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مطرانية نقادا وقوص
للأقباط الأرثوذكس
Diocese of Naqada and Qus

ICOM-CC-WOOD, FURNITURE AND LACQUER
ICOM-CC-BOIS, MEUBLES ET LACQUES

DR. HANY HANNA

The International Conference on Heritage of Naqada and Qus region
Monastery of the Archangel Michael, Naqada, Egypt
22-28 January 2007

PREPRINTS Volume I

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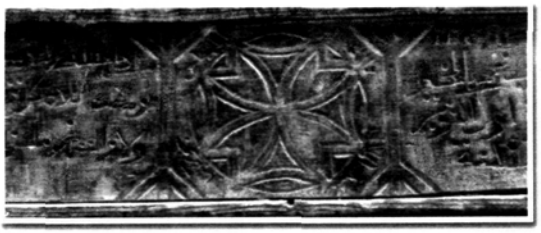

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COVER PHOTOGRAPHS

1. A Companion of a Zoomorphic micro-palette of a lion cub (green greywacke) from Naqada Great Cemetery and a repeated small jar with drooping spout from Naqada 421, the original figures are a present from Dr. Luc Watrin and the GREPAL, while the composed figure was created by Dr. Hany Hanna
2. A folio of a manuscript in the library of the Diocese of Naqada and Qus ornamented with a painted Coptic cross and Coptic and Greek inscriptions.
3. A part of a wooden lintel of a Naqadian house decorated with carved cross, geometric patterns and Arabic inscriptions.

Preface

Naqada is situated on the west bank of the Nile north of Luxor, opposite the entrance to the Wadi Hammamat providing direct access to the Red Sea coast and the gold reserves of the eastern desert. Thus Naqada was a prime centre of Predynastic gold trade in the Theban region. Because of the importance of archaeological finds in Naqada the name itself is now used to indicate the pre-pharaonic periods, called Naqada I, II and III. The large quantity of finds from Naqada has enabled the dating of the entire culture, throughout Egypt and environs. Naqada maintained its importance throughout the pharaonic period and into the late antiquity period, during which it became inhabited by famous anchorites such as Bishop Elias of Mount Bishwaw and Bishop Samuel of Mount Banhadab. Naqada is very famous for its archaeological sites, ancient monasteries churches, the special style of the houses as well as its textile industry, in addition to thousands of objects and manuscripts preserved in several museums around the world.

On the other side of the Nile from Naqada is Qus. It too was important as an entrance to the Wadi Hammamat. During medieval times Qus became the primary commercial centre of trade with Africa and Asia, and hence was a town of prime importance in Egypt during this period. Today, Qus is very famous with its mosques and mausoleums, it is also the site of a major US/German commercial project to convert the waste products of sugar cane refining into paper products.

We are grateful to Dr. Hany Hanna and the International Council of Museum - Conservation Committee - Wood, Furniture and Lacquer (ICOM -CC-Wood, Furniture and Lacquer) for organizing The International Conference on Heritage of the Naqada and Qus regions in our country, Egypt, and for taking the initiative to support the efforts given for the development in Naqada and Qus region.

B. Bieman
Naqada & Qus

His Grace Bishop Beman of Naqada
Bishop of Diocese of Naqada and Qus
Naqada, Egypt.

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Abstract

The royal wooden funerary vessel known as Cheops's Solar Boat was discovered in May 1954, buried under desert sand in a limestone pit dug into the Giza Plateau beside the Great Pyramid. It dates back to the Fourth Dynasty (2613-2498 BC), during the reign of Pharaoh Cheops (Khufu) and is one of the most important wooden objects in the world.
Upon discovery, the boat was a puzzle of separate pieces. After a lengthy restoration project, the boat was reconstructed and preserved in a special elongated museum building that was opened to the public in March 1982. Over the years, many problems have arisen due to such basic factors as the museum's design, the hall's atmospheric conditions, the visiting procedures, etc. causing the wood and other contents of the boat to decay a great deal.
In 2004, the author was given the responsibility of preparing a condition and conservation report on the Boat.
In this paper, the issue of the Cheops wooden boat, its museum and its condition is described in brief.

