

## **The Conservation of Historic Sites and Monuments: A Fact-Finding Analysis in Jordan**

It is often alleged that the root cause of underdeveloped aspects of the cultural heritage — such as ancient monuments and monumental architecture — is to be found in the chronic scarcity of economic resources. Although this situation is a real obstacle to progress, it hardly represents the major reason for the disrepair or abandonment of many ancient sites and monuments. In fact, the state of preservation itself is often the most pressing cause. While the preservation of standing architecture is often considered delicate, this situation is even more dramatic for architectural antiquities reduced to ruins.

The most important factor in conservation is usually not referable simply to the age of the ruins. For example, many extremely old buildings may be treated with the traditional, “tried and tested” methods. On the other hand, less ancient but badly fragmented monuments require specialised analyses and specific criteria for intervention.

Likewise, the potential or desire for modern reuse cannot be considered a major factor. As is occasionally the case, many ruined monuments that bear very important witness to the past — even if just in terms of local history — are accessible only with great difficulty. On the other hand, it often happens that monuments are chosen for rehabilitation after the recognition of the site's importance. This usually occurs after the passage of time (in the case of monuments with their own political or religious character, or other cultural stigma), the acquisition of new information, or simply “second thoughts”. Unfortunately many such monuments have been the victims of benign neglect or even worse, victims of improvised conservation efforts that lead to new and even more serious damage.

It should be recognized that such intervention is often embarked upon only for the sake of tourism and improvement of the site's image. This situation is even more noticeable when comparison is made with the field of restoration of mobile remains (such as statuary) where there have been important advances in conservation methodology and technique.

The conservation of ruined buildings comprises just one part of a wider discipline, but has its own specific needs and characteristics, for which special skills are required (Marino 1988a; 1989). For a long time it was considered necessary to intervene through the consolidation of ancient walls — invariably with the indiscriminate use of cement and resins — in the conviction that this would finally solve all structural problems. For some time, however, the notions of ordinary maintenance and above all prevention have gained more acceptance and proven more advantageous than final, so-called “definitive” restorations.

Additionally, diagnostic studies are even more important in the work of conservation. The present condition of the site can invariably be better understood in the light of analyses of what has happened in the past, including the work of former conservators. For example; apparently enigmatic cracking of architectural features can sometimes be traced to previous conservation efforts, which, while temporarily solving a problem, in fact led to secondary forms of deterioration and masked the original cause.

The chances of recovering the traces of ancient building activities, while safeguarding not only their present significance but also their future revelations, often depends upon the protective measures put into effect at the time of the excavation. In most cases little thought is given to what will happen to excavated features, or to the conservation that might be required. Regrettably, in this situation, the unpredictable nature of excavation and what is found, is often the usual excuse.

One of the most neglected areas is what may be called “emergency conservation” (Marino 1988b). This aims at assuring the maximum conservation of the building feature, while at the same time exploiting to the fullest the conditions of discovery. This is important when there are fortuitous finds where the procedures and economic resources are limited and a determining factor.

We have been doing active research into these matters for some years at the University of Florence, in conjunc-

tion with other universities and heritage organisations.<sup>1</sup> The main aim of the research has been to define a methodology of analysis and operative procedures on archaeological buildings, in particular those reduced to ruins. It should be understood that here when we talk about “operative” procedures, we mean all possible kinds of work to be included, namely: conservation, cleaning, completion of elements, symbolic reconstruction, replacement, abandonment, use of copies, temporary and final consolidation, protection during the excavation, control of the movement of water, control of vegetation, protection from the action of atmospheric agents, construction of museum facilities *in situ* and under cover, reuse, pollution control, and control of decay due to improper use.

The verification of works carried out recently and those carried out some decades ago is fundamental to our research. A comparison between present conditions and those existing before the first works of conservation, permits us to write a kind of medical file for the monument that can evolve as the situation changes. In such a way we can evaluate and in many ways assess with maximum precision the level of danger that the buildings are in, the resulting thresholds of risk, and we can also evaluate the incidence of the degenerative mechanism and the speed of decay. At the same time we can carry out checks, after due time has passed, on the various categories of operation and of the most widely employed technologies.

