



Brandenburgische  
Technische Universität  
Cottbus

# DOCTORAL THESIS

## Interpretation and Presentation of Nabataeans

### Innovative Technologies: Case Study

#### Petra/Jordan

Submitted to the Faculty of Architecture, Civil Engineering, and Urban Planning

Brandenburg University of Technology Cottbus, Germany, in partial fulfillment of the requirements for  
the degree of Doctorate of Engineer (Dr. Ing), 2006-2011

by

Yazan Safwan Al-Tell

(Born 07-04-1977 in Amman, Jordan)

#### Supervisors:

Prof. Dr. h.c. Jörg J. Kühn

Prof.Dr. Stephen G. Schmid

Prof. Dr. Ing. Adolf Hoffmann

## **Abstract**

The Nabataeans were people of innovation and technology. Many clear evidences were left behind them that prove this fact. Unfortunately for a site like Petra, visited by crowds of visitors and tourists every day, many major elements need to be strengthened in terms of interpretation and presentation techniques in order to reflect the unique and genuine aspects of the place. The major elements that need to be changed include: un-authorized tour guides, insufficient interpretation site information in terms of quality and display.

In spite of Jordan's numerous archaeological sites (especially Petra) within the international standards, legislations and conventions that discuss intensively interpretation and presentation guidelines for archaeological site in a country like Jordan, it is not easy to implement these standards in Petra at present for several reasons which include: presence of different stakeholders, lack of funding, local community. Moreover, many interpretation and development plans were previously made for Petra, which makes it harder to determine the starting point.

Within the work I did, I proposed two ideas for developing interpretation technique in Petra. First was using the theme technique, which creates a story from the site or from innovations done by the inhabitants, and to be presented to visitors in a modern approach. The purpose of this story is to link the visitor to the site emotionally, by providing them with the sense and feel of the site's real events by that time together with a good amount of information that gives the visitor the chance to live and feel an unforgettable experience of the place. The second idea was how to tailor a useful interpretation plan that could be implemented on all other archaeological sites in Jordan right after "evaluating the results of its implementation in Petra".

The aim of this thesis is to develop interpretation criteria for "local governments and nongovernmental organizations", as well as an interpretation plan in a Jordanian context and apply them on all other archaeological sites in Jordan.

Tourists would benefit from the quality of interpretation services offered by the interpreters and the techniques of presentation available on the site, in addition to tour guides who have received training programs derivate from this study, which would guarantee in return a more sustainable tourism movement to the site of Petra in the future.

## Zusammenfassung

Die Nabatäer waren ein Volk der Innovationen und Technologie. Sie haben uns viele Beweise hinterlassen, die diese Behauptung unterstützen. An einem Ort wie Petra, der jeden Tag von Mengen von Touristen besucht wird, müssen leider viele wesentliche Elemente in ihrer Präsentation verbessert und in ihrer Interpretation gestärkt werden, um die Einmaligkeit und die Bedeutung des Ortes zu vermitteln. Dazu gehören vor allem nicht autorisierte Führer und das sowohl inhaltliche als auch formal ungenügende Informationsmaterial.

Obwohl es eine große Anzahl von internationalen Standards, Richtlinien und Konventionen für die zahlreichen archäologischen Stätten in Jordanien und besonders für Petra gibt, die intensiv diskutiert werden, ist es nicht einfach dieses Standards in Petra zu implementieren. Die Gründe dafür sind unterschiedliche Interessensgruppen, nicht ausreichende finanzielle Unterstützung und die lokale Gesellschaft. Es wurden sogar viele Präsentations- und Entwicklungspläne für Petra selbst erarbeitet, die jedoch den Ausgangspunkt für eine Neuorientierung eher erschweren.

