1. Introduction

The natural southern border of Ancient Egypt was the region around Aswan with settlements on the Nile island of Elephantine. The desert region east of this location was more or less under Pharaonic control, at least during the Old Kingdom (2700–2160 BC) and Middle Kingdom (2119–1794 BC) but also during New Kingdom (1550–1070 BC) times, whereas during the different intermediate periods less Egyptian control of the Eastern Desert is documented. Large parts of this Eastern Desert belong geologically to the Precambrian basement of the Arabian–Nubian shield and host around 250 gold production sites, which were mined during different periods of ancient Egyptian history. Most of these sites were visited by the authors during four field campaigns between 1989 and 1993, and three additional campaigns during 1996–1999 in the Sudanese Nubian Desert (see Figs. 9 and 10, discussed later).

In the 1960s and 1970s expert teams of the Egyptian Geological Research Authority (EGSMA), the Geological Research Authority of the Sudan (GRAS) and the Soviet Techno Export group carried out extensive gold prospection programs in Egypt and the Sudan. Of the economically significant gold anomalies they discovered, few were investigated further.
of settlements and mine-shafts, indicating a long history of ancient extraction.

Unfortunately these expert groups never co-operated with archaeological specialists in order to classify the many remaining ancient mining traces and tools and this interesting aspect of historical prospecting efforts was thus left uninvestigated. It was the goal of the studies described here to fill this gap; thanks to generous funding from the German Volkswagen Foundation, we were able to visit, in co-operation with EGSMA and GRAS, most of the known gold production sites and even to rediscover quite a number of hitherto unknown ancient mining locations.

The most important aim of our expeditions was a systematic survey, encompassing archaeological inspection and classification of the remaining, mostly previously undescribed archaeological surface inventory and material, and a preliminary investigation of the geological setting of the mining sites. Additionally, information was sought on the prospecting, exploitation and ore processing methods of the ancient miners.

In modern times mineral exploration is assisted by complex computer-aided processing of satellite spectral imagery, highly sophisticated geochemical, petrographical and geophysical investigations, together with detailed geological field work. Nothing of that kind was available to the ancient prospectors, who most-effectively executed their profession in search of scarce gold finds during the Predynastic to Middle Kingdom times, in the vast regions of the Egyptian and even more difficult Nubian Desert, during the relatively short span of 1480–1340 BC (roughly Thutmosis III and Amenophis IV). During this period almost all important gold mining sites in the Eastern Desert of Egypt and in the Nubian Desert were discovered and exploited.

We visited almost 250 gold production sites. At most places only surface inventories, open cast workings, accessible underground diggings and a preliminary mapping and sampling of the geology could be performed, due to lack of permission and/or time for detailed excavations and geological fieldwork.

2. Geological Setting of the Gold Deposits of the Egyptian and Nubian Deserts

The gold occurrences described in this study are located in the Precambrian basement of Egypt and Sudan, also called the Arabian–Nubian shield (ANS), which extends from the river Nile eastwards towards the Arabian Peninsula. To the south, the continuation of the ANS is the Mozambique Belt (Vail, 1988). It is generally accepted that the ANS formed in the Neoproterozoic (Kroner, 1979) by a complex accretion of terranes onto...
man himself. When Jay raps, it pours right into your ear like water from a tap.

The fish sandwich arrives. Conversation turns to the schoolboy who was shot to death, Trayvon Martin — "It's really heartbreaking, that that still can happen in this day and age" — and, soon after, to Obama: "I've said the election of Obama has made the hustler less relevant." When he first made this point, "People took it in a way that I was almost dismissing what I am. And I was

"I'm so ahead of my time, my parents haven't met yet!"

like: no, it's a good thing!" He didn't have Obama growing up, only the local hustler. "No one came to our neighborhoods, with stand-up jobs, and showed us there's a different way. Maybe had I seen different role models, maybe I'd've turned on to that." Difficult to keep these two Americas in your mind. Imagine living it — within one lifetime!