These research projects also permit us to investigate the “authors” of the works of conservation and the historic conditions that prevailed at the time of the operations, and thus we may attempt to discover the tendencies and schools of thought which have sometimes determined the work of entire generations. This situation turns out to be particularly evident in areas often used in the past (and sometimes still today) as experimental areas by groups of (local as well as foreign) archaeologists who sometimes do not bother themselves with putting procedures of conservation into effect even in the areas where they have carried out important excavations.

The observations and investigations we carried out in Jordan<sup>2</sup> have been of particular importance. The reasons for this are at least six-fold.

1) The presence of important sites and monuments — even if they are little known outside the local area, with the exceptions of Petra and Jarash. It should not be forgotten that intervention which is not improvised

but rather tailored to the local conditions is also important for those areas and monuments found in inaccessible areas, and thus can benefit less from operations of systematic maintenance. The whole of Jordan presents the typical characteristics of sites and monuments left in the open without protection, such as the decay of materials and the subsequent ruination of the structures. The scale of erodability is quite variable from place to place, just as the materials from which the structures were made vary in resistance. It sometimes happens that the phenomena of decay appear not to be serious and are underestimated, while with the passage of time and the influence of unforeseen mechanisms of decay, the degradation assumes an irreversible character with very serious consequences.

- 2) The existence of environmental conditions that can be described at best as exasperating due to the natural elements, which work independently but more often in a dangerous mixture. This includes the action of wind (especially gusting wind, causing an abrasive sand blasting action); rain water which can form uncontrollable impacting masses; the effect of infestations of vegetation, and even the insidious action of temperature and water movement in both long and short cycles.
- 3) The continuance of forms of settlement, both nomadic and sedentary, using traditional materials and techniques which have remained essentially unaltered, and whose survival is linked above all to systematic and careful maintenance — for example plaster work and facings. In the last few years there has been in fact a legitimate acceleration of change even where a greater measure of prudence would have been appropriate. Sometimes, driven by the misunderstood and misperceived needs of tourism, decisions are made which time reveals to have been damaging while at the same time having produced no organic development whatsoever. While it is undoubtedly true, for example, that an efficient road network may be important for the economic development of an area, it is equally true that every project should take environmental impact (including archaeological impact) into account, and evaluate the risks to which historic monuments and natural sites are exposed.
- 4) The presence of numerous archaeological projects — local as well as foreign — each with its own characteristics and operative methods. This presents an in-

<sup>1</sup> The research project “Towards a definition of archaeological conservation. Research and preliminary studies” is active in the Universities of Bologna, Naples, Florence and Urbino. The first joint report on the work in progress was published in 1989.

<sup>2</sup> Research commenced in 1986 and since then we have always enjoyed the firm support of the Jordanian authorities. Special thanks are in order to Dr. G. Bisheh, Dr. F. Zayadine and Mr. S. Farajat for their help. We would also like to thank the Italian consular authorities, Dr. F. deCourten, the Italian

Ambassador to Jordan, and the Italian Cultural Attache, Mr. G. Benenati. We would finally like to recognize with esteem and affection the help which was always forthcoming from Prof. M. Piccirillo. A stay in Jordan in 1989 under invitation from the Department of Antiquities was of noteworthy usefulness and was directed toward investigating the condition of sites and historic monuments. This was accomplished in the context of an agreement for cultural exchanges between Italy and Jordan.

teresting (and perhaps disheartening) sample of methodologies employed over the past few decades; some of which are valuable; some of which are wholly unacceptable.

- 5) The objective risk of degradation due to tourism, at times poorly motivated and insensitive to the problems of care for the historical heritage. We cannot continue to pretend that unique historical and natural features are indefinitely renewable resources.
- 6) The fact that the authorities and local operators have always been very helpful and that we have an excellent history of maximum cooperation and exchange of ideas.

From the point of view of our research, Jordan may be considered, in many ways, to be a richer archive than is generally appreciated, and to a large extent present material which has not been recorded before. It is thus amenable to being consulted in a systematic manner and is suitable for reliable comparative studies with already known situations in other areas.

