Discovery and conservation of a hoard of votive bronzes from the Sacred Animal Necropolis at North Saqqara

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Abstract

This paper outlines the discovery of a hoard of votive bronzes from the Sacred Animal Necropolis at North Saqqara, and gives the background to the original work at the site by Professor W.B. Emery. This collection of material gives an interesting insight into the range of objects offered at the shrines of the Sacred Animal Necropolis, and gives us a glimpse of just how popular these cults were. Also, the methods used in the conservation of these bronzes are presented.

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1. Introduction

Conservation is an important part of the work of the Egypt Exploration Society, but there are few opportunities for conservators to provide details of their work for a wide audience. PalArch offers this forum and the conservation part of this paper has therefore been prepared by J. Gosling and P. Manti who worked as conservators in this latest season of work at Saqqara. They were preceded by W. Gneisinger and S. Stevenson (also of Cardiff University) who carried out the work of separating the pieces in 1996. A summary of the work will also be published in 'Egyptian Archaeology' 25 (Nicholson, forthcoming).

2. Emery's work at the Sacred Animal Necropolis

From the 1960s until the time of his death, the late Professor W.B. Emery (1903-1971), was engaged in a quest to locate the tomb of the architect Imhotep. Imhotep was the vizier and overseer of works to King Djoser (2667-2648 BC) of the 3rd Dynasty (2686-2613 BC) and was the person responsible for the construction of Egypt's first pyramid (Ray, 2002), the Step Pyramid of Djoser at Saqqara (near modern Cairo).

Such was Imhotep's reputation as a wise man that his name became a by-word for all branches of learning, and some two thousand years after his death he was deified and joined the pantheon of Egyptian gods. He was not the only Egyptian god associated with learning. Thoth, who was represented by the sacred ibis and the baboon, was regarded as the deity responsible for the invention of writing and all matters pertaining to learning and literacy. Imhotep was therefore linked with Thoth, and when the Ptolemies took over Egypt (from 332 BC) he was identified with their god of wisdom and of medicine Asklepios (Aesculapius).

Saqqara had a long association with the cults of those animals regarded as the living images of particular gods. The most famous of these is the Apis Bull, sacred to Ptah, creator-god of Memphis. The Apis was unique; only one animal at a time could represent the god, but other deities could be represented by an entire species, such was the case with the hawk or falcon sacred to Horus and the ibis sacred to Thoth (see Ray (1978) for a discussion of the animals of North Saqqara and Smith (1974) for the architecture).

Emery reasoned that Imhotep's tomb must lie in an area of other 3rd Dynasty tombs to the north of the Step Pyramid, quite probably in an area where there were deposits of votive pottery from the Late Period (747-332 BC) and after, since this might suggest cult activity associated with one of these much earlier tombs. This would be the sort of pattern that might well be expected if Egyptians of later times were coming to Saqqara to make offerings at the tomb of Imhotep.

Emery's excavations revealed, over a period of a decade or so, that this area was part of what is now known as the Sacred Animal Necropolis (Emery, 1965, 1966, 1970, 1971). Here he discovered a catacomb for the burials of ibises. The association between Imhotep and Thoth was tantalisingly clear when mummies of ibises were discovered, some bearing appliqués of Imhotep, others of Thoth. Emery's belief that the tomb of Imhotep should be in this area seemed justified, but no tomb was found. Further excavation revealed a catacomb for baboons, one for the mothers of the Apis bulls, another for ibises and a catacomb of mummified hawks or falcons.

In the Falcon Catacomb Emery and his team discovered a cache of bronze temple furniture. This had been removed from a shrine which had stood on the temple terrace, presumably when it became obsolete or when the temple was too crowded with other objects. As the property of the god this furniture could not be thrown away, and as such had been buried amongst the pottery jars which contained the mummies of the birds themselves in their catacomb.

This was but one of several caches of bronze items discovered during Emery's work (Green, 1987). Outside the catacombs, on the temple terrace itself, where once the shrines of the sacred animals had stood, also proved to be the burial place of several caches containing smaller votive objects such as figures of deities, and small tapering buckets known as *situlae*. These objects were given to the gods by worshippers who came to the shrines to receive oracles from the gods, they were given in the hope of a favourable response or as thanksgiving for a good fortune. So popular were the animal cults that quite frequently the shrines must have become overcrowded and had to be cleared. (For a discussion of the temple terrace see Smith & Davies, forthcoming).