Keywords

Pharaoh Cheops (Khufu), Wooden boat, Museum, Damage, Conservation

Cheops Wooden Boat and its Museum; Condition Case Study

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The Boat

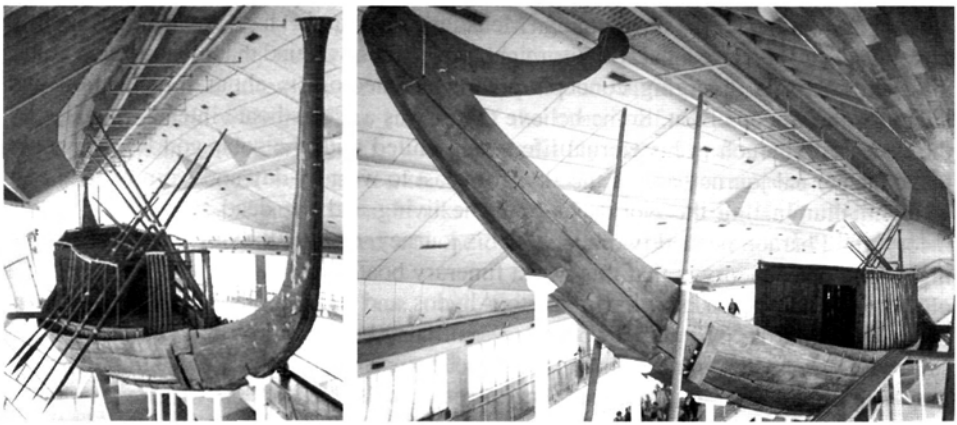
Introduction

The royal wooden funerary vessel known as Cheops's Solar Boat was discovered in May 1954, buried under desert sand in a limestone pit dug into the Giza Plateau beside the Great Pyramid. It dates back to the Fourth Dynasty (2613-2498 BC), during the reign of Pharaoh Cheops (Khufu) and is one of the most important wooden objects in the world (Atiya 2002).

The boat is 43.5 m long, 5.9 m wide, and has a hull that is 1.78 deep with an overall height, including the superstructure, of between 5 and 9 meters. It is composed of 1224 pieces of wood, the longest of which is 23 m while the shortest is just 10 cm long.

It consists of different species of wood: including a species of Cedar wood (either cedar of Lebanon or an allied species of Cedrus spp), a species of juniper wood (Juniperus sp.), a species of Acacia (whose identity is highly uncertain), thorn tree wood (*Balanites aegyptiaca*) and a species of Ostrya, presumably the hop hornbeam (*Ostrya varpinifolia*) (Iskander 1960).

Upon discovery, the boat was a puzzle of separate pieces. After a lengthy restoration project, the boat was reconstructed and preserved in a special elongated museum building that was opened to the public in March 1982 (Atiya 2002).



Figures 1, 2. The Cheops Boat [1]

Boat dimensions

The Cheops Boat (Figures 1, 2) is one of the largest ancient boats found to date. For comparison, the longest of the Viking boats found in Europe are no more than 30 meters, while the Cheops Boat - after rebuilding - turns out to be 43.40 meters long. It is about 5.90 m wide and 1.75 m deep. The prow, formed in the shape of a papyrus-bundle, is about 6 m tall, and the stern rises to 7 m, where the rudder consists of two massive oars.

A main cabin, consisting of two rooms, sits on the boat's deck: the smaller of the rooms (which is about 2 m long) is in the front, separated from the larger room (which is about 7 m) by a door. The cabin has two ceilings, the innermost one being supported by three palm columns, while the cabin as a whole is surrounded by 36 columns shaped like tent-pegs.

In the fore part of the boat lies the captain's cabin. It seems certain that both the main cabin and the captain's cabin were covered with the many reed mats found with the wooden parts of the vessel. The length of the ten huge oars, which were arranged five to each side, varies from 6.5m to 8.5m. No metal nails were used in building the vessel (Nour 1960). Instead its parts were bound together solely with ropes and cordage in a feat of intricate craftmanship.

Concepts about the function and nature of the Boat

Through a study of the solar religion and funeral rituals known to have been practiced in ancient Egypt, it is possible to explain the religous reasons for burying such boats beside the pyramids: it is believed that five boats were placed around each pyramid, including that of Cheops. In the 1920s, the American archaeologist George Reisner discovered three boat-shaped pits cut into the rock on the eastern side of the Great Pyramid: in one of them were minute remains of desiccated wood, which still showed signs of having been gilt. The later discovery of two more pits containing the remnants of boats brought the total number of boats that had surrounded the Cheops pyramid up

to five. The same number of pits was also found on the east side of Kephren's pyramid, and, although the area surrounding Menkaure's pyramid has not yet been fully investigated, it is believed that five pits might also be found around that monument as well.

There are two diverging concepts among archaeologists about the function and nature of the Cheops Boat. Some believe that it was a "solar boat" intended for use by the deceased pharaoh in his eternal life when, united with the solar god Re, he would make his eternal journey across the sky from east to west by day and from west to east at night, illuminating the worlds of both the living and the dead. According to this theory, the Pharaoh needed two boats for his journey, one for the day, the other for the night. The other theory is that this was a funerary boat, actually used to carry the body of the late pharaoh on his pilgrimage to Abydos and the Cenotaph of the god Osiris before burial in the pyramid. Two boats would also be needed on this journey: one to sail south, to Abydos, and another to return to the north for burial at Gizeh. In this case the boats would differ, one needing oars, the other sails (EAO 1984).