The research program envisaged the scrutiny of the recorded material, locally and outside Jordan, but above all reconnaissance of the monuments. After preliminary general reconnaissance we chose certain areas to be considered as deserving of special attention in which direct systematic and repeated investigations were carried out. Among these should be noted the great monumental complexes (above all Jarash and 'Ammān); the Crusader fortresses (Cardini *et al.* 1987; Vannini *et al.* 1990; Marino *et al.* 1990a; 1990b);<sup>3</sup> the area of Mādabā and Mount Nebo with regard to both the architecture and the mosaic floors (Marino, *in press*) (FIGS. 1, 2);<sup>4</sup> the monuments hewn out of the rock at Petra with particular emphasis on quarry faces, marks left by stone masons, as well as the water systems (Marino *et al.* 1990c); some sites left abandoned in the desert, and finally, the areas of the plateau where basalt was used as a construction material, such as at Umm al-Jimāl (Marino 1991; Marino and Piccirillo 1991).

Analysis of the state of conservation in some cases has served to define the diagnostic picture of the areas under consideration in order to better clarify the policies of intervention. The connecting factor in all the investigations has been a detailed graphic survey of the sites, carried out to provide the double function of "recording" the actual state and as an instrument of "interpretation". By way of example we offer summarized in-

formation about the investigation conducted at Machaerus (Makāwir).<sup>5</sup>

The program conceived for Herod's fortress was designed to take diverse directions. On the one hand operations were planned to solve some particularly serious aspects of decay and ruination, and on the other hand some plans were drawn up for ways to create a valid tourist attraction (FIGS. 3, 4). The phenomena discovered and analysed concerning the decay of the structures were as follows:

- 1) widespread cracking — by this we mean a general lack of cohesion between distinct structural elements — due to the natural ageing of the materials, especially the mortar;
- 2) localized damage with the recognizable situation of cracking;
- 3) actual or potential landslides;
- 4) loss of verticality in the walls due to bulging or overturning;
- 5) top or basal architectural shifts due to land pressures (earthquakes?);
- 6) surface break-up due to the action of water and temperature, assisted by wind and deepened by freeze-thaw;
- 7) pooling of rain water by depressions formed in the land or in the wall tops or counterslopes;
- 8) runoffs of surface flooded earth, and erosion by rivulets;
- 9) spontaneous vegetation and aggressive root systems;
- 10) various kinds of pollution;
- 11) ruination caused by neglect or acts of vandalism.

From the details of data gathered from all over Jordan, it can be affirmed that as a general rule the state of conservation is to be considered adequate, but local deterioration due to particular conditions has given rise to serious concern. We have established that numerous monuments — some of which are well-known and important — risk imminent collapse or substantial partial loss. The educative and descriptive facilities that would render the remains more comprehensible to visitors are practically nonexistent. These might, in their own way, make the sites more protectable. The most common form of intervention in Jordan consists of large-scale replacement of parts which, though they may be justified in extreme cases, should be less invasive or replaced by programs of systematic maintenance. Only prevention and routine maintenance programs carried out over a pe-

<sup>3</sup> The investigations for the project "Crusader settlements in Jordan" were conceived at the University of Florence (Prof. G. Vannini) and the University of Urbino (Prof. R. Franchi). Of particular interest to our research, was the archaeological excavation at the fortress of al-Wu'ayra near Petra. It allowed us to develop our criteria for the evaluation of the forms of degradation as well as their rate of development, a process which is initiated after excavation and exposure to the elements.

<sup>4</sup> Mount Nebo is one of the most important areas of our research since it presents the uncommon characteristic of having been the subject of surveys

and investigations of a number of excavations and conservation projects, undertaken over a period of more than fifty years.

<sup>5</sup> The project "Machaerus: Plan for Restoration, Maintenance and Tourist Development" (presented in July 1991) is the outcome of cooperation between the Department of History of Architecture and Restoration of Architectural Structures at the University of Florence and the Studium Biblicum Franciscanum. We would like to thank the former Director General of Tourism, Mr. Nasri Atallah with whom we have had numerous and profitable exchanges of ideas.

riod of time would avoid, or at least limit, the risks of degeneration in the future. The degeneration is particularly dangerous as it is unexpected and represents a significant economic cost.

