry from Nubia between the 32nd and 42nd year of reign: 150.5 kg (522.6 kg)

Booty from the battle at Megiddo in the 23rd year of reign: 39.3 kg (136.6 kg)

Income from a part of T's reign; raw gold in different qualities 332.8 kg (1,155.9 kg)

Total allowance for the temple at Karnak, from 46th year: 2,000.6 kg (6,948 kg)

Amenhotep III (1388–1351 BC)

Endowments pertaining to two different categories of gold: 412.4 kg (1,432.5 or 329.9 kg (1,145.8 kg)

Gold present to Niniveh and Hanigalbat: 1,320.0 kg (2 times 20 talents at 30.3 kg)

Ramesses III (1183–1152 BC)

Endowment to his temple in the temple district at Karnak: 655.0 or 54.0 kg (2,275 or 187.6 kg)

(according to the Harris Papyrus even for all temples only 17.8 kg)

Osorkon I (985–979 BC)

Endowment for the Heliopolis temple: 201.0 kg (698.2 kg)

For Amun gold and silver (?) 30,130 kg (104,650 kg)

Various 65.6 kg (228.0 kg)

Taharqa (690–664 BC)

For the temple in Kawa/Nubia over 9 years 15.7 kg (54.4 kg)

According to these randomly selected texts, gold production culminated under the reign of Thutmose III which corresponds to the time when Egypt was at the height of its expansion, imposing its rule over distant provinces throughout the Near East and Nubia up to the fourth cataract. In the 31st year of his reign, the annals of Thutmose III mention among others gold supplies from Syria contained in 41 protected, full bags, probably gold ore in the form of gold tinsels or nuggets (Helck 1965).

The texts disclose that the gold quantities decreased noticeably during the reign of the

Ramessides. By the end of the twentieth dynasty, a period for which the epigraphic material remains virtually silent as to gold deliveries, a full-scale pillaging of private and royal graves was made public under Ramesses IX in the Theban necropolis and whose official investigations for the clarification of the incidents is recorded in the Abbott Papyrus (Kitchen 1983).

Nevertheless, according to the above list only a 100 years later Osorkon I disposed over the largest gold stocks ever recorded, and it seems therefore tempting to connect this with the looted gold from the necropolis and its subsequent redistribution (Störk 1977).

Not included in the above list are the colossal amounts of gold cited in donation lists. Also, the numerous archaeological gold artefacts like the ~11 kg mask of Tutankhamun as well as his interior gold coffin weighing more than 110 kg to name but a few, make an impressive statement as to the scale of Ancient Egypt's gold prosperity (Fig. 2.5).

We may therefore assume that much larger amounts of gold than those suggested by the available texts had been in circulation, considering especially that over the time this non-perishable material has the tendency to accumulate rather than the contrary. Gold objects were melted down repeatedly and transformed to new artefacts, as observable by the heterogeneity of the data obtained from scientific analyses carried out on different samples from single artefacts (cf. Chap. 4). Even the gold jewelry sold today in Egyptian bazaars might well contain remnants from the country's ancient artefacts.

The available gold was essentially used for the manufacture of ornaments and jewelry of all sorts, cultic objects, amulets, and figurines of divinities. A comprehensive selection of such objects is found in the catalogue of the Vienna exhibition "Gold der Pharaonen" (Seipel 2001). In architecture gold was generally used for fittings in temple equipment like doors, columns and pillars, floors, and walls. In funerary contexts sheet gilding predominates on wooden coffins, gilt death masks and golden or gilt grave goods, like jewelry, accessories, and vessels.

Fig. 2.5 Inner sarcophagus of Tutankhamun from solid gold, weighing over 100 kg. Egyptian Museum, Kairo



Graefe (1999) gives a compilation of randomly gathered information on the weights of gold artefacts kept in various museums. They vary between a few grams to several hundred. The heaviest object in his list is a necklace from the “gold-rich” twenty-first dynasty attributed to king Psusennes.

The higher his rank, the more was an official able to supply his tomb lavishly with gold and thereby to lend expression to his aspiration for immortality. Deserving state servants were moreover rewarded by the king personally with the so-called gold of honor, often consisting of necklaces, bangles or other gold presents.

The wealthiest tombs however, were those of the kings. Unfortunately, only few have remained unscathed such as the most notorious one of Tutankhamun.

Considerable amounts of gold were required by the king for his foreign affairs and thus were too, contained in presents for distant rulers. Manufactured artefacts were not the only negotiated goods but raw gold as well. As revealed by the Amarna letters (Knudtzon 1964) however, presents could be demanded in counterpart by the pharaoh, as in the cases of the princesses for the harems of Amenhotep III and IV (Akhenaten).

Master planned and state-ordered pillaging of graves in Egypt took place during the first centuries following the Arab conquest 642 AD and ended only by the twelfth century (Rabie 1972). The subsequent beginning of the so-called goldrush in the South Egyptian and Nubian Deserts is most certainly to be seen in perspective with the dwindling gold resources from grave looting in the heartland. At the same time, new and lucrative profits were expected from the numerous gold producing sites rediscovered during earlier pilgrim voyages along the routes through Wadi Allaqi to the Red Sea.

Present-day gold producing sites in similar terrain situations (mostly wadiworkings) like those in the Bayuda Desert, in Sudan, may give some hint as to the yield of the exploited gold. During our stay at the site in 1999, about 500 people worked there, of which approximately 10 % were women and children. They worked at less productive locations and were mostly occupied with exploiting the sands.

According to the labourers, the day by day yield ranged between a minimum of 1 g (for most women) and a maximum of 15 g per person. The average yield for one male worker was given at 5 g/day. The annual work season varied between 3 and 4 months.

Because gold was plentiful like any other important commodity in Ancient Egypt, the

country never developed into a trading nation. Absent luxury goods like ivory, exotic woods and rare animals were imported from the provinces or even more distant countries through diplomatic channels and barter economy.

The fact that gold was accurately weighed demonstrates that it was a precious material, although no specific reference value was attached to it as one might expect in a modern economy. Defining a realistic value for gold in Ancient Egypt proves therefore problematic, especially considering that if ever it had been fixed to some other reference value, it would have fluctuated considerably over its 3000 years of history.

The first although not minted coins eligible for contributing to an evaluation of a gold price appear sometime during the thirtieth dynasty, only shortly before the Ptolemaic conquest in 332 BC, in other words towards the end of what is often referred to as "Ancient" Egypt. Until then Egypt had no money economy comparable to that of today. The economy resembled more a barter economy and above all, it was guided by the state that redistributed all produced goods according to its inhabitants' requirements and its own will to respond to these needs.

Gold and Gold Mining in Ancient Egypt and Nubia
Geoarchaeology of the Ancient Gold Mining Sites in the
Egyptian and Sudanese Eastern Deserts

Klemm, R.; Klemm, D.

2013, XX, 649 p., Hardcover

ISBN: 978-3-642-22507-9