In “Decoded,” Jay-Z writes that “rap is built to handle contradictions,” and Hova, as he is nicknamed, is as contradictory as they come. Partly because he's a generalist. Biggie had better boasts, Tupac dropped more knowledge, Eminem is — as "Renegade" demonstrated — more formally dexterous. But Hova's the all-rounder. His albums are showrooms of hip-hop, displaying the various possibilities of the form. The persona is cool, calm, almost frustratingly self-controlled: "Yeah, 50 Cent told me that one time. He said: 'You got me looking like Barksdale'" — the hot-blooded drug kingpin from HBO's

Cylindrical granitic rotation stone mill (quern) with well-preserved upper rotation stones for central and peripheral handle sticks, introduced by the Romans but predominantly used in Arab times. Gabatilo Arab mining camp, Nubian Desert, NE Sudan.

"The Wire" — "and you get to be Stringer Bell!" — Barksdale's levelheaded partner. The rapper Memphis Bleek, who has known Jay-Z since Bleek himself was 14, confirms this impression: "He had
nent shear zones became active, like the Najd fault system (Fleck et al., 1980; Fritz et al., 1996) or the Oko-shear zone in the Sudan (Abdelsalam, 1993, 1994) (Fig. 2). In the final stage of the orogenic evolution of the ANS, crustal extension can be assumed due to the occurrence of mafic and A-type felsic dike swarms (Stern et al., 1988).

After a prolonged period of erosion these basement sequences were largely covered by sand during the Cretaceous period (at about 90 Ma), forming the Nubian Sandstone. This sandstone was eroded during the relatively young continental uplift of the flanks of the Red Sea rift system. During this denudational period, the Precambrian basement with its gold-bearing quartz veins and quartz-filled shear zones became exposed at the surface and was thus open to exploitation.

2.1. New Investigations on Gold Mineralization

Gold occurrences in the ANS are mainly confined to quartz-mineralized shear zones, which occur in the ophiolitic sequences, the island arc assemblages, the Hammamat and Dokhan Groups and in the post-orogenic granitoids. The latter seem to have had an important influence on gold mineralization, as productive shear zones and quartz veins often occur in the granitoids themselves or in their direct vicinity. Analytical investigations of different rocks in the ANS (e.g. serpentinites, basalts, clastic sedimentary rocks) indicate exposed gold concentrations of 20–50 ppb in mafic rocks and clastic sediments, and concentrations close to 200 ppb in the serpentinites (Langwieder, 1994). However, unaltered granitic rocks did not show positive gold anomalies (Abdelsalam, 1993, 1994) (Fig. 2). In the main ore minerals were pyrite or arsenopyrite and pyrrhotite. Minor pyrite and arsenopyrite were present, low concentrations of gold were derived from the strained rocks, due to elevated temperature and pressure.

Where the aquifers provided open spaces, such as in the shear zones, convection cells, and interstitial waters dissolved available mineral species; where such cells were present, low concentrations of gold were derived from the strained rocks, due to elevated temperature and pressure.

Microscopic ore analysis of quartz veins and host rocks of the important gold occurrences at Hangaliya (west of Mersa Alam; Fig. 9), Fatira, Gidami and Atalla (all in the area west of Safaga and Qusir; Fig. 9), in the Eastern Desert of Egypt (Murr, 1999), yielded three different stages of mineralization. During the first stage the main ore minerals were pyrite or arsenopyrite, minor pyrrhotite and chalcopyrite. This stage is preserved both in the rims of the quartz vein itself and in the host rock. Asignificant alteration can be observed in the host rock, primary minerals are completely transformed into a sericite–quartz–pyrite assemblage. Achemical comparison between unaltered host rocks (e.g. granites) and their alteration products shows no significant change in the composition for major elements. In particular, the Fe-content remains the same although the pyrite/arsenopyrite
down on the youngsters because they wanna have shiny things. It’s in our genes, know what I’m saying? We just don’t all know our history, so—"

Fuck with me, you know I got it.
mineralization is evident. A chemical reaction of a fluid (pH between 3.5 and 5) with the host rock can be assumed, resulting in the formation of sericite and quartz. If gold was transported as a sulphide complex in the reactive fluid, primary iron from the host rock and sulphide from the fluid could have formed pyrite while the gold was being precipitated. Gold was confined within this first stage of mineralization mainly to pyrite or arsenopyrite.

The second stage of mineralization can be observed within the quartz veins. The main minerals are pyrite, sphalerite, galena and chalcopyrite, with minor amounts of digenite, hessite, calaverite, scheelite, hematite and tetraedrite. Gold occurs within quartz, sphalerite, galena, pyrite and chalcopyrite. The third stage of mineralization comprises mainly quartz; pyrite was rare and gold was not found. Therefore this generation can be regarded as barren.