Scenes from the walls of Old kingdom tombs at both Gizeh and Saqqara indicate that such pilgrimages were in fact carried out by the pharaohs, nobles and high officials, either in life or after death, to places made holy by historical memories. There is some evidence that the Cheops Boat was actually used in water: marks made by abrasion between the ropes, which shrink when wet, and the wood of the vessel, which expands in water are still clearly visible in many places (Atiya 2002).

The discovery of the Boat

The discovery of the Cheops Boat stands as one of the most important archaeological finds in Egypt and in the world since the discovery of the tomb of Tutankhamun. Its inherent importance lies in the fact that this is the oldest major vessel found in perfect condition anywhere in the world. It is also in an astonishing state of preservation after more than 45 centuries buried under the desert sands of the Giza Plateau.

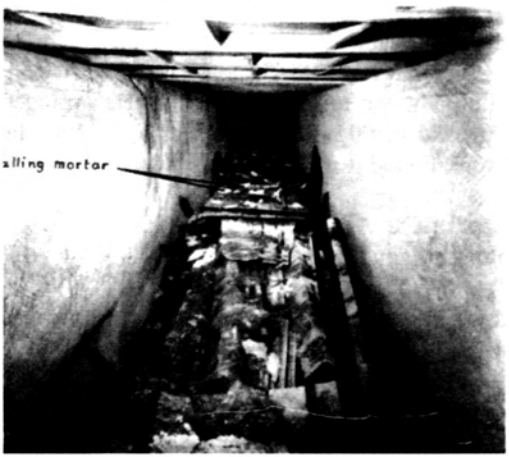


Figure 3. The wooden pieces of the Boat in the rectangular pit (Iskander 1960).

On May 26, 1954 the architect and archaeologist Kamal al-Mallakh, who was the Antiquities Director of the Pyramids Area at the time, discovered two rectangular pits cut into the rock close to the base of the south side of the Great Pyramid of Cheops. Each is about 30 m long and is aligned east-west along the pyramid's face. Each was covered with 41 large blocks of fine Turah limestone weighing about 18 tonnes which measured 4.5 m long, 1.80 m high and 85 cm thick: they rested on a 1 meter-wide lip around the pit which is itself 3.5 m deep (Figure 3) (Nour 1960).

A layer of thick mortar covered the stone blocks and filled the gaps between them, helping also to protect the contents of the pit

against the elements, dampness and insects - which might otherwise have attacked the wooden vessel (Osman 1960). The ancient architect of the pyramid had built a solid wall over the two pits, believed to have been part of the enclosure wall of the Great Pyramid, with the intention of hiding the position of the pits from view. Their preservation - and with them the survival of the boat itself - is due almost entirely to the concealment provided by this wall. Immediately after the discovery, a group of archaeologists and restorers started to study the eastern pit after removing part of the covering wall and the huge stone blocks, which closed the pit itself. On January 28, 1955, the last block was removed and the contents were revealed for the first time in 4500 years.

The dismantled parts of the boat, made from mostly of Lebanese cedar wood, had been placed in systematic order, with the major parts laid out in 13 layers, consisting of 651 definable groups comprising a total of 1224 pieces: the largest being 23 m long and the smallest a mere 10 cm. All the very small pieces - about 5 per cent of the total - are of local wood. The remains of ropes made of Halfa-grass were also discovered. These were used to connect the various parts and in the matting which originally covered the cabins.

It was immediately noticed that hieratic signs had been carved on each end of most of the larger wooden blocks, and much archaeological research proved that these signs were used not only in boat-building, but also in all building work in Egypt at the time (Nour 1960).

All the blocks were connected to each other in accordance with these signs, indicating that the ancient Egyptians or the Old Kingdom believed that the instructions were necessary on the buried boat so that it could be reconstructed in the after-life. To make sure that reconstruction could take place, the various parts of the boat had also been carefully dismantled and laid out to prevent the collapse which would have taken place had it been buried complete (Osman 1960).

Restoration and reconstruction work

The wooden pieces were lifted from the pit and housed in a temporary shelter on the western side of the Great Pyramid that was specially built for use during the chemical treatment and restoration (Figure 4).