The future development of our research program aims at collecting a large quantity of data by the completion of operations, concerning:

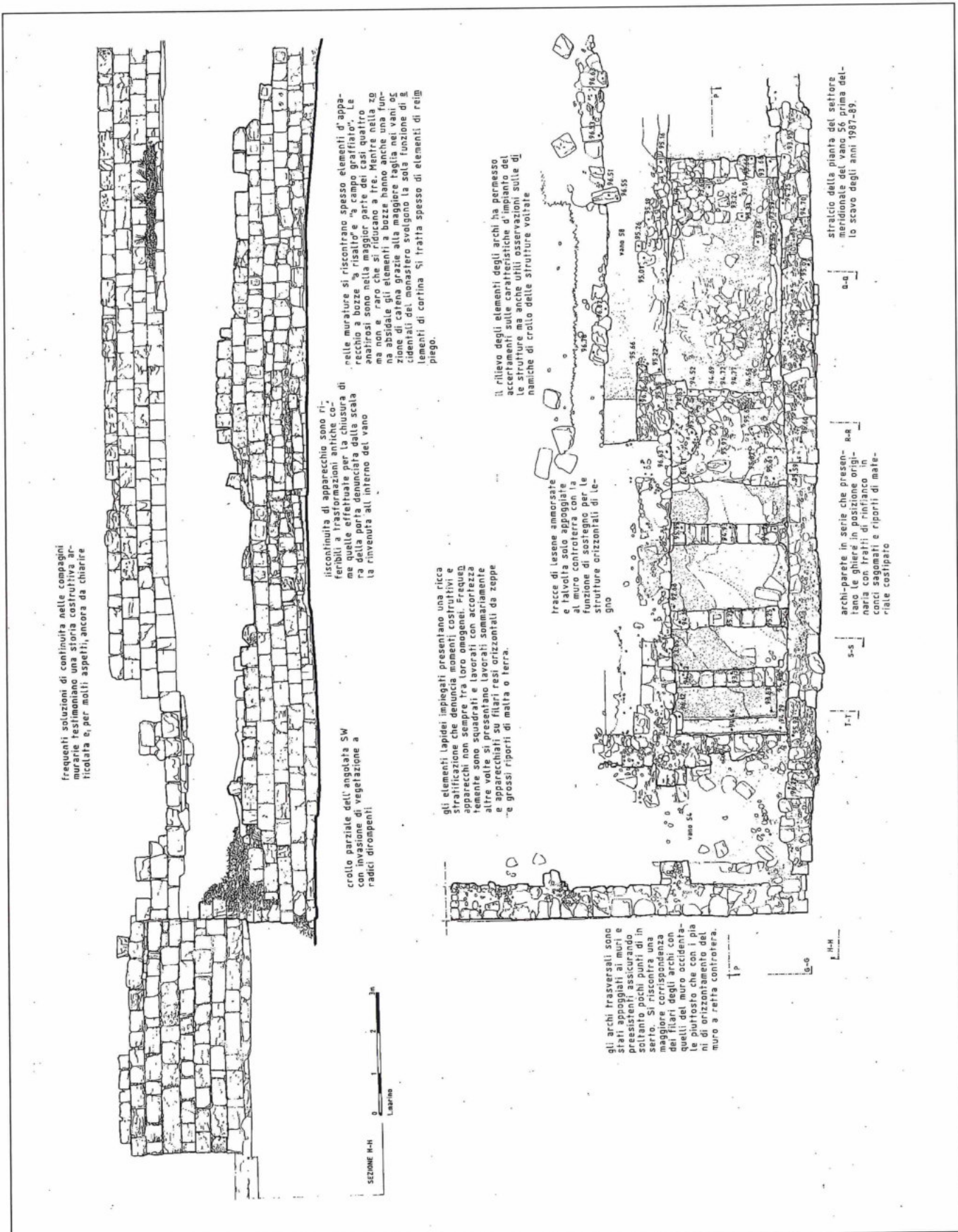
- 1) detailed surveying of building techniques in addition to physical layout;
- 2) completion of survey of structures recognized as being of special importance;
- 3) sample probes of foundation structures;
- 4) ascertaining the static conditions, particularly evaluating the notable variability of the coefficients of resistance of degraded and ruined building materials;
- 5) recording the phenomena related to the water-table, which is perhaps the main cause of damage in exposed archaeological areas;
- 6) studying the procedures for analysis of the speed of degradation in order to evaluate risk factors over time for the archaeological features as well as people;
- 7) setting up the operations and definition of the methodologies involved in the obligatory recording of every aspect of archaeological fieldwork.

