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The Gurna Manuscripts (Hermitage in MMA 1152) : Conservation Report 2010

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MUZEUM HISTORII POLSKI

EGYPT

THE GURNA MANUSCRIPTS (HERMITAGE IN MMA 1152) CONSERVATION REPORT, 2010

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Abstract: The conservation of three Coptic manuscripts discovered in the refuse dump of a hermitage at Sheikh Abd el-Gurna in 2005 was continued, monitoring the state of preservation of the two papyrus codices and the parchment book and addressing the need to improve conditions of storage, following the results of a laboratory microbiological analysis carried out on samples (see appendix for results).

Keywords: Gurna, West Thebes, papyrus, parchment, Coptic, conservation

Three Coptic manuscripts, discovered in 2005 in a rubbish dump context associated with a Coptic hermitage installed in a Pharaonic tomb in West Thebes (Górecki 2007: 266–272), have engendered extensive conservation efforts ever since their discovery. The original preservation work was done in field conditions on site, after which the decision was made to store them at the National Museum in Alexandria where a then newly established laboratory promised proper conditions for essential conservation work. Time was needed also for the PCMA UW mission to arrange for proper funding for this unexpected task. Conservation has been ongoing since 2006, carried out by the present author as well as other conservators,[1] dedicated to the cleaning of the books and their documentation and conservation. Monitoring of conditions in Alexandria increasingly demonstrated threats posed by the local climate, positing the transfer of the objects to a drier place.[2]

The reported season in 2010 followed standard procedure: evaluation of the condition of the objects following a period of storage, essential steps to counter potential threats and continuing planned conservation treatment. The items in

[1] Total of 182 days: 1 March–11 April 2006; 17 August–28 September 2006; 26 June–22 July 2007; 12–28 October 2008; 4 January–24 February 2010; 11–27 May 2010; for a report on this work, see Kordowska 2008.

[2] From February 2013 the manuscripts are in storage at the Coptic Museum in Cairo where they are undergoing final conservation treatment.

question are two papyrus manuscripts, the Canons of Pseudo-Basil (7th–8th century AD) and the Encomion of St. Pisenthios (7th–8th century AD) (Myszor 2007: 273–274), and a parchment codex, Book of Isaiah (9th–10th century AD). The Canons had been known from late medieval, Arabic translations and the original had been believed to be lost; the present text could be the only preserved full text of this document in Coptic. The other two texts are also considered as rare examples of the category.

The preservation of written matter in the ground is rare even in Egypt and indeed after lifting from the archaeological context, in which they had been deposited for hundreds of years, the objects were in

Table 1. List of parts of the objects stored separately

Canons of Pseudo-Basil (Inv. No. Coptic MS.1)
1) remaining part of the leather cover (front) with geometrical tooling, 2) board (from the front) with retained pastedown, made of fragments of papyrus-waste, 3) 74 leaves (148 pages) making up 37 bifolios, divided into nine quires, 4) endleaf from the back board of the cover with inscription, 5) fragmented back board of the cover.
Encomion of St. Pisenthios (Inv. No. Coptic MS.2)
1) remaining part of the leather cover (front), with painted ornament (now in pieces), 2) wooden peg of the cover (decorated with an ornament), 3) fragments of the cover's leather ties, 4) board (from the front of the manuscript), made from fragments of earlier manuscripts, 5) papyrus endleaf from the front board of the cover, 6) 40 leaves (80 pages) making up 20 bifolios, divided into five quires, 7) 10 leaves (20 pages), 8) part of the textblock, the leaves of which have not yet been separated (probably over 10 leaves), 9) endleaf from the back board of the cover (or the last leaf of the textblock).
Book of Isaiah (**Inv. No. Coptic MS.3**)
1) two parts of the wooden cover (in separate cardboard boxes covered with dark blue bookcloth, 2) 50 parchment leaves in individual envelopes of Japanese tissue.

Team

Dates of work: January/February and May 2010

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SCA representative: Safinez Ali Mohamed Ali, conservator (National Museum of Alexandria)

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poor condition. The papyrus books were tightly squeezed and deformed, whereas the melted edges of the parchment codex had caused tight adhesion of the wooden covers to the textblock. Conservation treatment began with separating of all of the leaves and efforts to stop degradation of the material. As a result of this work all of the books were opened and all of the leaves were separated. The parchment codex comprised 50 leaves, the papyrus books 74 and 50 respectively for the Canons and for the Encomium. Fragments of both leather covers were removed from the thick boards made of waste-paper and lined with Japanese tissue. The objects are now stored in individual cases [see ***Table 1***], appropriately furnished with silica gel packets.

Initial treatment after opening and separating of the leaves consisted of disinfecting with a 10% solution of PCMC (4chloro-3metylofenol) in ethanol. The parchment leaves were deformed and had to be flattened first, which engendered considerable effort due to the thinness and friability of the leaves. Full assessment of the condition of the objects was possible only after this task was completed. The current objective is to complete full treatment of the objects and to prepare them for possible display in museum conditions.

