The conservation and restoration of the mosaic floor of the Bizantine Church (Western) in the Nabatean town of Mamshit in the Negev desert.

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Abstract
During 1994 the C.C.A., Centro di Conservazione Archeologica - Rome, carried out the in situ conservation of the mosaic floors of the Bizantine Church (Western Church) in the nabatean town of Mamshit in the Negev Desert. This was a polichrome mosaic of about 80 square meters with geometrical, figurative decorations plus three inscriptions.
The two months intervention on site was carried out by a team of 8 conservators and was implemented by using lime based techniques of in situ consolidation. A detailed documentation was carried out to record the consistency of the mosaic, the state of conservation, the treatments carried out.
When the intervention was almost completed the entire church was vandalized one nigth. The mosaic was heavily damaged and almost all figures and inscriptions destroyed. Local authorities immediately decided to answer with a strong political message and decided for a complete reconstruction of the mosaic. This was possible thanks to the accurate documentation carried out during the conservation intervention.
The remaining mosaic was partially lifted, shipped to Rome, restored (or better re-made) and, after two years work, it was brougth back and relayed on site.
This paper describes all those phases and concludes presenting the actual programme for future protection and maintenance on the monument.

On the list of the many possible damaging factors of the artistic and monumental heritage of a country, and probably, one of the most frequent, is the human factor. Incidents of damage voluntary or involuntary by man, increase as is greater the lack of management planning of the heritage and the lack of surveillance, protection and conservation over a long period of time accompanied by the development of an active opera of valorisation.
Among the main potential risks owing to man are the voluntary aggressions, known as vandalism, one of the most devastating and least predictable forms of damage, as it is impossible to attribute this phenomenon to a limited motive.
This article describe the reconstruction of the polychrome floor mosaic of the Mamshit Nile Church, Nabatean city in the Negev Desert, in the south of Israel, destroyed by an act of vandalism in October 1994. The mosaic was at that time being restored on site by C.C.A., Centro di Conservazione Archeologica of Rome.

The mosaic in 1994
The Nile Church is one of the two churchs found in the Nabatean city of Mamshit, originally a resting place for those who, following the silk trade route, crossed the desert to Petra. The church, belonging to the Byzantine period, conserves a polychrome floor mosaic rich in symbolis representations and incriptions related to the christian cult.
The church was destroyed, as were the most of the buildings of the city, after the Arab conquest, in VII century AC, but the mosaic, uncovered during the excavation headed by the Hebrew University of Jerusalem in 1956, was almost perfectly preserved, thanks to the dry climate, typical of the desert and the absence of vegetation.
In 1994, when the Centro di Conservazione Archeologica was appointed by the National Parks Authority to carryout the on site intervention of conservation, the mosaic was showing signs of deterioration owing principally to the natural ageing of the building materials and to the open air.
The preparative mortar of the background layers and of the bedding layer of the tesserae were in part disintegrating, particulary in apsidal area, causing the separation of the *tessellato* and the formation of empty areas under the tesserae. The alterations that were present were all included in the phenomenon common to all mosaics exposed to open air for a long period of time without protection and maintenance. Others were the depressions of the *tessellato* , superficial deposits, dechoesion of the tesserae and fillings done with cement.

The operations foreseen in the intervention were the full documentation of the mosaic and the creation of on site conservation conditions for the future using traditional methodology and lime based materials. The intervention

foresaw the consolidation of deep detachments by local injecting hydraulic mortar, the consolidation of bedding layer between the tesserae, surface cleaning operations, removal of cement, stuccoing of lacunae with lime based mortar and small reintegrations with original tesserae, planning a periodical maintenance.