Supergene alteration of the primary paragenesis resulted in the formation of lepidocrocite, jarosite, argentite, stromeyerite, anglesite, cerrusite, smithsonite, mimetesite and rare tellurates and arsenates. Gold was locally remobilised, re-precipitated and concentrated. Temperature estimations of the ore-forma-
pressure of 1–2 kb can be estimated, assuming a temperature of 300–400 °C from the arsenopyrite thermometry. In the second mineralization stage the ratio of CO2 and H2O changes. Pure CO2-inclusions can be observed, indicating an unmixing of a primary mixed CO2–H2O-fluid due to the pressure release. The absence of water-rich fluids can be explained by a selective trapping of CO2, whereas water is transported to higher levels within the hydrothermal system. Indeed, primary inclusions in identical quartz veins become more and more H2O-rich, with increasing topographic levels, whereas the total density of the fluid decreases dramatically (Fig. 5). The above mentioned third stage of mineralization probably formed from this low-density H2O-rich fluid phase.

A well-constrained model for the gold mineralization can be presented. Post-orogenic granitoid intrusions produced heat anomalies, leading to hydrothermal convection cells. Interstitial water was able to dissolve gold from slightly enriched rocks (e.g. serpentinities, ophiolites etc.). Joints and shear zones served as channels for the circulating hydrothermal cells. Chemical reactions of the sulphide-enriched fluids with the host rocks resulted in host rock alteration, with liberation of iron and the formation of pyrite and/or arsenopyrite, submicroscopic gold inclusions within them became liberated.

We are able to define three inclusions within them became liberated. and/or arsenopyrite, submicroscopic gold of gold, when, due to oxidation of pyrite caused locally visible concentrations normally are barren. Supergene alteration tated at the lower levels, these upper parts eralization occurred. As gold was precipi

eralization stage the ratio of CO2 and hydrogenation of volatiles induced precipitation of gold and sulphides from the fluids. CO2 was trapped preferentially due to the higher wetting angle under these circumstances, whereas water was transported to higher levels where a further quartz mineralization occurred. As gold was precipitated at the lower levels, these upper parts normally are barren. Supergene alteration caused locally visible concentrations of gold, when, due to oxidation of pyrite and/or arsenopyrite, submicroscopic gold inclusions within them became liberated.

We are able to define three general geological environments of gold mineralization, exploited by the ancient miners:

(i) Gold mineralization associated with mafic to ultramafic units of ophiolitic affinity, such as basaltsandesites (amphibolites) and serpentinites with remains of pyroxenites and/or with their clastic erosion products such as greywackes and conglomerates. If these sequences were intruded by late Proterozoic granitoids, quartz vein mineralization with locally developed low gold contents could form within the whole rock unit but preferably along the granitoid assimilation rims, related to dilated shear zones or joint systems.

(ii) Towards the southern part of the Egyptian Eastern Desert, but located mainly in NE Sudan, the gold environment changes to more rhyolitic–andesitic volcanic rocks with less common intercalations of clastic
down on the youngsters because they wanna have shiny things. It’s in our genes, know what I’m saying? We just don’t all know our history, so—” Fuck with me, you know I got it
sedimentary rocks and marbles. This environment was penetrated by late granitoids producing the perfect tectonic setting to allow for gold-quartz vein-mineralization.

The only present-day gold producer in NE Sudan is the Sudanese-French (GRAS–BRGM) joint venture operation of Ariab (Bakhiet and Matheis, 1993; Wipfler et al., 1999). At this locality high quality gold ore is mined in an extreme intensively leached SEDEX deposit, occurring in a sequence of highly folded acid volcanics of mainly rhyolitic character. Due to superficial leaching, only a sponge type whitish silica residue remains from the former SEDEX deposit, enriched up to 50 ppm in Au. According to drill core results, this leached zone changes gradually into a pyrite dominated massive sulphide ore body, which is stratabound and folded, with only an average of 0.5 ppm Au. It appears quite likely that sulphidic SEDEX occurrences or their oxidized remains might have been the primary gold source of this second type, hydrothermally leached and redeposited, forming the gold-bearing quartz mineralization investigated during our studies.