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frequenti soluzioni di continuità nelle compagini murarie testimoniano una storia costruttiva articolata e, per molti aspetti, ancora da chiarire

le discontinuità di apparecchio sono riferibili a trasformazioni antiche come quelle effettuate per la chiusura della porta denunciata dalla scala rinvenuta all'interno del vano

croto parziale dell'angolo SW con invasione di vegetazione e radici diramanti

nelle murature si riscontrano spesso elementi di appoggio a bozze "a risalto" e "a spacco graffiato". Le anfrattuosità sono nella maggior parte dei casi quattro ma non è raro che si presentino anche una funzione di appoggio alla maggiore taglia nei vani degli edifici del monastero svolgono la sola funzione di appoggio di cartina. Si tratta spesso di elementi di reimpiego.

gli elementi lapidei impiegati presentano una ricca stratificazione che denuncia momenti costruttivi e appaiono sempre tra loro omogenei. Frequentemente sono squadrati e lavorati con accuratezza. In molte parti si presentano lavorati sommarariamente e appaiono su filari resi orizzontali da zeppe e grossi riporti di malta o terra.

tracce di lesene ammassate e talvolta solo appoggiate al muro controterra con la funzione di sostegno per le strutture orizzontali di legno

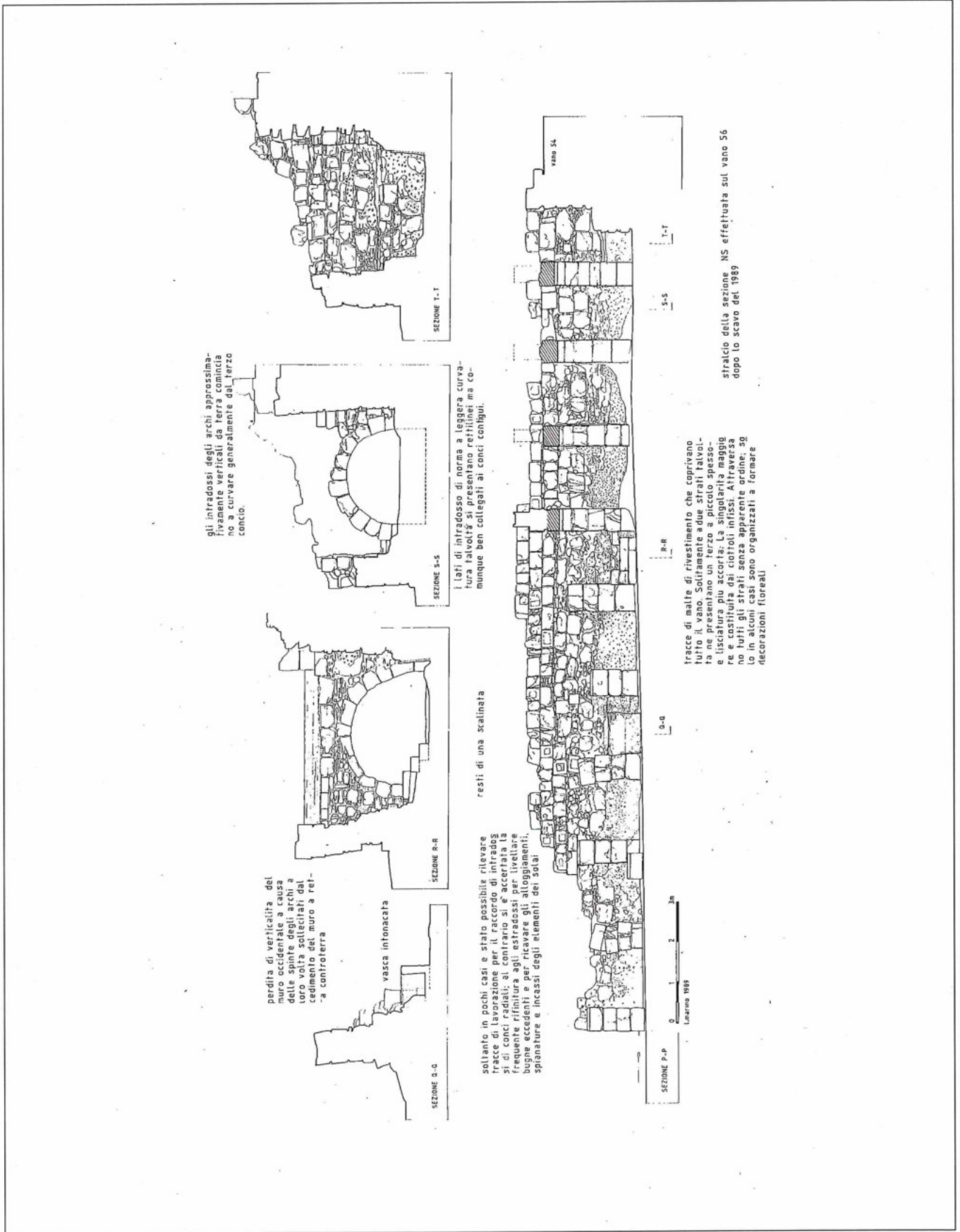
il rilievo degli elementi degli archi ha permesso accertamenti sulle caratteristiche d'impianto delle strutture ma anche utili osservazioni sulle dinamiche di crollo delle strutture volteate