From 8th October 1994 eight conservators from C.C.A. were working on this intervention having planned the completion for two months later. On the 19th October everything had been completely recorded, the consolidation of the detachments were finished and cleaning operations were well on their way.
On 20th October the mosaic was a mass of rubble and tesserae; the columns of the lateral naves and the marble elements of the apse were destroyed and thrown to the ground in pieces.
During the night the destruction of the entire church had been performed by vandals using pickaxes.
54% of the mosaic surface of the apse and 30% of that of nave was no more. Of a total surface of 85 square meter about 30 sqm of mosaic had completely disappeared.
The vandals were particularly ferocious towards the most significant parts of the church, the apse, and of the mosaic, the three inscriptions, the symbolic representations of the Christian religion (peacocks, pomegranates etc.).
In a matter of hours the historical memory of the site had lost one of its most precious documents.

Possible answers

The question was at this point how to repair this deep wound, in particular for those who work everyday to conserve and transmit the cultural heritage to future generations.
Two work hypothesis were formulated during the days following the devastation. The first was the gathering of all the tesserae and fragments, their storage, the complete documentation of the damages, reburial of the apse and the conservation treatment of surviving pieces of the nave mosaic.
The second hypothesis was to transfirm all the tesserae and fragments to our laboratory in Italy and reconstruct the damaged mosaic wich would be reapplied in situ at a later date.
This second hypothesis, after discussion, was approved by the Antiquities Authority, by the National Parks Direction and by the conservator to give a political answer to the event.

The gathering of the fragments and the documentation.

To be able to catalogue the tesserae and to assign each one to its original position in the mosaic, the gathering of the fragments followed a similar system used in archaelogical excavations. The whole surface was subdivided into a grid made up of 1 square meter, numbered, photographed and graphically documented.
A further subdivision was carried out inside every single grid square that had more than one lacuna, so as to facilitate, in the reconstruction phase, the attribution of the tesserae. The gathered tesserae were placed in plastic bags and labelled with the corrisponding number; the fragments were placed in sponge blocks, the type used for dried flower arrangements, and sealed with transparent film.
At the end of these operations, the graphic and photographic documentation of the after vandalism mosaic was done for the successive task of recontruction.
A 1:1 relief was taken on sheets of poliethilen of all the lacunae, tracing the edges and 20-30 cm of the surround. The repeated geometric designs were also noted. The extension of the lacunae was documented by the use of a map.

The detachment of the edges from the lacunae, a temporary treatment and reburial

The next step was the detachment of the edges of the lacunae for the reconstruction. The mosaic was fixed by cotton gauze (calicò) applied with PVA diluted in 50% water.
The lacunae were cleaned from the remains of the preparative layers that had been destroyed, filled with sand and stuccoed with a temporary mortar (slaked lime, stone powder, 1:3).
It was instead necessary to proceed with the complete detachment of the surviving mosaic of the apse, that had been reduced to island of fragments completely detached from the preparative layers.
To protect the nave mosaic awating the next phase of the intervantion a layer of geotextile covered by sand and vulcanic powder was applied. All the collected material, packed in wooden crates was left in the site storehouse waiting to be sent to Italy.

The reconstruction

After an unplanned permanence of 4 years in the site storehouse and never-ending bureaucratic sluggishness, the boxes containing the mosaic were finally sent to Italy. It was not surprising that after such long time spent in the

crates the textile and the glue used to hold together the tesserae had deteriorated and was covered in mould. The mosaic was in an even more delicate condition having lost its support. Before proceeding towards the identification of the single fragments it was necessary to fix the tesserae to give the pieces the missing support. The fragments, taken from the position they were found, were placed face down on a board and blocked along the edges with clay. The back of the tesserae was cleaned of the mortar residue and fixed with clay, to create a solid support.
Only then, having become easier to handle, was it possible to turn the fragments face up and identify the origin through the still readable numbers and the superimposition of the reliefs.
Having placed the borders of the lacunae in their exact position, a clay base was created inside a wooden frame to begin the reconstruction of the missing parts.
All the remains of the gauze on the surface was removed using water vapour and scalpels.
By using the reliefs, and the photographs taken before the vandalism, the drawing and the inscriptions to be reconstructed were defined. The outline were tranferred to the clay by incision.
For the reconstruction the original tesserae from the corrisponding area were used, following the grid. For the missing tesserae were used new tesserae of the same stone bought in Israel.
In all 18 square meter of the nave mosaic, relative to 16 lacunae of various size and the whole apse, 15 square meter, were reconstructed.
The intervention was carried out in one year by three mosaicist, Antonio, Roberto and Massimo Cassio.
At the end of the restoration the mosaic was prepared and sectioned for sending back to Israel and replacing in situ.
The temporary support of the mosaic was done using cotton gauze (calicò) applied with flour glue with 5% vinyl.
The mosaic was divided into pieces maximum 40x60 cm, following the lines of the designs, not separeted into squares or rectangles. This method permitting the pieces to be moved more easily, helps avoid dilation owing to the excessive weight and aids the rejoining of the fragments in situ.
The 15 sqm of the apsidal were divided into 107 sections of various size, the 16 lacunae of the nave, for a total of 18 sqm of reconstructed surface, were divided into 80 pieces. Before the division all the sections were recorde and the signs traced for repositioning.
The fragments had the clay backing taken off. They were then packed in wooden crates protected from humidity and sent to Israel.