The wooden pieces were cleaned with an electric brush both by suction and blowing air, and consolidated with solutions of poly vinyl acetate and Bedacryl 122 X (ICI). These solutions were applied with a spray gun, by brush, or by the immersion of smaller pieces. The concentration of the solutions used and the number of coats applied depended

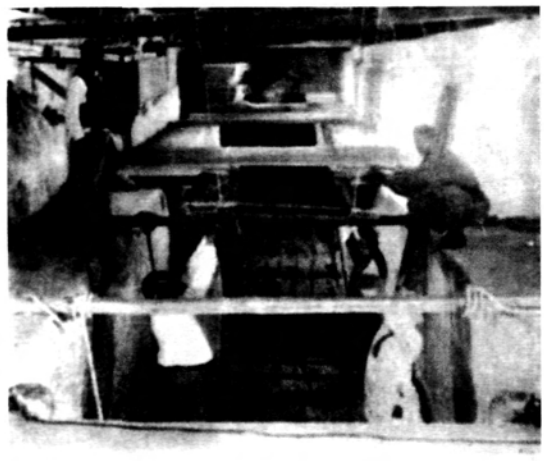


Figure 4. During lifting works (Yousef 1960).

on the state of preservation of the piece.

This treatment protects the wood from any damage, which might be caused by exposure to atmospheric or humidity changes after the boat's long protection in its hermetically-sealed pit.

This difficult task was carried out by the late Dr. Zaki Iskander, Director of the Chemical Laboratory of the Department of Antiquities at that time. Every piece was photographed and described fully, each according to its original position and layer, and recorded on a massive sheet divided into squares relating to the major sections of the boat, so that each individual item was registered in full.

Low viscosity Markon Resin 9 (Scott Baderand Co. Ltd, London) dissolved in acetone was used for the conservation of very disintegrated pieces. Markon resin mixed with wood saw dust was used as a filler material and was also used to stick some of the broken pieces together. Para-dichlorobenzene and DDT were used as safeguard against insect attacks (Iskander 1960).

The very detailed and demanding task of restoring and reconstructing the boat was carried out by Mr Ahmed Youssef Mostafa, after he had made extensive studies of the vessels of Ancient Egypt (Yousef 1960).

The museum

The concept around the boat museum

After the discovery of the boat, it was necessary to build a museum over the pit in which it had been found. It was designed to complement the vessel in both size and shape, and to take advantage of all the latest advances in modern display methods, so the visitor could view it from all sides (Atiya 2002).

This placing of the museum brought a good deal of controversy, and all of it on the same topic - how was it possible to build a modern construction in the shadow of the Great Pyramid itself, without its looking totally out of place?

The problem was solved by the architect's combination of an outer shell of steel-reinforced concrete with a facade of transparent glass, which complemented its stern surroundings while helping to conceal its vast size and unusual shape. The use of glass also served the purpose of allowing the visitor to keep a visual link with the nearby pyramid, thus removing any sense of isolation from the archaeological site Figure 5.

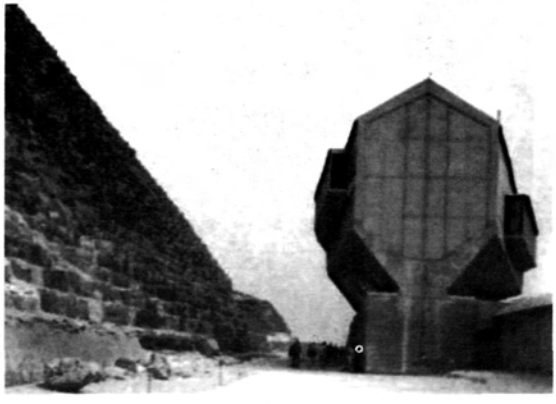


Figure 5. the museum of the Cheops Boat (Atiya 2002).

The glass is double-glazed and stylistically massive - each pane is 8 cm thick, and the air space is a further 8 cm, giving a total thickness of 24 cm to

insulate the interior from both the heat and noise outside. The museum is also air-conditioned with the temperature and humidity being controlled to maintain the unique vessel in perfect condition (EAO 1984).

The main design of the museum

To suit the nature of the artifact it contains, the museum is designed in the shape of a huge boat itself. The Cheops Boat is located at the space's center, both horizontally and vertically, directly above the pit in which the vessel was found. This is one of the main elements of the display offering the visitor a comprehensive impression of how the boat was preserved throughout the centuries. Also in the designer's mind was the fact that the museum should be capable of being extended to incorporate a second boat, if one were eventually discovered.

The boat is surrounded by terraces on different levels, to enable the visitor to examine all its various details from below, above and on all sides, including from directly underneath. The terraces are placed in such a manner that an overall view of all aspects of the boat might be gained from a single continuous walk around the exhibit.

The lower parts of the museum's exterior walls are covered with mud-brick, as an added insulation against the sun's heat, and the lower walls are faced on the interior with concrete slabs to increase the efficacy of the air conditioning and as a fire precaution. The museum also has a comprehensive fire-extinguishing system. In addition, all the electrical circuits laid when the museum was built were recently isolated from the mains supply as an additional safety factor.