CONDITION OF THE OBJECTS

Increasing physical deterioration was observed on all of the objects, but especially on the papyrus manuscripts despite PCMC (4chloro-3metylofenol) disinfection carried out three months earlier. Microbiological degradation was also found to have progressed (see appended laboratory microbiological report). Microorganisms were observed in the form of white, furry colonies on the inner side of the wooden boards of the parchment codex, the covers of two papyrus manuscripts, the last leaf of the Canons, the leather cover of the Canons, the unseparated textblock of the Encomium, on leaves E4, E9, E1, B3 of the Encomium and on the folios of the parchment codex (about 50% of the leaves) [***Fig. 1***]. Other forms of microbiological changes appeared as a brown suede-like textured patches on 95% of all papyrus leaves of both codices and yellow spherical examples of *Aspergillus* [see ***Fig. 1***].

The cardboard sheet and Japanese tissue, which had been used to interleave papyrus leaves were damp and the leaves were also damp. Silica gel packets, which had been placed with the manuscripts in the cases, changed color from blue to pink, indicating excessively high humidity levels. Monitored conditions in the studio were as follows: temperature – in January 19°C, in May 24°C; relative humidity – in January 68% RH, in May 70% RH. The humidity monitoring was especially alarming.

PAPYRUS MANUSCRIPTS

The edges of the leaves were extremely brittle leading to progressive loss (especially in the case of the Encomium) [***Fig. 2***]. The papyrus fibers were extremely weak, brittle and fragile. The outer margins of the leaves, especially at the top, had darkened in color, indicating changes of physical condition and weakening of the structure. Numer-

Fig. 1. Condition of the papyrus from the Canons of Pseudo-Basil and Encomion of St. Pisenthios at the beginning of the season in 2010: observable biodeterioration of the papyrus, microroganisms on the covers and the textblock of the Encomion; other forms of microbiological change, including yellow spherical form of Aspergillus (bottom right) (All photos A. Thommée)

ous tears, breaks and losses could be seen along the edges and in the case of many of the leaves the inner areas were cracked and missing parts of the material [*Fig. 3*]. Several leaves were fragmented and had numerous vertical cracks. The edges of some leaves were delaminating. The ink was friable and parts of the text were missing. The leather fragments of both bindings were very brittle, stiff and hard.

PARCHMENT CODEX

The parchment was extremely thin, fragile, brittle and stiff. Yellow discoloration (also orange), caused by fungi growth, occurred in many areas on about half of the leaves

Fig. 2. Condition of the papyri: brittle edges of leaves, numerous tears and breaks (especially the Encomium 78,10); changing color, especially at the top edge (especially the Canons)

[*Fig. 4*]. The edges of the leaves had gelatinized and melted fragments of parchment were observed. The leaves were cockled and distorted and the edges demonstrated several cracks and tears. Severe iron gall ink corrosion has caused losses in text areas and burned the parchment [see *Fig. 4*]. Some leaves showed severe surface dirt. Fourteen leaves had been temporarily secured with Neschen tape. The wooden boards were in poor condition, the inside of the boards having rotted.

Fig. 3. Damaged inner areas: cracks and losses (Encomium, top left; Canons, bottom) and fragmented leaves (Encomium, top right)

CONSERVATION WORK IN 2010

In January and February 2010 the manuscripts were disinfected once again with PCMC (4chloro-3metylofenol) following routine procedures. The low pH of the manuscript leaves, about 5.5–6.0, was cause for concern. After the disinfection was finished, the visible white colonies of microorganisms were removed using cotton swabs and ethanol. Prior to disinfection, the folios of the manuscripts were dried between blotters under weight (blotters were changed several times). Measurements of the thickness of the leaves produced an average of about 0.5 mm for a leaf; the top leaf margins were much thinner, only about half the average thickness.

Fragments of the leather covers were cleaned and a conservation leather product Maroquin and Cire, a wax with fungicide, were applied. The fragment of tooled leather was secured in the cracked areas with Japanese tissue, using methyl cellulose mixed with modified wheat starch paste.

A method of sizing papyrus leaves with methyl cellulose, 1% (with a disinfectant), using an aerograph was developed. This method was tried on one of the manuscripts (22 bifolios and the boards of the binding of the Canons, as well as the binding of the Encomium). Loose fragments and cracks were secured with Japanese tissue and

Fig. 4. Condition of the parchment codex: yellow discoloration (also orange) resulting from fungi activity (top left), cockled and distorted leaves (bottom left); severe iron gall ink corrosion causing loss of text areas and burning of the parchment (right)

methyl cellulose (1%). Manuscript leaves were dried between holitex sheets.