The mosaic goes home

In March-April 1999 the final steps of the intervention were completed, with the repositioning of the mosaic in situ, the consolidation of the mortar between the tesserae, the final cleaning of the surface and the stuccoing of the lacunae preceding the vandalism.
With the mosaic uncovered, the first job to do was to prepare a new solid foundation for the repositioning the fragments with a lime mortar (slaked lime, stone powder, tuff, 1:1:1). To allow rain water to flow freely away the foundation was built with the original sloping side. In the same way the lacunae present in the areas of depression were restored to the height of the orizontal level. The fragments were reapplied onto a bed of mortar of about 10 cm deep (slaked lime, hydraulic lime, stone powder, 0,5:0,5:3). Having knocked the fragments into position so as the borders met perfectly, the cotton gauze was removed by damping the surface and the joining of the mosaic in situ with the reconstructed one was perfected by adding a few tesserae.
All the lacunae preceeding the vandalism were maintained and filled with a lime based mortar (slaked lime, hydraulic lime, stone powder, 0,5:0,5:2) to preserve the image of the mosaic before the vandalism and traces of its conservation history.
Only in one case does a pre-existing lacuna not exist any more. The removal of an old filling of cement brought to light the presence of mosaic under a layer of earth. It was subsedence, never excaveted, 20 cm deep, probably caused by a capital falling on the surface. As it would have been a perfect point for rain water to collect, and subsequently an area at risk for the conservation of the mosaic, the detachment and relaing of this fragments was decided upon.
The areas between the tesserae where the mortar had disintegrated were consolidated by applying hydraulic mortar with brushes (hydraulic lime, sifted stone powder, 1:1). This operation improved the compactness of the tessellato and the adhesion between the tesserae. Repeted rinses were done with water and spoges to remove excess mortar and to aid the deep penetration of the mixture into the spaces between tessera and tessera.
The last operation carried out was the cleaning of the surface by applying a solvent solution (30 gr ammonium carbonate, 25 gr EDTA, 10 cc. NeoDesogen per lt of water) and rising with water and soft plastic brushes.

The maintenance plan and the protection measures

The future of this mosaic now depends carrying out of a maintenance plan and realisation of a protective system. For protecting the mosaic we have two options: the first consist in the sheltering; the second organized on the base of a programme of seasonal covering. In both cases a night guard against vandal is required.

The mainenance will be the fundamental compendium of both protection plans proposed.

For the seasonal protection plan was proposed to cover up the mosaic for the winter period by applying a system that consents the easy removal for late spring and summer seasons. Fine plastic netting will be placed directly on top of the mosaic. Over this , a layer of geotextile and geotextile cushions ,100x150cm , filled with washed tuff grains (2-10 mm), sown shut on all sides to avoid dispersal of the material.

The plastic netting is needed to stop the geotextile sticking to the tesserae. The geotextile form a barrier against dust, sand and helps to prevent inquisitive people, who wishing to see, could move the coushions and so expose the mosaic. The size of the material will not allow the formation of spaces between the cushions. The cushions in themselves guarantee to protect the surface from both mechanical damages and crystallisation of soluble salts. Being easy to menage, the periodic covering and uncovering will be easy, does not dirty the surface and is completely reusable.