(3) In the western part of NE Sudan close to the Nile, a number of ancient mined gold-quartz mineralizations occur within the older gneissic pre-Panafrican basement. Some of these sites are remarkably rich with an average of one ounce (about 30 g/m.t) Au per metric ton, such as Sarras, Duweishat and Abu Sari (Fig. 10). All along the eastern bank of the Nile between Ager and Ginnis, the extended hilly plain is covered by heaped remains of ancient alluvial workings of generally scattered quartz vein detritus. The remains of these operations indicate an intensive gold production. The concentration of New Kingdom (NK) temples, built during the reigns of Amenhotep III and IV (about 1380–1340 BC) opposite the eastern bank of the Nile might not be an accident and supports the importance of this region to the Egyptian NK occupants in Nubia. Due to the mentioned lack of detailed geological knowledge on this region, a convincing source for the rich gold mineralization in Nubian basement rocks unfortunately cannot be offered.
bitter accounting of the losses in a long
and unfinished war. Kanye raps: I feel
the pain in my city wherever I go/314
soldiers died in Iraq/509 died in Chica
go. Written by a couple of millionaire
businessmen the fly (“Like ‘New Day,’
Kanye told me that — the actual rap —
last year at the Met Ball, in my ear at
dinner”), it really shouldn’t be as good
as it is. But somehow their brotherly
rivalry creates real energy despite the
mammoth production. And in one vital
way the process of making it was unusu-
ally intimate: “Most people nowadays
that word. “It’s a lot of pain and a lot of
hurt and a lot of things going on beyond,
beneath that.” He offers an analogy: “If
your kid was acting up, you’d be like,
‘What is wrong with you?’ If they have a
bellyache — ‘Oh, you ate all the cotton
candy.’ You’d make these comparisons,
you’d see a link. You’d psychoanalyze
the situation.”

Rappers use language as a form of
asymmetrical warfare. How else to
explain George W. Bush’s extraordinary
contention that a line spoken by a
rapper — “George Bush doesn’t care
about black people” — was “one of the
most disgusting moments in my presi-
dency”? But there have always been
these people for whom rap language
is more scandalous than the urban
deprivation rap describes. On “Who Gon
Stop Me,” Jay-Z asks that we “please
pardon all the curses” because “when
you’re growing up worthless,” well,
thing’s come out that way. Black hurt,
bright self-esteem. It’s the contradictory
pull of the “cipher,” rap terminology for
the oldest mining tools are connected to
the gold-bearing quartz veins, which origi-
nally contained a variable copper-sulphide
mineralization, that is almost completely
leached out and which has been re-depos
ited as typical green malachite (and some
other green secondary copper miner-
al). Obviously this green staining guided early
prospectors to the auriferous quartz veins.
Apart from gold, those malachite enriched
veins were mined for copper, as recently
shown by Castel and Mathieu (1992). Earlier
sites also were mined for copper, as recent-
ly shown by Castel and Mathieu (1992).

3. Gold Production Periods in Egypt

3.1. Gold Production in Pre and Early Dynastic Times

Discoveries of gold artefacts, dating back
as far as the Predynastic time (about 500
BC) demonstrate that gold production
must have taken place in Ancient Egypt
ear the middle of the fourth millennium
BC. During this time, obviously only
small nuggets were picked from the wall
of flowing river systems. Such a
occurrence of visible nuggets must have
been restricted to rare occasions. Such a
ground system is preserved in the area around
Umm El-Qa’ab (Thebes), 1999 in the south-
central Eastern Desert of Egypt, where some field bearing decora-
tions of the “Earliest Hunters,” could be
detected.

Statistical analysis of the geological envi-
ronments around Pre- and Early dynastic
times (Kroeper and Wildung, 1994) as well
as the gold alteration systems within the joint system of the
granitic intrusions, belonging to the so-
called older and younger granites of the
Eastern Desert.

Furthermore, discoveries of
disputes on gold-enriched quartz veins, mainly
golden and yellow conten-
tions of the “Earliest Hunters” could be
detected.

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In the Eastern Desert of Egypt, remains
of gold production sites were dated to the
time of “Earliest Hunters” of Winkler
(1938), who classified this nomadic
population as part of the Amratians in
the middle of the fourth millennium
BC. In the Eastern Desert of Egypt,
remains of gold production sites were dated to the
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(1938), who classified this nomadic
population as part of the Amratians in
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BC. In the Eastern Desert of Egypt,
for a gold concentration procedure could be discovered. Taking into account the hydro-metallurgical concentration processes applied during later periods of gold production, comparable methods can possibly be assumed for this epoch as well. Apart from the large two-handed stone hammers, different types of discus-shaped hammers have also been found within Pre-dynastic sites. This hammer type obviously was used only to gain lumpy quartz ore from the brittle vein systems, which was powdered later by the large hammers.

