

DIETER EIGNER

MEROE JOINT EXCAVATIONS: EXCAVATION AT SLAG HEAP NW1 IN MEROE¹⁾

About fifteen slag heaps of different sizes²⁾ are situated on the eastern periphery of the city of Meroe. They are the relics of an iron industry which had its golden season from about 200 B.C. to 300 A.D. The lion temple was built around the year 255 A.D. on top of the heap SE 1 and is therefore a *terminus ante quem* for this area of production. The ironwork was not restricted to the city of Meroe; during the pre-campaign in 1992, the MJE team has also investigated neighbouring archaeological sites, and iron slag was found at Hamadab and Sayal Sirag.

Since the outer appearance of the heaps today is defined by the yellow desert sand, the slag pieces (up to 15 cm in diameter) can only be seen at certain parts. Especially the foot of the heap is covered by sand, which renders precise measurements impossible. The diameter is about 10 m to 100 m with a height of several metres. None of the heaps still retains its original form, all show signs of digging or excavations, be it by treasure-hunters or archaeologists. However, there are no reports about archaeological investigations of the slag heaps. The heap SE 2 is cut through by the railway line.

One of the main objectives of the MJE is the investigation of the role of iron-technology in ancient Meroe, its technical means, technological processes and economic factors. Until today the slag heaps of Meroe have obviously not yet been archaeologically investigated; therefore, the first and most basic step of the MJE is the investigation of a slag heap by archaeological experts, with an exact documentation and analysis of the findings, especially as concerns archaeo-metallurgical findings.

For this purpose, the heap NW1 (= north-western mound 1, ref. to R. F. Tylecote 1970,

Fig. 1) was selected. There are several reasons: the original shape of the mound has mostly been preserved, while all other heaps have been dug into or dug under to a great amount. The size of the mound roughly corresponds to the average volume of the slag heaps of Meroe. The results of the archaeological investigation could therefore be considered to be typical and can be achieved within a reasonable period of time (about 4 campaigns).

During a test-excavation in 1969-70, R. F. Tylecote has found the remains of smelting-ovens at the southern foot of the heap. The MJE excavations shall – in their last phase – provide the junction to this section, whereby a fundamental broadening and completion of Tylecote's findings it to be expected.

The present base of the heap is rather circle-shaped, with a diameter of about 35 m.³⁾ The highest point is not located in the middle, but shifted 3-4 m to the east and is elevated about 3 m above the adjoining sandy plane in the east. The level of the adjoining area in the west is about 1 m higher. It can therefore be assumed that the original base of the heap is located further west than the one visible now. Thus, the heap would have an oval ground plan, as can also be observed at other mounds. In the west, the peak of the mound has got a dent, which is brought about by a horizontal plane, about 1 m lower than the highest point. It could be the traces of an archaeological excavation. In the South, the foot of the mound is cut through by Tylecote's excavation, as well as by running water, due to heavy rainfall. The northern side shows some irregular excavations, whereas the eastern side of the heap is completely intact. In the north lies the irregularly-shaped slag heap 1 a, which could be the result of an excavation attempt.

The two smaller heaps 1b and 1c are situated in the south; their circle-round base suggests antique piling-up. The eastern foot of the heap

1) Translated from *MittSAG* 4, 1996, pp. 23 - 27. For cited literature see the German version of this article. - Several Sudanese colleagues asked us to publish some of the more important articles in *MittSAG* in English. This is the first of a planned series.

2) See fig. 1 on page 23 of *MittSAG* 4.

3) See fig. 2 on page 24 of *MittSAG* 4.

is covered by sand-drifts, which, further towards the east change into an uniform sandy plane. The adjoining areas in the north and the west show a thick cover of broken pieces of pottery (ceramics), broken bricks and slag lumps. Fragments of hand mills complete the picture.

The surface findings lead to the conclusion that a settlement area was situated next to the heap. The original base of the heap is nowhere visible.

It was decided, first to excavate the south-eastern quarter of the heap, without following a 10 m-square-grid pattern, to direct the section direction, however, according to the system introduced by MJE. The east-west section was performed along the line $x=1032$, cutting through the highest point of the heap; the north-south section was along the line $y=866$, about 2,5 m to the west of the highest point. The southern boarder line of the digging area at $x=1019$ corresponds to the currently very irregularly broken out north limitation of Tylecote's excavation. In the east, line $y=883$ was preliminarily chosen as a boarder line. Thus, in horizontal projection, an excavation area of 17 m by 13 m was established. Base point for the elevation measurement was point 840/1010, which had been concreted by MJE, the level of which was preliminarily assumed to be 10,00 m. For the deposition of the excavated material, the rubble-heap made by Tylecote, about 40 m east of the excavation area, continued to be used. Planning, carrying out and documentation of the archeological findings was done by the author and Barbara Wewerka. Thilo Rehren dealt with questions of archaeo-metallurgy. The actual excavation job was accomplished by 20 locally recruited workers. These were mostly nomads, who had only recently settled in the Nile valley, and to whom this kind of work was completely new.

However, under the guidance of Ahmed Abdallah, who already had worked with P. Shinnie in Meroe, they showed excellent teamwork in course of time, and some of them even exhibited a good talent as excavators. Within the framework of the pre-campaign there was merely a period of time of just 3 weeks for the actual excavation works, from 6.2. – 25.2.1992.

A working concept was chosen, which planned the digging off of the chosen heap area, level by level, starting from the highest point. The levels to be excavated should follow the original

slope of the heap as much as possible. Their thickness was on the one hand governed by the archeological findings, on the other hand by work-requirements of a technical nature. At the end of the short excavation period, the digging area was deepened by 1,10 m – 1,40 m.