The night surveillance that is now in operation is one of the essencial conditions to stop new acts of vandalism.

The maintenance will be carried out by a local group of conservators, employees of the National Parks Authority that have followes and partecipated in the last steps of the intervention, having learnt the techniques used and the use of all the traditional materials.

Periodic interventions and timeliness in the repair work in the case of damage to the mortar used in the intervention would mean conserving the results obtained, slowing down and minimising the risks for the conservation of the mosaic in the future.

The maintenance operations foreseen are periodic dry cleaning of superficial deposits, a general check up for eventual problems with salts, water flow and alghae, substitution of mortar if cracks should appear or in the case of mechanical damage, and eventual restoration of the mortar between tesserae. The maintenance program is scheduled every two monthes with a day work involved.

Conclusion

If we can be certain of the preventive measures that must be taken against damage provoked by water, wind, dust etc, we cannot be quite as certain how to protect this mosaic and, in general , the cultural heritage ,from the damage that can be done by man. The use of barriers can be helpful in avoiding involuntary damaging behaviour and persuade people to conduct themselves in a more appropriate way, but they are not absolute and nowhere near enough in the case of voluntary aggression.

More than before we believe that the best investment for the safety of the heritage is an active and continual valorisation. This valorisation is the instrument for the understanding of the historical and cultural value of the material evidences. In absence of comprehension the relationship between man, as a cultural subject, and his history is interrupted and, with this,the relationship becomes indifference or, in the best case, a passive relationship, not critical, but with a consumer attitude, that can set off a large range of different types of destructive behaviour.

Damage caused by man to monuments derived from the break up of a continuity of use, in this case cultural use, are frequent and known to all of us. The common place damage that goes from everyday carelessness to doubs of varnish and graffiti; the climbing onto monuments to have quite useless photographs taken, the theft of souvenir tesserae from archaelogical mosaics and so on, the list is long. To all this we can answer through active information, education and involvement in the activity of protection not only letting them know the historical and cultural value of their own heritage, but also how fragile and how difficult and expensive is its conservation, above all in the absence of a sense of common responsability.

On the contrary, there is deliberate damage caused by man, paradoxically derived from a recognition of those historic and cultural values that are translated into their commercial and economic value. This is the case of theft, all on commission, of archaeological objects and finds, for the pleasure of the very few. The only answer to this, apart from sourveillance and protection, is the eradication of the collectors culture, typical of our society in wich a social class exists that finds confirmation, by possessing works of art, in his own prestige and reason for ostentation.

Vandalism remain, among the activities of man, a question to wich we have to find a valid answer and one wich

must slowly but surely be eliminated. The daily expense of repairing damage by vandals absorbs a lot of resourecs designated to the conservation of the heritage, without taking into account the immeasurable social and cultural price we have to pay for the destruction of a work of art.
The passage from the material to the cultural use that does not neglect the aspect of the conservation and the durability of the monuments, we believe, is the only pratical way to keep them alive, monuments that find themselves in a situation radically different from that in wich they were realised, creating at the same time a sense of common responsability wich could then isolate vandals into costantly smaller contexts and therefore make voluntary destructive actions predictable.
This task involves everyone that work in this field, above all the conservators. They have a concrete and unique possibility to work on material and, at the same time, to open worksite to the public. In this way it is possible to transform a technical intervention into a cultural event, that permits the diffusion of specific explanetions of conservation, and the understanding of the fragility of works of art.

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Captions

1. The church after vandalism.
2. The gathering of the tesserae and fragments.
3. The mosaic after restoration.
4. Seasonal protection for the winter period made of direct application of "couchions". This system consents the easy removal for late spring and summer seasons.
5. Maintenance team during the on site conservation intervention in Mamshit. This team has been trained in using techniques based on traditional materials for conservation and maintenance.

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