In der vorliegenden Arbeit habe ich zwei Interpretationsansätze vorgeschlagen: der erste ist Technik als Leitthema, in dem die konkrete Geschichte des Ortes als eine von den Innovationen der Nabatäer erzählt wird, die dem Besucher in moderner Form vermittelt wird. Der Besucher soll emotional mit dem Ort verbunden werden und ihn auf unvergessliche Weise erfahren, in dem ihm schrittweise Informationen gegeben werden und ihn eine Zeitreise durch die Geschichte Petras antreten lassen.

Der zweite Ansatz versucht, ein allgemeines Präsentationskonzept für Petra zu entwickeln, das nach einer kritischen Auswertung in Petra für alle archäologischen Stätten in Jordanien eingeführt werden könnte.

Das Ziel dieser Doktorarbeit ist es, am Beispiel von Petra Strategien und Kriterien für die Kommunalverwaltungen und für Nicht-Regierungsorganisationen zu entwickeln als Grundlage für Präsentations- und Entwicklungsplanungen für andere jordanische archäologische Stätten.

Touristen würden von einer verbesserten Qualität der Interpretation und Präsentation profitieren, ebenso von Führern, die durch diese Studie veranlasst Trainingsprogramme absolviert haben. Damit würde ein nachhaltigerer Tourismus in der Zukunft von Petra ermöglicht werden.

## Terms and abbreviations

ACOR:	American Center for Oriental Research
AD:	Anno Domini
ADAJ:	Annual of the Department of Antiquities of Jordan
B.C.:	Before Christ
DOA:	Department of Antiquities
ESCWA:	Economic and Social Commission for Western Asia
GDP:	Gross Domestic Product
GTZ:	Deutsche Gesellschaft für Technische Zusammenarbeit
ICOMOS:	International Committee on Monuments and Sites
IFAPO:	Institut Francais D'archeologie Du Proche-Orient
ICAHM:	International Committee on Archaeological Heritage Management
ICOM:	International Council of Museums
IUCN	The International Union for Conservation of Nature
JADIS:	Jordan Antiquities Database and Information System
JICA:	Japan International Cooperation Agency
JTB:	Jordan Tourism Board
MOTA:	Ministry of Tourism and Antiquities
NPS:	National Park Services
PAP:	Petra Archaeological Park
PNT:	Petra National Trust
UNESCO:	United Nation Educational Scientific and Cultural Organization

## **Acknowledgement**

The efforts of many individuals have helped make the production of this work possible; the scholar would like to express his sincere appreciation to the following individuals:

Prof. Dr. Jörg Kühn, whose generous assistance made everything possible, he stimulated my interest on the archaeological way of thinking, and how to explain things deeper than a text book, how to be an “architect archaeologist” at one time and to have a wider analyses and expectations in understanding the Nabataeans and their techniques. Prof. Dr. Ziad Alsaad, who inspired my interest in the subject of the Nabataeans and their achievements in Jordan and generously supported the scholar with time, knowledge, books and references.

I would like to thank also Mrs. Julia Zillich, who proofed the manuscript and gave very helpful grammatical suggestions concerning it, as well as assisting in research and preparing the indices. I also would like to be grateful for the great efforts done by Nabil Al-Awawdeh in translating the abstract into German, it was highly appreciated.

I particularly thankful for all those mentioned above for their patience and their attention to every single detail throughout my study; without their invaluable assistance and encouragement this study could never been completed.

The thesis would not have been possible without the aid of many: My parents, for their unquestionable support and faith in me, they have been the strength and stability that kept me going, thank you for your patience and advices that kept me going through all hard problems I faced. And to my dear wife Salam who stood by me day and night, you cannot know how important your love, encouragement and passion have meant to me in these past years, and to my son Safwan, who was my major motive that let me going hard toward accomplishing my thesis, love you forever. I would have never completed the dissertation without them. And a special regard to my dear sister, who encouraged me when I faced difficulties, and helped me to defeat them, would like to thank you for your trust on me thank you all.