In 1971 Emery died, with the work at the animal necropolis still incomplete, and the tomb of Imhotep undiscovered. Professor Martin published the first of the ibis catacombs, the South Ibis (Martin, 1981), and Smith and Jeffreys undertook some work on the Temple Terrace and environs (Smith & Jeffreys, 1977) but most of the rest had to wait until the 1990s when Professor H.S. Smith and P.T. Nicholson resumed work there in the hope of bringing Emery's work up to date and supplementing it with a modern investigation (Nicholson, 1996; Smith & Davies, forthcoming). In 1995, as part of this work, the area near the entrance to the Falcon Catacomb was re-cleared so that Emery's plan could be checked and if necessary revised.

3. Discovery of the 1995 bronze cache

The re-clearance outside the Falcon Catacomb led to the discovery of a very large cache of bronze objects, which had been placed in an abandoned, and partly collapsed tomb chamber, very close to the stairway leading down to the Falcon Catacomb. These objects, which number over 600, had become badly corroded and had fused together into a large, and extremely heavy, mass.

Figure 1. Vessel 314 showing damage to one side. Situation during conservation. Scale bar in cm. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.

Figure 2. Vessel 314 digitally 'unrolled' to facilitate publication and study. This is a trial of this technique. Scale bar in cm. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.

The mass was carefully removed, and fortunately separated quite readily into three smaller lumps. These were packaged and stored until a team of conservators from Cardiff University (Ms. S. Stevenson and Mr. W. Gneisinger) were able to come out to Saqqara early in 1996 to work on them (Nicholson, 1996). They were able to separate the large concretions into their individual objects, and also to begin to clean some of them. It was very quickly apparent that this was not only the largest cache of votives from the Sacred Animal Necropolis, but a particularly interesting one.

It was intended that work continue the following year, but the antiquities magazine in which the bronzes were stored was the subject of an attempted robbery and remained sealed for several years following 1996. The material only became available for study, after the construction of a new storage magazine, in 2003. At this time the writer was asked to resume work on the finds and the Society undertook to fund the work in March-April 2004. This work is a part of the Society's commitment to the conservation of finds and monuments in Egypt.

A team comprising the three authors plus a photographer, illustrator and field assistant spent three weeks working on the finds. We were joined in the field by a conservator from the Supreme Council for Antiquities and we are grateful for his help and assistance (see Acknowledgements).

The first stage of the work involved the checking and re-packaging of those objects considered by the Supreme Council to be the most significant after their cleaning in 1996. These had been stored separately and needed to be re-packed. They also needed to be fully described and to have detailed publication photographs made of them. The photography has been done using entirely digital media. This will allow the designs which decorate some of the *situlae* to be 'unrolled' as well as helping to facilitate publication (figures 1 and 2).

In examining these objects it was discovered that an unusual, hollow-cast, figure at first thought to be some kind of hedgehog or porcupine was in fact a type of beetle. This has been provisionally identified by Professor P. Buckland of Bournemouth University as *Bubas bubalus* (Ol) (figure 3). Further research may help to suggest whether this species is particularly associated with either the ibis or the falcon species. These registered objects were also described onto an ACCESS database.

Figure 3. Bubas bubalus*, copper alloy hollow-cast. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.*

The second stage of the work involved the rest of the objects, starting with the *situlae*. These were spread out, and each assigned an individual, unique number. Some had already been numbered in 1996, but this season's work completed that process. They were separated into groups according to their shape and size. In the meantime, a small group of very large and elaborate *situlae* were given to the conservation team so that work could be begun on them. It was believed that these were the most likely to preserve any traces of inscription, and certainly had the most, and most elaborate, decoration.

All of the *situlae* were then measured, weighed and described. With so many very similar objects the weight category was felt to be a useful cross-check lest there be any confusion between the pieces at some time in the future. The groupings arrived at visually seem to be quite consistent, but it is intended that the data be examined statistically to arrive at more clearly defined groups. All of the pieces were photographed as well as described. The aim of the exercise was to make a record of every piece, and photography offered an excellent method of doing this in a relatively short period of time.

During the three weeks spent in the field, all the *situlae* were measured and photographed, and a short, coded description made of them. However, the sheer number of pieces made it impossible to describe every one in detail. This was further complicated by the discovery that a far higher proportion of the pieces were decorated than had been expected. The data have not yet been processed, but up to three-quarters of the examples may have decoration of some kind.

The decoration normally comprises one or more bands (registers) showing a worshipper standing to the right of a small altar or offering table, and adopting a pose of adoration. In front of him, to the left of the table stands ithyphallic Amun, and behind him come a procession of other deities. The number and selection of deities varies, as does the quality of workmanship. The base of the decorated vessels is usually in the form of a lotus flower.