### 3.2. Gold Production in Old and Middle Kingdom Times

During the Old (2700–2160 BC) and Middle Kingdom (2119–1794 BC) the previously described prospecting method of searching for malachite staining in the host rocks continued in general, but in addition hematite enriched quartz veins (in places with barite) became important for exploration and, in case of gold discovery, for subsequent mining targets. Old Kingdom gold mining techniques continued with in situ crushing of the gold-bearing quartz vein systems, but two new basic types of stone hammer were developed:

- An oval stone axe of 2–5 kg weight with a chiseled notch for a forked wooden stick (“Rillenschläger”) and a more or less cylindrical one-handed stone hammer with a chiseled, ergonomically formed handle (Fig. 8). With the advantage of these new mining implements a more effective exploitation of the auriferous quartz veins could be established.

During the Middle Kingdom this tool inventory in general continued, but additional stone mortars were introduced, allowing for the lumpy quartz ore to be crushed first to about pea-sized grains and then for grinding it to a powder fraction. Again, no archaeological evidence for further gold recovery treatments during this period could be discovered, but the remark of the nomarch (provincial ruler) Ameni, who is quoted in his Beni Hassan tomb as having said “I forced their (Nubian) chiefs to wash the gold” (Newberry, 1893) gives a clear hint that hydro-metallurgical concentration processes were well established during these periods. The majority of miners in these times were most probably members of desert tribes and not Egyptians of the Nile valley. This is suggested by the ergonomically formed handle of the one-hand stone hammers, fitting best in a hand of 18–20 cm in size, rather than one of 11–13 cm, which was the average for the Nile valley population at that time. Furthermore, this could be verified by sporadic finds of typical Nubian pottery. On the other hand, it has to be emphasized that typical Egyptian pottery of that time, such as red polished
Meidum bowls (Ballet, 1987) were also frequently discovered in the surveyed surface remains, which can be seen as a hint for stronger Egyptian control of the mining operations, in contrast to the previous Egyptian restriction on gold trading.

In Fig. 9, only a few gold mining sites for both Pre- and Early dynastic times and Old and Middle Kingdom periods are shown. This corresponds with the low number of known gold artefacts from those early periods, compared to the later periods. However, quite a few of the early mining sites might have been so intensively overprinted by later operations that today no older surface remains are still visible. Systematic archaeological excavations certainly will modify the number of known sites shown in Fig. 9. The first military campaign in the 18th year of Sesostris I (1956–1911 BC), at the beginning of the Middle Kingdom, was most probably organised to gain access to the Nubian gold. It is recorded by the Sestoris I nomarch Amenemhet, in his tomb at Beni Hassan, that he undertook expeditions to Nubia from where he returned with gold and gold ore for his king (Newberry, 1893).

However, almost all ancient gold mines of these early times are more or less collapsed, and any estimation of the maximum depth without archaeological excavations is debatable; nevertheless, depths in open trenches of up to about 25 m seem realistic.

### 3.3. Gold Production in New Kingdom Times

From the New Kingdom (1550–1070 BC) period onwards, gold mining operations concentrated more in the central Eastern Desert, predominantly south of the Qena-Safaga road, and were also spread over the eastern portion of the Red Sea hills. Due to the conquest of Nubia, exploitation of the Wadi Allaqi area and deep into the NE Sudan (Figs. 9 and 10) also became possible. Moreover, the gold prospecting targets were significantly enlarged: in the vicinity of the older mining sites quartz vein systems free of hematite and green copper aureoles were also successfully prospected.

More detailed studies of the quartz vein systems exploited during New
Kingdom periods indicate the profound knowledge of the ancient prospectors. They obviously were aware of the general structural control of gold-bearing veins, which despite showing different strike patterns in different parts of the Eastern Desert, have a general tendency of north–south or east–west strike directions. The prospectors followed only veins of these known productive orientations and ignored the many others running divergently within the same prospecting area. Whether this knowledge was based on systematic geological investigations or on trial-and-error based experience is not known. However, it is striking, that in regions where the normal N–S direction of the gold productive veins has locally changed, the ancient miners unerringly prospected the new productive vein strike directions, which might be regarded as a hint for a basic geological-structural knowledge.