## **Statutory declaration**

I hereby declare that this thesis is the result of my original work carried out in Brandenburg University of Technology Cottbus, Germany and in Yarmouk University, Irbid, Jordan, within the framework of the doctoral program in Interpretation and Presentation of Nabataeans Innovative Technologies. My research was supervised by Prof. Dr. Jörg Kuhn, BTU Cottbus, and Prof. Dr. Ziad Al-Saad, Yarmouk University, Irbid. All of the work contained within this text is original except where cited from an additional source. Quotations and other direct or indirect information have been clearly marked and noted. This work has not been submitted before or to other examination bodies, and is currently unpublished.

---

Signature

\_\_06/09/2011\_\_

Date

# Table of Contents

Abstract .....	I
Zusammenfassung .....	II
Terms and Abbreviation.....	III
Acknowledgement.....	IV
Statutory Declaration.....	V
<b>1. Introduction</b>	
1.1 Introduction.....	2
1.2 Statement of the Problem.....	4
1.3 Significance of the Problem.....	5
1.4 Goals and Objectives of the Research .....	7
1.5 Research Question .....	8
1.6 Research Hypothesis.....	9
1.7 Methodology of the Research .....	9
1.8 Thesis Structure .....	10
<b>2. Petra Historical Back Ground</b>	
2.1 Introduction.....	13
2.2 Geography and Location .....	13
2.3. Climate.....	14
2.4. History of Petra.....	14
2.5. Nabataean and Trade.....	18
2.6. Golden Age of Petra.....	22
2.7. The Nabataean Architecture .....	23
2.7.1 The Nabataean Graves .....	24
2.8. Farming in Petra .....	26
2.9. The Nabataean Language .....	27
2.10. Religion of the Nabataeans .....	27

### **3. A Few Distinctive Elements of the Nabataean Achievements**

3.1 Introduction.....	29
3.2 Themes from Petra.....	29
3.2.1 Hydraulic System.....	30
3.2.1.1 Historical Background of Petra’s Hydraulic Strategies.....	33
3.2.1.2 Classification of the Hydraulic System (Nature-Element-Component) ....	34
3.2.1.3 Significance and Value .....	38
3.2.1.4 Innovation and Creativity .....	39
3.2.1.5 Network Management Operations of the Water Supply System.....	42
3.2.1.6 Technical Innovations characterizing Nabataean piping system.....	44
3.2.1.7 Piping Design in Petra .....	46
3.2.1.8 Condition assessment of the Hydraulic System in Petra.....	47
3.2.2 Quarries.....	48
3.2.2.1 Introduction.....	48
3.2.2.2 Typology and Location.....	49
3.2.2.3 Quarry Types in Petra.....	49
3.2.2.4 Umm Sayhoon Sandstone Quarry Parts .....	52
3.2.2.5 Levelling Site Quarries .....	54
3.2.2.6 Tomb Quarries .....	55
3.2.2.7 Tools Used in Petra Quarries.....	55
3.2.2.8 Extraction and Tools.....	56
3.2.2.9 Technological Innovation in Petra Quarries .....	58
3.2.3 Pottery.....	59
3.2.3.1 Introduction.....	69
3.2.3.2 Importance of the Nabataean Pottery in Defining Nabataean Civilization .	61
3.2.3.3 Nabataean Pottery Geographical Distribution .....	61
3.2.3.4 Nabataean Pottery Previous Studies and Excavations.....	62
3.2.3.5 Clay and Raw Material .....	63
3.2.3.5.1 Nabataean Pottery Clay Distinctive Characteristics .....	64