Where handles remain intact, they vary considerably in their proportions, bearing no relation to the size of the vessel they were intended to serve. There is a strong impression that the person(s) who made the handles were not the same as those who produced the vessels, but were perhaps less skilled apprentices.

4. Conservation

During the 1996 field conservation season, conservators Stevenson and Gneisinger dealt with the separation of copper-alloy objects from the recovered conglomerates. During that season, investigative mechanical cleaning was carried out on fourteen objects, whilst a wrought copper alloy *situlae* that demonstrated active corrosion was chemically stabilised with benzotriazole corrosion inhibitor. All the copper alloy objects were packed with acid free tissue and placed in polyethylene boxes with silica gel. Analysis was not conducted for the identification of the corrosion products present on the copper alloy objects.

The 2004 conservation team aimed to pack and stabilize all retrieved objects and clean those that were considered priorities of study and research. Given the limited working period of three weeks and the large number of retrieved objects, different approaches of cleaning were adopted according to the post-excavation use of the objects. The most representative examples of each type of copper alloy objects were prioritised for conservation, to ensure that maximum information is recovered via investigative cleaning and the revealing of decorative details. Only objects already registered to the Supreme Council for Antiquities were cleaned to a display standard, because they may be put on exhibition in the future. Although the conservation strategy incorporated an element of selectivity (as not all the artefacts would necessarily receive the same level of cleaning), environmentally controlled storage would insure the long run preservation of the objects. This would permit further conservation treatment in case of future display.

X-radiography, analysis of corrosion products and materials characterisation did not take place due to lack of facilities and time constraints. Limited analysis for material characterisation will take place in following seasons.

4.1. Copper alloy objects

Technical examination

Most of the recovered objects are heavily leaded cast *situlae*, with a few of lower lead content (empirical assessment via weight analogies). Two of the *situlae* were hammered out of copper alloy sheet. The *situlae* were divided into separate groups, according to their shape, manufacture, size, and decoration (see above). Almost all the *situlae* had handles, and a few had spouts, attached chain links or square stands. The rest of the artefacts consisted of small statues of the gods or sacred animals and appear to be heavily leaded copper alloy casts.

Condition assessment

Details of the surface decoration on the copper alloy objects was obscured by thick compact layers of powdery light blue corrosion and totally disfigured by dense, voluminous pustules of hard green corrosion products, most likely copper carbonates (malachite and azurite) (figure 4 and 5). All objects were covered with a firm layer of soil and had suffered mechanical damage, most of them were cracked and broken, and very few have retained their handles *in situ*. Their interiors were filled with soil and other inorganic debris, and in the case of Cons no. 314, two smaller objects (figure 6).

Only the registered copper alloy objects had been treated before (1996), having had corrosion mechanically removed, separated pieces adhered, stabilisation with benzotriazole corrosion inhibitor, and Incralac™ protective lacquer applied. These objects were repacked and stored with silica gel in Stewart™ boxes. No further conservation treatment took place.

Figure 4 (left). Situlae *Cons. No 39 before conservation treatment. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.*
Figure 5 (right). Detail of corrosion products, showing cracking of corrosion layer. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.

Figure 6. Detail of situlae *Cons no. 314 with two smaller objects, a figure of Osiris and of a shrew, found corroded inside. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.*

Conservation treatment

Investigative cleaning suggested that details of decoration were preserved at the interface of red cuprite and voluminous carbonate corrosion and/or at the interface of a very thin black copper oxide layer and light-blue corrosion product. Surface dirt and the thick layer of light-blue corrosion, which appeared to be very hygroscopic, were softened by immersing the objects in tap-water for a minimum of an hour. After immersion these layers were removed by brushing with soft and firm tooth-brushes. In some cases it was necessary to remove layers of dark green corrosion products in order to reveal incised details, exposing a very thin black oxide layer (figures 7 and 8). Hard green corrosion products were removed with mechanical means (glass bristle brush, scalpel, vibrotool) and voluminous corrosion pustules were removed with a small chisel, small wooden mallet and diprofil. Localized application of 5-10% w/v formic acid or 5-10% w/v 2Na-EDTA (di-sodium salt of

ethylene diamine tetra-acetic acid) softened green corrosion layers and facilitated their mechanical removal. In those cases, the objects were thoroughly rinsed with water in order to remove any acidic residues.

In the case of two *situlae*, cleaning revealed incised hieroglyphs on the bands between the registers. They were possibly added at the donors' bequests after the object's manufacture and they did not appear to be regular or linked to object size. As yet these are not sufficiently complete to be read with confidence, and the Egyptian authorities did not feel that it was necessary to add them to the register list this year, but may well do so when cleaning has been completed.