gli archi trasversali sono stati appoggiati ai muri e preesistenti assicurando soltanto pochi punti di inserimento. Si riscontra una maggiore corrispondenza dei filari degli archi con quelli del muro occidentale piuttosto che con i piani di orientamento del muro a terra controterra.

archi-pariete in serie che presentano le ghiera in posizione originaria con tratti di rifianco in conci sagomati e riporti di materiale costipato


stralcio della pianta del settore meridionale del vano 56 prima dello scavo degli anni 1987-89.

1. Sample from the surveys of dimensions and materials carried out at Mount Nebo-Şiyāgha. Extract of a plan, and section (H-H) of room 56 on the western side of the monastery. The original drawings are at a scale of 1:25.



2. Sample from the surveys of dimensions and materials at Mount Nebo-Shiyāgha. Sections of room 56 on the western side of the monastery. The original drawings are at a scale of 1:25.

3. Sample from the work prepared for the intervention at Machaerus. Table 4 concerns the proposal for the urban redevelopment of the area and the provision of pedestrian paths.


  
 THE MINISTRY OF TOURISM  
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 المعهد الوطني للسياحة  
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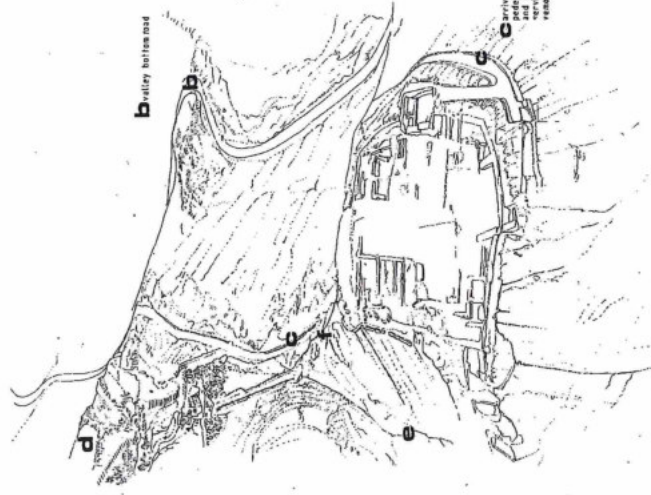
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**MACHAERUS: Plan for Restoration, Maintenance and Tourist Development**  
 Dr. LUIGI MAMMO ARCHITECT - University of Florence  
 Department of Urban Architecture's History and Cultural Landscapes

1977

The plan for the future use of the area for tourist activity includes the following:

- 1) The need to indicate the simplest and safest pathways both from the point of view of the visitor and of the site itself;
- 2) The presence of suitable parking for the area's topography;
- 3) The need to give visitors information about the area's history and the archaeological remains;
- 4) The necessity of documenting the architectural remains on site and offering the possibility of relating these to the notes on the site plan;
- 5) The requirement for giving documentary evidence to the visitors about the topography of the archaeological remains if they are not in a sufficiently detectable condition.