The building contains an entrance hall in which the visitor is prepared for the transition from the heat of the Giza plateau to the cool air and humidity-control of the museum proper. Its outer door is made of iron and glass, and the door leading to the museum itself is security glass, providing protection for the controlled atmosphere inside.

From the vestibule, the visitor transfers into a second hall, of approximately 64 sq m, in which those entering and leaving the museum overlap.

At the eastern end of the ground floor, on the southern side of the museum, is the pit from which the boat came; on the northern side are five square halls, each 40 sq m large. Each of these spaces adjoining the space with the pit along the south has only three walls, which are used to display photographs explaining the boat's discovery and the boat's appearance when its elements were extracted from the pit. The spaces are also used to display ropes and matting found with the timber.

The displays at the museum

It is generally accepted that museums should have their objects displayed on the walls, with natural lighting from above for the best results. But this museum has a special and even unique nature, as the only museum in the world built to display a single object - an ancient boat 43.4 m in length and 7m high - with the result that, in both appearance and construction, it differs from all other museums, thus breaking all the accepted design rules (Atiya 2002).

The boat is displayed in the centre of the museum's internal space, set on a tall base some 7.70 m above the ground floor. The visitor reaching the ground-floor display area sees towering above him the lower part of the vessel, and can therefore grasp its overall shape and size. The visitor then walks up wooden steps to the topmost terrace, which

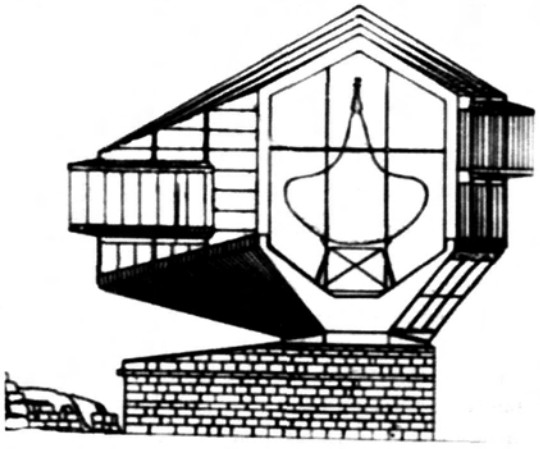


Figure 6. Vertical Section for the museum showing the visitors galleries (EAO 1984).

extends the full length of the boat at a height of 11.61 m above the ground, offering a view of the deck, the main royal cabin and the hull's interior. The visitor then proceeds to the middle (or southern) terrace, which, at 8.90 m above the ground, proceeds the best view of the whole vessel. The visitor's circular tour is completed with this terrace and the northern stairway leading back to the anteroom on the ground floor (Figure 6).

Lighting the museum

Extensive experience in designing museums has proven that precautions have to be taken with the use of artificial light; as such lighting will inevitably have some effect on museum objects. Since the wood of the boat is very ancient, it was decided to depend completely on natural lighting: all artificial lighting has been removed, and all electrical circuits throughout the display rooms cut off as an additional safeguard. The boat is thus illuminated completely naturally, from the long windows on the museum's northern and southern sides.

It is necessary to recall that the construction work was started in 1961, delayed several times, and then stopped completely while technical and engineering problems were overcome. Amongst others, these problems included how to regulate heat, which was making the air conditioning inefficient, and how to keep the occasional rain from seeping through the roof. Construction eventually started again in an intensive manner in November 1981. The air conditioning system was renovated and repaired so successfully that instead of working at 50 per cent efficiency, as it had before, it now worked at full efficiency.

During this final phase of the museum's completion, the boat itself was fully restored chemically. The museum was officially opened to the public on March 6, 1982 (EAO 1984).

Signs of decay due to the design of the museum and its daily use

Over the years, many problems occurred as result of such basic factors as museum design, the interior atmospheric conditions, the visiting procedures, etc. which resulted in a great deal of decay to the wood and other contents of the boat.

Unfortunately, the museum building has a peculiar design that does not provide the necessary environment for preserving the wood; most of the outer walls are made of several sheets of glass that allow a variety of the sun's rays such as UV, visible and IR

Figure 7. The damage to the wood inside Cheops boat.

Figure 8. Detail showing the damage to the wood.

Figure 9. Detail showing the damage to the wood on a side part of Cheops boat

radiation to enter without any prevention or filtration.

The space between the sheets does not prevent rainwater, pollution, rodents and insects from entering the boat.

The air control system at the museum is antiquated and depends on a freezing system using Freon gas. The air-conditioned environment it supplies is not suitably controlled for the preservation and protection of wood.

The interior includes galleries on varying levels, which are built close to the object so as to enable visitors to study the boat from all angles. The longitudinal shape of the building - which is similar to that of the boat - keeps the admiring tourists in semi-physical contact with the boat. Emissions and detritus from visitors following the pre-laid out route are absorbed into the surrounding atmosphere.When one takes into account the fact that the boat attracts hundreds of visitors daily, the outcome of such a visitation circuit has a very detrimental impact on the object.

