MAPUNGUBWE METALLURGICAL MATERIAL

by

Professor G. H. Stanley.

The examination of the material submitted to me helps to confirm the impression that the practice of iron smelting among pre-European African peoples was almost as wide spread as that of pottery manufacture and other domestic arts.

The specimens submitted by Mr. Neville Jones are such as would be made by simple native methods of smelting; while two pieces of the metal product similarly exhibit the characteristic features of such material from other ruins, including Zimbabwe, as well as of modern native-made metal. These features are lack of homogenity, inclusion of slag, and partial carburization, with corresponding variation in quality.

There is but little, however, to indicate that non-ferrous smelting was practised here at Mapungubwe, or that copper, bronze or gold were fabricated. It is, on the contrary, perhaps more probable that articles made of these metals were brought from elsewhere , and in this I am inclined to agree with Mr. Weber. Nevertheless, they present many points of interest, on which the following comments are offered.

With regard to copper, the only specimen, other than metal, submitted to me, which can be connected with copper smelting is a piece of copper sulphide (technically known as matte). I am not aware, however, of any evidence that such was used in primitive South African metallurgy, at least by itself, as a source of copper. It is generally assumed that it was the oxidised i.e. carbonate ore (malachite), which was smelted by natives and this piece may therefore have been merely an object of interest, i.e. a sort of curio, as is possible

also in the case of the piece of greenish stone also submitted, which consists of a zeolite (prehnite) of no metallugical significance.

The short copper rod has apparently been cast into almost its present shape, but has received a certain amount of hammering and reduction in diameter, during and after which it has been annealed to soften it. This apparently is a kind of material from which certain copper bangles were made. It may also have been the raw material for manufacture of wire, but not necessarily at Mapungubwe.

The flat wire bangles, both gold and bronze, have quite definitely been made by hammering out the metal into thin sheets and then cutting it into narrow strips in the manner suggested by Mr. Pearson, though I think a chisel-like tool was probably used. This is indicated by the irregularity in width and by the fact that overlapping cuts have been observed.

Further, in winding over the fibre core, ends of successive lengths of wire strip are trimmed to fit and neatly interwoven , and the surface, I feel sure, was finally burnished to give the final smooth and almost solid appearance. This is indicated by the close fit of the somewhat irregular edges. The micro-structure shows that the metal has been annealed.

The round wire of the other bangles I have studied very carefully and have come to the conclusion that it has been produced by "wire drawing".

Though not circular in section, the cross section is so uniform, allowing for the somewhat worn outer face of the bangle, and the length so considerable that I cannot believe that it can have been made in any other way. Moreover, when unwound, the inner unworn surface is seen to be fibrous in appearance, presenting parallel striations over long distances as

if drawn through a somewhat rough hole, and further, (the gold wire) etching in cyanide solution shows it to possess a long stranded fibrous structure (etching)

Curiously, the modern platinum wire on which the beads were strung, shows somewhat the same appearance.

The micro-structure is markedly crystalline and twinned, indicating annealing at relatively high temperature to finish with: in fact one end of one wire examined has been partly melted. It is, ofcourse, quite possible that the thin strip was first produced as in the case of the other kind of bangle, and then finished by drawing, instead of drawing down a relatively thick rod. There is not sufficient evidence on which to base an opinion as to which of these two alternatives was employed.

The bronze sheet is smooth - though scratched - on one side and rough on the other (as is the gold strip of the bangles) and I think this indicates that it was hammered out on a stone (no doubt smooth for a stone but nevertheless rough) by aid of a smooth iron hammer.

The beads also are of two kinds, the one clearly made by bending short pieces of wire to the required shape, and the other probably by cutting off small pieces of thick wire, hammering them to the required flattened spherical shape and then perforating with a small round punch with a square shank resembling an ordinary bradawl.

The hole is not circular enough to have been drilled, and on the other hand the micro-structure shows that the metal has been annealed during manufacture, but that subsequently the work both of shaping and perforating has been finished cold, i.e. the interior is coarsely crystalline and

twinned, while the exterior and perforated surfaces show much distortion of the crystals and "flow structure".

Mr. Pearson's (conception) of the use of gold globules is possibly correct, but I think this less probable, and there would appear to be no reason for smoothing the interior of the hole as he suggests. More likely it is the result of rubbing on the connecting string while adorning the owner.

With regard to his suggestion that a refining process was used , this is very interesting and by no means impossible, but I think it more probable that any refining occurred incidentally to its melting and oxidation in a crude form of furnace. In any case alluvial gold, at least, of such fineness is not unknown.

Mr. Weber's observation of the presence of a light coloured flaky material in the interior is probably due to the presence of pieces of scale of iron oxide -- perhaps originally iron -- from the surface of the punch used in forming the hole, and serves as confirmation of that method of perforation; while the rough porous surface may be due to the impression of the surface of the hammer or anvil used in shaping the bead by hammering.

The concentric marks are certainly puzzling, but may have been the result of abrasion by other and larger beads of different material in contact on a string, or by a cupped support used when perforating, or may even be the remains of the marks made in cutting up the length of wire from which, I suggest, the bead was made.

I certainly do not think the beads were made by casting; and the hexagon referred to is clearly the imprint of the butt of the punch. Etching by corrosion is by no means precluded however, in spite of the low solubility of gold. Some of the surfaces I examined

did possess such an appearance and moreover exhibited a distinct reddish coating but I was not able to confirm the presence of gold in this. But this applies to exposed polished surfaces, and Mr. Weber however, explains the rough appearance of the hollows by this assumption, and that I think was due rather to rough surface working during manufacture.

His observations with respect to the marks on the head of the tack are simply explained as being due to the top surface projecting somewhat above the surface of the plate which it was doubtless attaching to some wooden object and consequently suffering wear in use.

Mr. Beck's comments that one bead appeared to have been made of two pieces of metal bent so as to leave a cavity appears to parallel an observation of mine relative to another site in which a bronze coating over copper was used, as was also tubular metal in forming a "bent" bead. It is, however, very exceptional.

The general absence of any silver renders his remarks respecting bead R. 1 of exceptional interest. I think, however, that the black coating was possibly black copper oxide. His other observations have been dealt with in commenting on the results of Mr. Weber and Mr. Pearson. In conclusion, I would only observe that the Mapungubwe material appears to present just the same general charctaeristics as that from similar sites in Rhodesia.