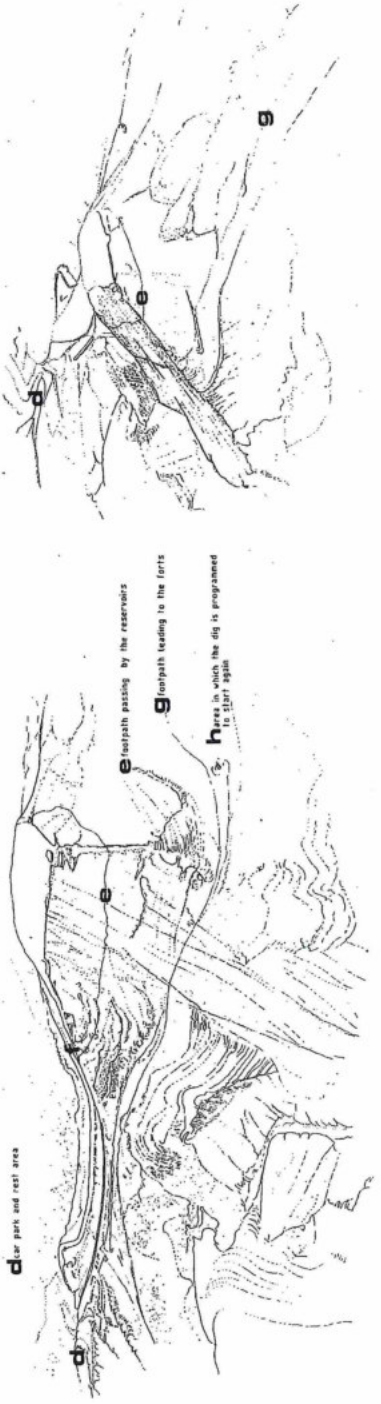
**PLAN**  
 The ideas here form part of a wider plan of making the most of and looking after the archaeological and natural sites of the future in collaboration with the University of Florence (Project: 'Conservation of Archaeological Conservation. Preliminary Research and Study'). The plan is based on the following:


- 1) In detail the practice and the methodology of acting to conserve the archaeological remains.
- 2) The need to give visitors information about the area's history and the archaeological remains on site.
- 3) The necessity of documenting the architectural remains on site and offering the possibility of relating these to the notes on the site plan.
- 4) The requirement for giving documentary evidence to the visitors about the topography of the archaeological remains if they are not in a sufficiently detectable condition.

The plan considers the location of some pathways (of choice or of time) and the obligation for getting to the walls and the paths which are safest and easiest both for the visitors and for the walls themselves.

One final category of work concerns the acquisition of the archaeological remains. The plan is based on the following:

- 1) The need to give visitors information about the area's history and the archaeological remains on site.
- 2) The necessity of documenting the architectural remains on site and offering the possibility of relating these to the notes on the site plan.
- 3) The requirement for giving documentary evidence to the visitors about the topography of the archaeological remains if they are not in a sufficiently detectable condition.