In addition, unexplored new areas with an enlarged geological framework were prospected during New Kingdom times. Particular emphasis was placed on geological environments characterized by basaltic–(amphibolitic) and serpentinitic lithologies with or without black shales, in the vicinity of granitoid batholiths. Furthermore, due to the systematic exploration of remote desert regions during New Kingdom times, granitic–granodioritic areas in the southern and eastern parts of the Eastern Desert became new and important prospecting and mining targets. These were extended to the Wadi Allaqi and even to the North-Eastern Sudan.

As an important innovation, intensive gold prospecting and processing were extended to include wadi-working operations, where gold-bearing quartz samples were systematically picked from the coarse-grained fractions of the wadi sediments. At these sites, the simultaneous employment of hundreds of workers was possible, in contrast to the severely limited number of miners in underground workings. Archaeologically these wadi works are preserved in extended settlements along the exploited wadis (Klemm and Klemm, 1994). Normally house ruins remain only at the wadi boundaries, parallel to the hill-sides as the remainder of the settlements was mostly washed away by sporadic floods, but in a few cases ruins still cover entire wadi sites. Consequently these sites led to an enormous increase in gold.
production, documented by an increase of known gold artefacts from those times. In addition to the greatly expanded milling activities, a radically new milling technique had a strong impact on gold production at the onset of the New Kingdom: mill stones up to 80 cm long and 30–50 cm wide, with a flat and oval-shaped grinding plane, and differently sized sets of mill stones used with one or both hands (Fig. 11) were introduced. These stone mills are similar to the flour mills commonly used in the Nile valley since very early times (Roubet, 1989). The introduction of these flour milling techniques into the gold ore processing industry can be regarded as an indication that only from New Kingdom times onwards were the majority of miners Egyptians from the Nile valley. This assumption is also confirmed by the predominant occurrence of typical New Kingdom pottery remains within mining sites in the Egyptian Eastern Desert, but partly also in Nubia.

Before milling, the initial lumpy ore was crushed down to about bean-sized particles with a double-sided stone anvil of about 30–30 cm and a rounded stone pestle of 0.5–2 kg weight. Demonstrably, the separation of barren and gold-bearing quartz fragments exclusively by eye was perfected by the workers, as small and uncommon remaining mine dump heaps in the wadi grounds today contain only milky white and translucent barren quartz gravels (Fig. 12).

Separation of gold from the fine-milled quartz powder fraction was managed by washing as attested by preserved tailing dumps. At first view these tailings appear as mostly pink to reddish heaps of quartz sand, analogous...
Fig. 11. New Kingdom oval shaped andesitic stone mill with a selection of grinding stones from Hairiri gold mining site, Wadi Allaqi, southern Eastern Desert, Egypt (scale is 10 cm).

Fig. 12. Remaining New Kingdom waste dam heaps from wadi workings at Umm Garaiyat, Wadi Allaqi, southern Eastern Desert, Egypt. Note that parts of the wadi ground became flooded later, destroying most of the ancient situation.

In many cases today, mortar and sand mortar was used to consolidate the inclined washing tables constructed of stone fragments. Consolidation was achieved by a layer of the same material, covered by a layer of the same material, covered by a layer of the same material. The length of these washing tables varies between 2.2 and 4 m, and they are 40–60 cm wide and 80–100 cm high, corresponding with an inclination angle of 15–20° (Fig. 13). At the end of the slope, the washing water was recovered in a box about 60 cm deep and wide, walled by stone slabs, and sealed again with the described mortar. Here also the detritus of the quartz tailings was deposited, from where it was dumped close by, at the tailing heaps, still partly preserved in many cases today. Mortar and sand mortar and a surface covered by primitive clay conducted the washing water back to a large, 80 cm by 60 cm basin, from where the water was recycled for further washing processes. This rather high residual gold content unfortunately caused the destruction of many ancient gold production sites at the beginning of the 20th century, when modern gold production started with cyanide leaching of the old tailings, thus destroying most of the archaeologically valuable and untouched original gold deposits. At quite a few of the New Kingdom gold mining sites, inclined washing tables, included gold tailings, contained gold concentrates as well as remaining gold concentrations as well as remaining gold concentrates as well as remaining gold concentrations as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates as well as remaining gold concentrates.