The work started with the removal of a layer about 20 cm thick, which let expect the uncovering of a surface, free of sand drifts.

At the foot of the heap, much thicker sand layers had to be taken away, in order to get to the original surface of the heap. The uncovered surface showed surprisingly little slag, but a great proportion of brown-red sandy cinder material, mixed with charcoal and scattered pieces of broken pottery. Slag in concentrated form only appeared at a few points and was otherwise evenly and loosely distributed.

At the top of the heap, some accumulations of burnt brick and clay pieces were observed, leading to the assumption that foundries could have existed there. Excavation proceeded therefore with special care at these spots; there were no indications, however, that furnaces had been situated there.

In the further process of excavation it was shown that such accumulations of burnt brick and clay could in actual fact be the fragments of furnaces (acc. to T. Rehren), which were deposited on the waste-heap after the clearing of the furnaces.

A cavity appeared on the top in about a depth of 30 cm, filled with white cinder, obviously the filling of a pit. In order to document and analyse the finding, an intermediate section was performed along the line $x=1030$, 2 m south of the excavation boarder line; it was drawn after the end of the excavation works.⁴⁾

At the eastern foot of the heap appeared in this phase of the excavation the remains of clay-brick walls: two walls, at least two bricks wide, form a corner; three layers can be distinguished, the bricks are 20 cm wide. - The walls were covered again with sand. The further handling shall be performed when this level has been reached in all the excavation area, i.e. when the heap has been excavated. Tylecote found huts containing furnaces in his section. The present finding could be similar to his, the floor level could then be

4) Fig. 3 on page 24 of *MittSAG* 4.

expected to be about 1,5 m below the present wall top.

On the level of planum 3 (about 50 cm below the original surface) a rather homogeneous consistency of the heap could be observed: a fine mixture of slag lumps and charcoal, slaggy material, brown cinders and sandy material, sporadically broken brick material. At the foot of the heap, rough slag pieces and fragments of furnace coating were found (positions 6 - 11 in Fig. 3).

The process of "peeling off" level by level was further continued. No changes concerning the characteristics of the heap were observed and work went on speedily. A level thickness of 15 cm proved to be technically the most favourable; it can be excavated in a single operation with the hoe "Turia". This tool is much better suitable for the establishment of a smooth surface than are shovel and pick-axe, which the workers are not acquainted to anyhow. Starting with planum 3, another 5 levels were excavated (Fig. 4), until the excavation works came to a preliminary end at planum 4. The profile $x=1030$ was kept in place, in order to keep the profile $x=1032$, which is specially threatened by strong winds, in good condition.

As much as possible, the excavation of the heap proceeded parallel to the original surface. Following the surface of the old dumps was hardly possible in the loosely piled-up material and it would have been asking too much of the inexperienced workers.

At profile $x=1030$ it then became evident that the old pilings are considerably steeper than the surface established by us, which follows the contour of the heap.⁵⁾ At the western excavation boundary, however, the levels of the single pilings run parallel to the surface. This shows that piling-up was done from west to east.

Below a very sandy slag level along the west profile $y=866$, observed in planum 3, further sand levels without slag appeared,⁶⁾ partly with lots of broken pottery and animal bones (cattle?), as well as fragments of hand mills. These are obviously household waste. Now and then some slag is scattered. The evident conclusion is that this is household waste of the iron workers whose dwellings can be assumed a little bit more to the east.

Components of the heap and single findings which originate from iron production and processing: furnace slag (flow slag) in pieces of different sizes, fragments of slag-tapping, forge slag (firing slag, drop-shaped), iron-ore, oolitic iron-ore, charcoal, cinder (white, grey, brown, sandy).

Fragments of blast pipes ("wind pipes" or "tuyeres" to blow in the air into the furnaces) made of clay in different shapes and sizes. Pieces of burnt clay (reddish-brown to orange) from furnace coating. Fragments of burnt bricks from the wall structure of the furnaces. There remains to be mentioned 1 piece of copper slag and 1 piece of corroded copper of amorphous shape from the sand drifts at the foot of the heap.

During the excavations works, T. Rehren collected samples for archaeo-metallurgical analysis (refer to report of T. Rehren in MittSAG 3), and furthermore carried out a preliminary quantitative calculation.

For the homogeneous part of the heap, the weight proportion of slag turned out to be maximal 40%, nearly half of which is furnace slag, the rest is forge slag. The volume proportion of charcoal is 10%; considering the proportion of household-waste, the proportion of furnace slag for the mound as a whole is only about 10%. It is rather probable that this value is also valid for the other slag heaps.

Thus, a completely new basis for the calculation of the total volume of iron production in Meroe has been established.

Other components and findings (in the first place household waste): sand, partly drifted, partly piled-up, clay-like sand. Ashy sand. Sandy cinder. Lumps of clay. Broken bricks. On fragment of a special brick for a torus-mould. Fragments of ceramics, containing parts of big storage vessels, sherds of "mat-impressed ware" and one sherd with engraved pattern. Fragments of grinding stones. Fragmented bones, partly burnt. Large animal bones (cattle?). Three fragments of archer's rings made of stone (granite, gneiss) from the sand drifts at the foot of the mound. Some beads made of faience, stone, ostrich-egg.

5) See fig. 3 on page 26 of MittSAG 4.

6) See fig. 3 on page 26 of MittSAG 4, positions 14 - 22.