The museum's environment and the visitation procedures cause some direct and indirect damage to the wood of the boat. Quite apart from the direct damage that may result from the environmental conditions and procedures for visitation, they may also damage the boat indirectly by influencing the level of humidity, temperature, light and pollution, raising the degree of their variation and increasing their negative effects.

Figure 10. Detail showing the breshness of the wood on a side part of Cheops boat

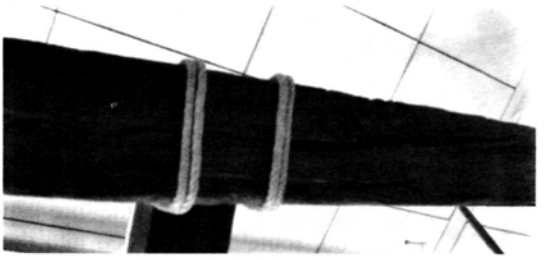


Figure 11. The damage to the wood on a wooden panel.

Figure 12. Detail showing the damage to the wood and ex-restoration material on an oar.

The damage to the wooden boat includes a wide range of damage resulting from the combined effect of the above-mentioned factors on the vessel and its surroundings, including:

1. Increasing Weakness, Flaking, Corrosion, dryness and brittleness in some areas of wood and widening Separations between the wooden parts.
2. Breakage, Cracks, Cracking knots and shearing and warping disfigurements such as bowing, crooking and twisting, the main cause of which is changes in relative humidity and temperature.
3. Cavities, gaps and holes in various places due to such factors as insect infestation.
4. The wood has turned colour, because of factors such as fungal infection and photo-sensitized degradation due to UV-radiation and visible light.
5. Signs of fungal infection in the wood are clear in several places.
6. Extensive alteration has taken place due to defective former restorations and the metamorphosis of consolidation, coating and restoration materials. There are also several oil paint spots resulting during the painting of the interior of the museum building.

Some details of the damage to the wood on different parts of the Cheops boat are shown in Figures 7-12.

Investigation work

The following investigations were carried out, involving sampling, analysis and experimental examinations:

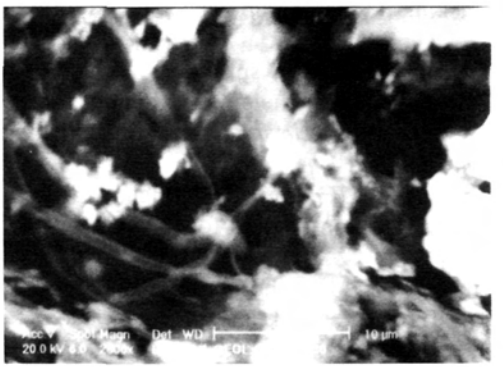


Figure 13. SEM photo, showing hypha and fungal spores (2000x).

Light microscopy (LM) and Scanning Electronic Microscopy (SEM) testing

Light microscopy (LM) testing was used to distinguish the differences between various species of wood and various degrees of decay.
Scanning Electronic Microscopy (SEM) testing was used to show the damage in wood. It showed significant damage in the vessel's walls and in the xylem parenchyma and equally significant damage by boring-insects to the tissue of the wood, as well as the presence of hypha and fungal spores (Figure 13).

Figure 14. Aspergillius niger (1000x)

Figure 15. Pencillium verrucosum (400x)

Growth media and fungi investigations

Growth media (using Dox's agar and Nutrient agar) was used to test the wood samples. Many species of microorganism were obtained from the infected wood specimens. Those species are:
1. Three major fungi were obtained from infected wood specimens from different locations in Cheops boat, especially in the interior of the boat and from the oars. These include *Aspergillus Niger* (Figure 14) from some oars, *Pencillium verrucosum* (Figure 15) and *Rhizopus stolenfir* (Figure 16) from the top of some vaults, the floor and the bottom of some roof beams. This infestations

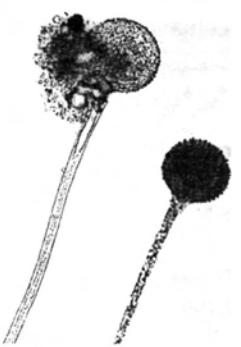


Figure 16.Rhizopus stolenfir (400x)

Figure 17: SEM photos for Actinomymycetes sp. (4000x)

Figure 18: SEM photos for G +ve cocci (16000x)

made the wood very brittle, while also cracking it, opening up gaps and and turning it brown.