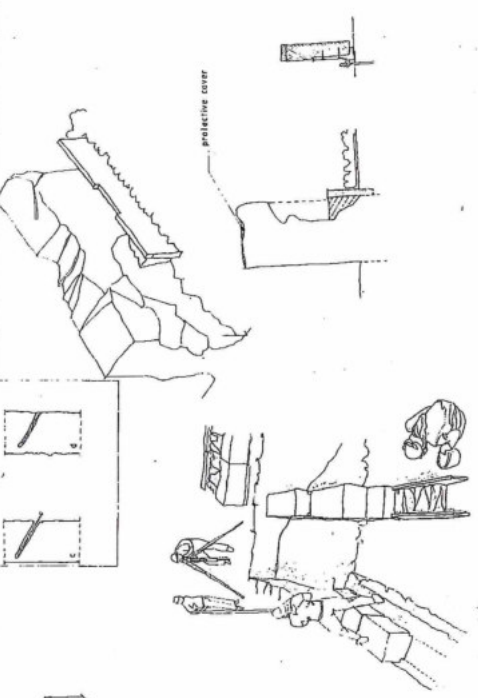
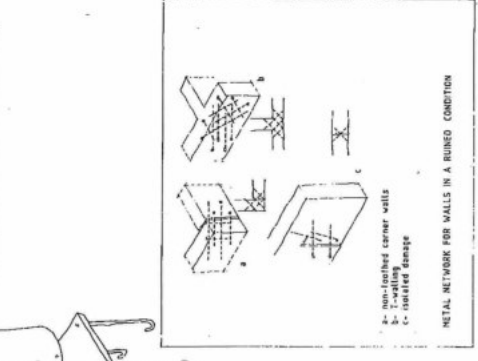
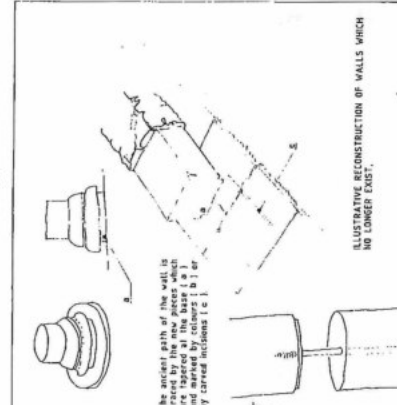
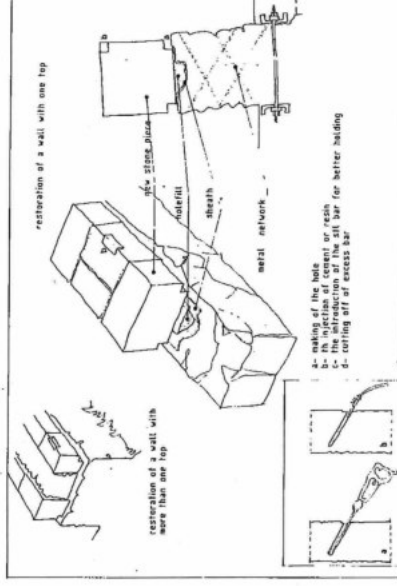
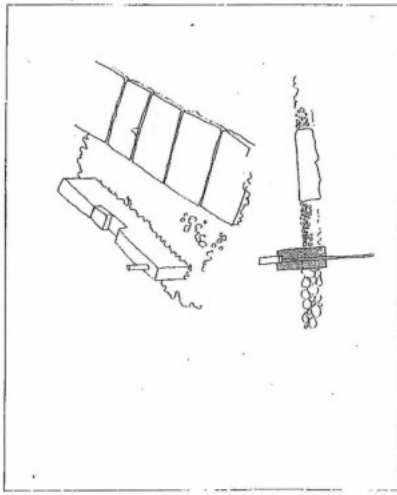

  
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 جمهورية الأردن

Frenchman Archaeological Institute - Mount Naba - Jordan  
 معهد الفرنسيين لدراسة الآثار  
 جبل نابو - الأردن

**MACHAERUS: Plan for Restoration, Maintenance and Tourist Development**  
 Author: Luigi Marino Architect - University of Florence  
 Scale: 1:5000 (Architectural) / 1:10000 (Site Plan)

The reconstruction of some of the monuments of the palace is required to make out the architectural value only and in some cases to take the place in importance of the actual remains. The work is identified by numbered signs and color codes put on the walls to indicate the stage and the period of building. These may also be used to outline suggested itineraries to the visitors.

The work must be carried out with the necessary caution that the archaeological and the walling must be in some way identified by photographic and graphic records being kept to be used by specialized persons from each sector. In some cases the work may be carried out by the archaeological service itself. The dismantling must be carried out with the utmost care and shall provide the opportunity for the study of the walling. The stone sections which will have to be put aside at the end of the work shall be carefully numbered to ease the task of reassembly.



THE PLAN, RESTORATION AND PROTECTION OF THE WALLS

4. Sample from the work prepared for the interventions at Machaerus. Table 7 shows examples of some categories of intervention for the strengthening and completion of the walls.