Deacidification of papyrus leaves with Bookkeeper was tested. The leaves were placed separately between sheets of Japanese tissue and sheets of acid-free cardboard. The order of the leaves and sections was kept as in the original. The leaves were then placed in a specially made protective boxes made of acid-free cardboard. Silica gel packets (indicators changing color according to the humidity) were put inside to control the humidity.

Samples were collected for microbiological tests and sent to the microbiological laboratory of the Library of Alexandria (see appended microbiological report).

The same procedure of disinfection and removal of microorganism colonies concerned the parchment codex. Cotton swabs and ethanol were used for the purpose. Japanese tissue envelopes containing parchment leaves were numbered appropriately. Neschen tape repairs on 14 leaves were removed and replaced with thin Japanese tissue impregnated with parchment adhesive. The last leaf (no. 50) was removed from the wooden board in two pieces and a large area of the bigger fragment secured with Neschen tape. As the leaf had no writing on the other side, is was lined with Japanese tissue pre-coated with parchment adhesive (the tissue was humidified gently in a Gore-Tex chamber). After lining, the Neschen tapes were removed by gentle application of isopropyl alcohol.

Leaf no. 48, with an ornament in the form of a cross on one side, and with

Fig. 5. Book of Isaiah, parchment leaf no. 48, ornament in the form of a cross — after restoration; all gaps filled in with thin Japanese tissue; left, close-up of part of leaf no. 48 after treatment

writing and a figure of a bird on the other side, was put together from numerous (over 50) little fragments, which were secured provisionally with Neschen tape. Before removing tapes from the side with the cross, the other side was secured with Japanese tissue pre-coated with parchment adhesive. All missing areas were filled in with thin Japanese tissue using 2% fish glue securing all damaged areas and edges on the other side of the cross [***Fig. 5***].

The weakened areas in the wooden boards of the cover were treated several times with a solution of Paraloid B-72 and toluene.

The outlines of all parchment leaves were drawn on tracing paper. All leaves placed in Japanese tissue envelopes were interleaved with thin acid-free cardboard sheets and placed in a box furnished with silica gel packets to indicate levels of humidity. Samples from areas of discoloration were collected for microbiological testing in the laboratory of the Library of Alexandria (for the results, see appended below).

CONCLUSIONS

The assessment made in view of the results of microbiological tests, which demonstrated the activity of live toxic microbiological forms, mainly from the *Aspergillus* family, is that relative humidity levels in the place of their storage were significantly higher than recommended norms for parchment, leather and papyrus. Successive disinfections were not successful owing to the fact that the conditions of storage continued to be inappropriate. Monitoring over four years demonstrated excessive fluctuation of both temperature (15° to 25°C) and relative humidity (between 40% and 80%). In effect, the degradation and biodeterioration of the objects has not ceased.

Recommendations following this season called for disinfection in a vacuum chamber followed by cleaning with ethanol all of the areas affected by the microorganisms. The parchment codex should be disinfected manually by interleaving it with blotters impregnated with PCMC and treating affected areas with isopropanol. Next, appropriate conditions of storage needed to be ensured: clean polyester pockets for all leaves, placed in a special album with mountings for individual leaves (parchment) or between glass sealed with tape (papyrus). International norms of relative humidity and temperature for objects made of leather and parchment should be followed: RH 50%–60% (+/-3% allowed daily fluctuation) and temperature 18°C (+/-1°C allowed daily fluctuation). The norms for papyrus are: 50%–55% relative humidity and 20°C temperature. Consequently, optimal conditions for the three conserved manuscripts can be achieved by maintaining stable temperature between 18°C and 20°C, and 50%–55% relative humidity in both the conservation studio and in the storage area. Conditions in the storage area where the objects are kept, should be monitored every day. Further conservation work should be undertaken only after these conditions have been met.

APPENDIX
MICROBIOLOGICAL REPORT

Prepared by the Bibliotheca Alexandrina Manuscripts Center & Museum Department (Chemistry and environmental monitoring section), released 26 May 2010

Sample:
Scratches from papyrus and parchment books.
Culturing date: 18 May 2010.
Sampling media: Sabouraud dextrose agar SDA, Malt extract agar MEA.
Culturing technique: "pour plate" method.
Incubation: at 28°C for one week.

Results:
Net resulted species: *Aspergillus flavus, Penicillium sp., Aspergillus ustus*.
Comment: Low count is mainly due to the infected objects having been treated before. [...] The recommended levels are from 18–22°C and 40–60% humidity; light intensity should be at 50–150 lux.

Sample number	Culture Results	
	Count	Species
1 (p6)	5 CFU	*Aspergillus flavus, Penicillium sp.*
1(p8)	2 CFU	*Aspergillus flavus, Penicillium sp.*
1(p38)	2 CFU	*Aspergillus flavus, Penicillium sp.*
2	5 CFU	*Aspergillus flavus, Penicillium sp., Aspergillus ustus*
3	0 CFU	Negative
4	1 CFU	*Aspergillus flavus*
5	0 CFU	Negative

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