All treated copper alloy objects were dried by immersion in a succession of acetone baths and then placed in 5% w/v Benzotriazole in ethanol solution. Once dry, a protective lacquer coating of Incralac™ (5% Paraloid B-72 acrylic co-polymer in toluene and 1% w/v benzotriazole) with 1% w/v matting agent (Santocel™) was applied. Detached fragments were adhered using Araldite™ 5-minute epoxy resin.

Figure 7 (left). Situlae *(Cons. no. 10) before conservation treatment. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.*
Figure 8 (right). After immersion in water and mechanical removal of hydrophilic corrosion layers. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.

The registered objects were packed individually in carved polyethylene foam (Plastazote™), placed in aerated polyethylene bags and packed in Stewart™ polyethylene boxes with silica gel. The rest of the objects were placed in Stewart™ boxes padded with acid free tissue. All polyethylene boxes were desiccated with self-indicating and non-self indicating silica gel. A humidity indicator stripe was placed in the boxes to allow monitoring of the humidity levels. Prior to packing, the silica gel was successfully regenerated by drying it under the exposure of the sun having the self-indicating silica gel as a guide of efficiency.

4.2. Organic objects

Technical examination

The organic objects in the cache consisted of wood and rope fragments (Cons. No. 301-311), small wooden carvings, a small piece of wood with textile impressions and remains and a large fragment of carved wood (Cons. No. 564) with inlaid metal decoration and a white organic material (possibly ivory). One of the wooden carvings was a cobra, covered with a layer of gesso and gilding (Cons. No.284). These objects may have been from shrines that were buried with the cache.

Condition assessment

The objects were all very fragile and prone to mechanical damage. Dirt and dust covered their surfaces, with larger sand particles becoming embedded. The wooden cobra had lost much of its gesso and gilding, and that which remained was very delicate. The fragments of rope were extremely fragile and friable with incorporated dirt and sand grains. Inlaid decoration on the large wooden artefact was heavily obscured by a firm layer of soil. Despite first-aid past consolidation with solutions of Paraloid B72™ in toluene (1996), warping of the wood surrounding the inlays had caused them to become loose, and extreme care was needed when handling to prevent them shifting from the wooden substrate.

Conservation treatment

For most of the wooden objects, surface dirt and dust was removed with air puffer and soft brushes. Embedded sand particles were removed with a fine pin under with the aid of an optical microscope. Powdery wood surfaces, rope fragments, fragile areas of gesso/plaster and gilded areas were locally consolidated with 3-10% w/v Paraloid B72™ in acetone.

When treating the large wooden fragment with inlays (Cons no. 564), cleaning and consolidation took place simultaneously (figure 9). Acetone or 3% w/v Paraloid B72™ in acetone solution were used to soften the previously applied consolidant enough to remove surface dirt. Solutions of 5-10% w/v Paraloid B72™ in acetone were then applied to keep the inlays in place. Removing of the firm soil layer exposed part of the inlayed copper decoration revealing the presence of hieroglyphs. Due to time constraints cleaning was incomplete and hieroglyphs could not be read with confidence. As in the case of the two situlae (see above) the Egyptian authorities did not feel that it was necessary to add the object to the register list this year, but may well do so when cleaning is completed. All organic objects were packed individually in aerated polyethylene bags padded with acid free tissue.

Figure 9. Cleaning and consolidation of Cons. No. 564. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.

4.3. Inorganic objects

Technical examination

There were very few inorganic objects in the cache. There were two schist models of offering tables with incised decoration, three faience amulets, a carved limestone head with pigment residues in the corners of the eyes and mouth (Cons. No. 283), and a cast plaster head decorated with painting and gilding, which is possibly not directly associated with the cache (Cons. No 1000).

Condition assessment

The surface of the objects and details of their decoration were obscured by dirt and dust. The edges and corners of the schist tablets were chipped, as were parts of their surfaces. The limestone head had a fine network of cracks radiating from its back pillar. The pigments on the plaster head were extremely friable, and it had lost some of its gilding. The faience amulets were in good condition, with only soil and dirt deposits covering their surfaces. None of the inorganic objects had received any treatment in the past.

Conservation treatment

All the inorganic objects had been added to the register list during previous expeditions by the Egypt Exploration Society in Saqqara, and cleaning was undertaken to display standards. Removal of surface dirt and dust from faience, schist, limestone and painted plaster artefacts was carried out with an air puffer, soft brushes and/or solutions of mineral water/ethanol.