3.2.3.6 Nabataean Pottery Features (Characteristics) .....	64
3.2.3.7 Decoration Technology Used in Nabataean Pottery .....	65
3.2.3.8 Innovative Technology in Producing Standard Sizes of Vessels and Plates ..	66
3.2.3.9 Kilns and Firing Temperatures Techniques .....	66
<b>4. Interpretation and Presentation of Cultural Heritage Sites</b>	
4.1 Introduction.....	69
4.2 Interpretation.....	69
4.2.1 Interpretation: Definition and Terminology .....	69
4.2.2 Founders of Interpretation .....	71
4.2.2.1 Historical Background .....	71
4.2.3 Who offers Interpretation and for whom .....	77
4.2.4 Why we do Interpretation (Purposes and Values) .....	77
4.2.5 Principle and Techniques of Interpretation.....	79
4.2.5.1 Tilden Principles .....	79
4.2.5.2 Cable and Beck Fifteen Principles.....	80
4.2.6 Types of Interpretation.....	83
4.3 Presentation.....	85
4.3.1 Presentation of a Cultural Heritage: Definition and Terminology .....	85
4.3.2 Purposes and Values of site Presentation .....	86
4.3.3 When do we use Presentation .....	86
4.3.4 Techniques and Principles used to Present Cultural Heritage Sites .....	87
4.3.5 Advantages and Disadvantages of Various Presentation Techniques .....	97
<b>5. Interpretation and Tourism in Jordan</b>	
5. Interpretation and Tourism in Jordan.....	100
5.1. Tourism and Interpretation.....	101
5.2. What Benefits does Interpretation Bring to Historic Site Management in Jordan .....	101
5.3. Roles for Interpretation in Sustainable Tourism.....	102

5.4. Baseline Information on the Interpretation Activities .....	105
<b>6. Management Plans and Interpretation Done for Petra- Jordan</b>	
6.1 First Plan.....	108
6.2 Second Plan .....	109
6.3 Third Plan .....	110
6.4 Fourth Plan .....	112
6.5 Interpretation Plans in Jordan .....	114
6.5.1 Interpretation Plan SIYAHA Project .....	114
6.5.2 Assessment for SIYAHA project.....	115
6.6 Issues Affecting Interpretation in Petra (Status Quo).....	116
6.7 An interpretation and Presentation Proposed Model for the Site of Petra.....	117
6.8 Interpretation and Education Programs .....	118
6.9 Interpretive Planning .....	120
6.10 Comprehensive Interpretive Plan .....	120
6.10.1 Guide and Index to Data .....	122
6.10.2 Detailed Archaeological Base Map .....	122
6.11 Personal and Non-personal Services .....	122
6.11.1 Personal Services .....	122
6.11.2 Non-personal Services .....	123
6.11.3 Electronic Interpretation .....	123
6.12 Interpretive Competencies and Skills .....	124
6.13 Requirements for all Interpretation and Education Services .....	124
6.14 Implementation Plan (a Concept) .....	127
<b>7. Suggested Proposal for Presenting the Selected Themes</b>	
7.1 How to Present Hydraulic System to the Tourists .....	130
7.2 How to Present Petra Quarries to the Tourists.....	132
7.3 How to Present the Pottery to the Tourists .....	133

<b>8. General Interpretation Needs in Petra (Recommendations and Conclusion)</b> .....	135
<b>9. Appendix</b> .....	148
List of Figures .....	176
Bibliography.....	202

## **List of Figures**

Figure 1: Map of Jordan

Figure 2: Petra site feature map and water distribution system

Figure 3: Map of Petra Basin showing the location of the city center built up along Wadi Musa and several of the major rock-cut monuments dating to the Nabataean and Roman period

Figure 4: Map of the Nabataean Trade routes

Figure 5: Interpretation sign from Petra

Figure 6: Interpretation sign from Petra

Figure 7: Visitor Center in Petra

Figure 8: Hydraulic pipe remains at the Siq

Figure 9: Hydraulic Tunnel System in Petra

Figure 10: Water reservoir in Petra

Figure 11: Decorated pottery plate from Petra

Figure 12: Nabataean decorated Juglet

Figure 13: Map showing the quarries of Petra

Figure 14: Quarries distribution at Petra Site

Figure 15: Steep and high quarry face

Figure 16: General view showing Umm Sayhoon sandstone quarry Q1

Figure 17: Traces for quarrying tools at Umm Sayhoon sandstone quarry Q1

Figure 18: One of Petra ancient quarry landscapes; a spectacular 'high elevation' quarry face.