2. Some other species of fungi obtained from infected wood specimens are common growth fungi in the growth media. These fungi include *Aspergillius flavus*, *Aspergillius sydowi*, *Aspergillius sulpharous*, *Alterneria alternata*, *Stemphylium macrosporidium*, and *Stemphylium verruculosum*.
3. Both Actinomymycetes sp (Figure 17) and bacteria (G +ve cocci) (Figure 18) were obtained from material used in the previous restoration process for the boat's wood, especially from the ores.
4. The most infected wood species (by fungi) were Hop hornbeam wood (*Ostrya varpinifolia*), Juniper wood (Juniperus sp.) and Thorn tree wood (*Balanites aegyptiaca*).

The fungi mentioned above vary in their ability to excrete Cellulase enzyme for decomposing cellulose as shown in table 1.

Table. 1. The fungi species obtained from the infected wood.

Microorganisms	The ability to excrete Cellulase enzyme for the decomposing of cellulose	The ability to excrete Amylase enzyme for decomposing starch
Aspergillius niger	+++	++
Pencillium verrucosum	+++	++
Rhizopus stolenfir	+++	+
Aspergillius flavus	+++	+++
Aspergillius sydowi	++	+
Aspergillius sulpharous	++	+
Alterneria alternata	++	++
Stemphylium macrosporidium	++	++
Stemphylium verruculosum	++	++

Measurements of visible light and ultraviolet (UV) radiation

Visible light and ultraviolet radiation was also recorded using an ELSEC Environmental Monitor & Data Logger Type 764
The average of light was up to 3509.76 Lux
The average of ultraviolet light was up to 1260.8 mW/M2 and in Microwatts per lumen was 323 µW/Lm.
It is evident that these levels of radiation are detrimental to the structure of the boat.

The temperature (T) and relative humidity (RH) measurements

Degrees of temperature (T) and relative humidity (RH) were recorded in the museum during 2004 in the day time (D) and night time (N) using an ELSEC Environmental Monitor & Data Logger Type 764. The averages of the recordings are shown in Table 2 and figures 19 & 20.

The records indicate that the average changes in temperature are between 2-14.5 degrees, and that the average change in relative humidity is between 2 - 30.5 degrees. Such average changes are very detrimental to the wood.

Table 2. The averages of the temperature (T) in degrees Celsius and the relative humidity (RH) during year 2004 in daytime (D) and nighttime (N).

Months	Temperature (T) ° C		Relative Humidity (RH) %		Months	Temperature (T) ° C		Relative Humidity (RH) %	
	D	N	D	N		D	N	D	N
January	24	23	48	43	July	37.5	23	59	28.5
February	26	24	53	54	August	36	25	48	44
March	29	23	50	50	September	37	24	49	41
April	27	25	46	56	October	30	26	57	38
May	32	24	49	38	November	29	24	55	34
June	34	24	59	39	December	27	13	52	33

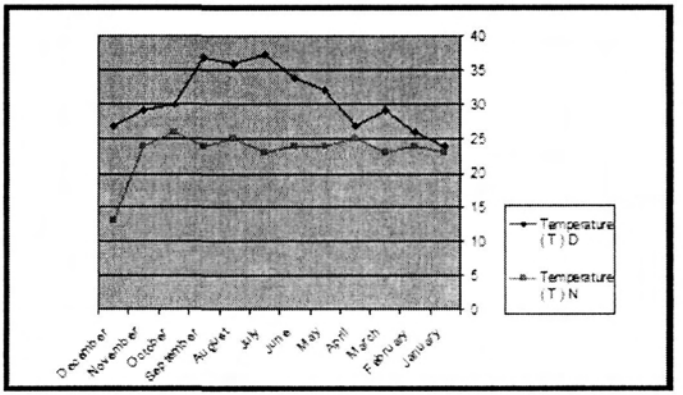


Figure 19. Temperature averages during 2004 in the daytime (D) and nighttime (N).

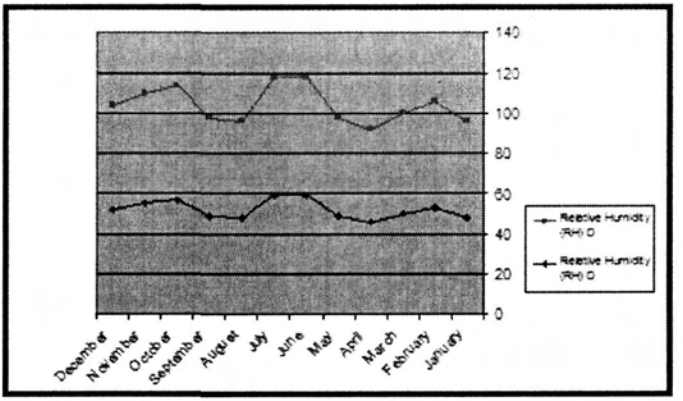


Figure 20: The average of RH during 2004 in the daytime (D) and nighttime (N).