The pigmented areas of a cast plaster object were consolidated prior to cleaning with a solution of Paraloid B-72™ 3-5% w/v in acetone. Loose gilding was secured in place with 5% and 10% w/v Paraloid B-72™ in acetone solutions. Cracks in a limestone head were consolidated with solutions of 3-15% w/v Paraloid B72™ in acetone.

All objects were packed individually in carved polyethylene foam in clear polyester boxes or aerated polyethylene bags and placed in Stewart™ boxes. The cast plaster head was packed standing on carved Plastazote™ mount in a clear plastic container. This ensured mechanical protection and allowed it to be easily viewed, thereby minimizing unnecessary handling (figures 10 and 11).

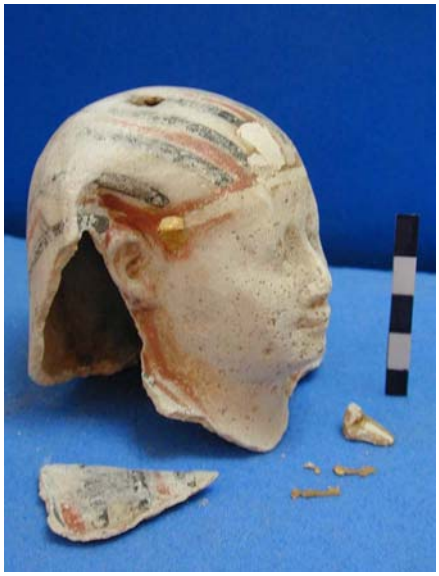

Figure 10 (left). Cons. no. 1000 before conservation Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.
Figure 11 (right). Cons. no. 1000 after conservation and packing Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.

4.4. Appraisal of conservation work

Time constraints meant that only a minority of the prioritised objects were treated, although all the registered copper alloy artefacts, a variety of *situlae* types, and all the inorganic and organic objects (except Cons. No. 564) were treated. All of the objects were repacked in stable microenvironments to prevent further corrosion or mechanical damage and to ensure their long run preservation. Once packed, the objects were returned to the storage magazine of the Supreme Council for Antiquities at Saqqara.

A challenge posed by the particularities of such a conservation project was setting up a working laboratory and dismantling it again in a 3 week period. Although some supplies and equipment were available, the majority of tools, equipment and some chemicals were transported from the United Kingdom. This meant

that careful planning and the development of a conservation framework was necessary to ensure that conservation materials would be available and sufficient according to needs.

The spacious study room provided to act as the working lab had sufficient light (natural and tungsten) and air circulation to host the whole of the study team (figure 12). Despite locating the conservation bench at the far end of the room, the nature of the conservation treatments and lack of extraction units meant that care was needed to minimise the potential health hazards that could result from exposure to solvents or dust from copper corrosion products. This difficulty was overcome by regular cleaning of the conservation area, limited use of solvents and the use of dust masks by the rest of the study team. All the treated copper alloy objects were lacquered on the same day to avoid unnecessary exposure to solvents, and long stays in the study room on that day were prohibited unless an appropriate solvent mask was worn. Discussions on health risks associated to conservation practices and other conservation issues were particularly appreciated by the S.C.A. members and Mr. Abdel Aziz Sayed Abdel Rasheed Soltan, conservator from the Egyptian Supreme Council for Antiquities, whose invaluable suggestions and assistance are acknowledged gratefully.

Figure 12. Part of the study room used as a conservation lab. The situlae were placed on benches in order to facilitate their typological characterisation, recording and the identification of study priorities. Photograph by J. Coyle. Reproduced by the courtesy of the Egypt Exploration Society.

5. Conclusion

This collection of material gives an interesting insight into the range of objects offered at the shrines of the Sacred Animal Necropolis, and gives us a glimpse of just how popular these cults were. There are vessels in a range of sizes, decorated and undecorated, which would have been sold to pilgrims of varying wealth and given to the shrines. We can imagine the workshops and stalls of those selling these items, and start to see something of the skill (or occasionally otherwise) of these Late Period craftsmen. None of the pieces so far cleaned bears a royal cartouche, but it is likely that most belong to the 4th century BC.

The Egypt Exploration Society's commitment to conservation in Egypt has proved especially fruitful in this project, and good links have been established with the conservators and inspectors of the Supreme Council for Antiquities.

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similarly helpful and I am indebted to them. The writer would like to express his gratitude to all those members of the Supreme Council for Antiquities mentioned above, as well as to Mr. Kamel Wahid, Chief Inspector at Saqqara, for their help and hospitality.

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