Conclusion

It has become very clear over the years since the boat was discovered that many very basic problems must be faced, including reconsidering the museum's design, adapting the interior's environmental conditions, changing the visiting procedures, etc. because these aspects of the status quo have caused significant levels of decay to the wood and

the other contents of the boat.

It is important to re-examine the concepts of the restoration work applied to the boat as well as the design of the boat museum in light of the knowledge and experience acquired in restoration, conservation and museum design since the discovery about 50 years ago. The museum building has a peculiar design that does not provide the proper environment for preserving the wood; most of the outer walls are composed of several sheets of glass, which allow the sun's rays to enter without any prevention or filtration for most of the spectrum, across the full range of UV, visible and IR radiation.

The space between the glass panes also does not prevent rainwater, pollution, rodents and insects from entering the boat.

The air control system of the museum is so antiquated that it depends on a freezing system using Freon gas to function and does not supply a suitably controlled air-conditioned environment to preserve and protect the wood.

The interior includes galleries on varying levels, which are built close to the object so as to enable visitors to study the boat from all angles. The longitudinal shape of the building – which is similar to that of the boat - keeps the admiring tourists in semi-physical contact with the boat. The emissions and detritus of visitors following the pre-laid out route are absorbed into the surrounding atmosphere. The results of such visitor procedures are detrimental to the object, particularly when one takes into account that hundreds of visitors visit the boat daily.

The museum's environment and the visiting procedures therefore cause both direct and indirect damage to the wood of the boat.

In addition to the direct damage that may result from the above-mentioned environmental effects and visiting procedures, indirect damage is taking place as a result of the degree of variation they cause in humidity, temperature, light and pollution levels, which in turn increases the risks of detrimental impact to the structure of the boat.

Worse still, the combination of the above-mentioned factors exacerbates the damage. Such damage includes increasing Structural weakness, Flaking, Corrosion, Dryness and Brittleness, Breakage, Cracks, disfiguring Warping, Widening Gaps, the appearance of Holes, the Turning of wood colours to new colours, Fungal infection and extensive alteration due to the metamorphosis of the consolidation, coating and restoration materials used during defective former restorations.

The author took the twin initiatives of digitally documenting most of the present damage, previous restoration work, condition reports, and related archives, and of collecting and archiving such records in one group file. This group file was included in the condition and conservation report on the Boat that he delivered to the SCA in fulfillment of his mandate.

It is important to set up a highly scientific committee to study the plan suggested in the author's condition report. Such a committee should determine what further investigations may be required, complete those studies, and then modify (if necessary) and complete the conservation suggestions and supervise the restoration and conservation process until it has reached a satisfactory conclusion that ensures the durable preservation of the boat.

Notes

1. Source of Figure 1. is: http://www.bluffton.edu/~sullivanm/egypt/giza/boat/whole3.jpg
   Source of Figure 2. is: http://www.bluffton.edu/~sullivanm/egypt/giza/boat/whole.jpg

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The International Conference on Heritage of Naqada and Qus region took place in January 2007 in Egypt. This Conference is special in several ways. It is a three days of lectures, followed first by a field visit and then by a significance post conference tour to several places including the great ancient monasteries, churches, *museums and archaeological sites in Naqada and Upper Egypt.*

The competition for the Conference has been exceptional and there is an impressive group of international authors and participants; several abstracts were submitted, we have selected some of them to call as papers. The final number of authors is (37) with (30) papers, the authors came from (26) Organizations from (9) Countries, from (4) Continents. It is a truly International Event.

عُقِـدَ المؤتمر الدولي لتراث إقليم نقادا وقوص فى مصر فى يناير ٢٠٠٧.
إن هذا المؤتمر مُتميز من عِدَّة جوانب، فقد استغرق ثلاثة أيام، قُدِّم فيها عدداً من الأبحاث العلمية، اتُبِعَت بزيارة ميدانية، ورحلة للعديد من المواقع الأثرية الهامة، ومنها الأديرة الأثرية والمتاحف والمواقع الأثرية فى نقادا وصعيد مصر.

ولقد كان التنافس لنشر الأبحاث العلمية من خلال المؤتمر استثنائياً، شارك فيه عدد من الباحثين من الخُبراء والدارسين الدوليين، حيث قُدِّمت عشرات المُلخصات والتي تمَّ تحكيمها، واختيار بعضها ودعوة الباحثين إلى إعداد الأبحاث الكاملة... كان العدد النهائي من الباحثين المُتضمّنة أبحاثهم فى هذا الكتاب (٣٧) باحث، اشتركوا فى عمل (٣٠) بحث، وينتمي الباحثون إلى (٢٦) مؤسسة من (٩) دول من (٤) قارات من قارات العالم؛ إنه حقاً كتاباً دولياً لمؤتمر دولي.

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