Figure 19: Nabataean rock-cut façade

Figure 20: Spot image taken in 1992, showing the Wadi Musa, Petra. The siq lies to the city side with an open area where the famous Al-Khazneh (Treasury) faces it.

Figure 21: An ortho-photo of the al-Khubtha area showing the siq and al- Muthlim flows. The dams and cisterns surveyed by the Petra National Trust

Figure 22: A general view for Petra site showing all the locations

## **List of Tables**

Table 1: Monthly numbers for visitors to Petra 2005/2006

Table 2: Monthly numbers for visitors to Petra 2006/2007

Table 3: Monthly numbers for visitors to Petra 2007/2008

Table 4: Monthly numbers for visitors to Petra 2008/2009

Table 5: Monthly numbers for visitors to Petra 2009/2010

# **1. Introduction**

## **1.1 Introduction**

In 1985, Petra became recognized as a UNESCO World Heritage Site in recognition of its unique cultural and natural heritage. This imposes on Jordan a task to protect it and preserve it for several reasons such as: enjoyment, scholarship, and pride of next generations. Previously, in 1968, Petra had been recognized by the government and contributing agencies as an outstanding example of human heritage, and the United States National Park Service (NPS) was invited to prepare a comprehensive plan to manage the site. This plan was used as a guide for its development, interpretation, protection, and general administration. (NPS plan: 1968: 134)

On July 7<sup>th</sup> 2007, Petra confirmed its fame by becoming one of the New Seven Wonders of the World in a worldwide vote. This recognition generated a huge increase in tourism which has been coupled with the deficiency of effective planning and management (Tables 1 - 5). The urgent challenge is an all-out effort to protect, upgrade, and promote Petra effectively while usefully engaging local communities to sustainably develop the local economy.

In August 2007, PAP (Petra Archaeological Park) Council was given administrative and financial independence with the passage of the PAP Council regulation delegating park management to it. This is still awaiting institutional development to become fully operational.

It is generally noticed that conservation, interpretation and presentation of the site of Petra have not been given proper attention despite all the efforts made by the concerned national and international bodies.

Heritage conservation seeks to sustain the values of heritage landscapes, places and objects, individually and collectively, so that the community and visitors can continue to appreciate, experience and learn from them and about them, so that they can be passed on to future generations (Interpretation Policy 2005: 4). Heritage interpretation is a means of sharing history and culture with other communities, new citizens, visitors, and people overseas. It is also a means of passing on the knowledge of Jordanian history, culture and values to new generations (Interpretation Policy 2005: 4).

The story of the site has not yet been fully pieced together as various aspects about the ancient cultures which dominated the site have yet to be fully learned.

Therefore, the objective of this research project is:

- To fill in the gaps in interpretation and presentation techniques for cultural heritage in Jordan, taking Petra as a case study, Interpretation and presentation plans for cultural heritage in Jordan are lacking.
- To establish a general interpretation criteria for Jordan and specific criteria for various potential sites.

The following issues have been covered in this study:

1. The definition of interpretation and presentation archaeology.
2. The theoretical basis for archaeological interpretation and presentation.
3. The role of archaeological and heritage interpretation in developing tourism in Jordan.

Being a Jordanian citizen, I have had the chance to compare the level of interpretation and presentation between the different archaeological sites in Jordan. This allowed me to conclude that the principles of archaeological interpretation have not been used in the right way.

This comparison has raised questions related to the interpretation and presentation situation in Jordan's cultural heritage:

- What are the themes that could be addressed through interpretation and presentation in Petra?
- Why should we start enhancing the interpretation and presentation methodology in Jordan and Petra?
- What is the relationship between interpretation and sustainable tourism?
- Can interpretation and presentation help solve some management issues?

Unfortunately, very few published books exist on archaeological interpretation and presentation. This made the development of this thesis more challenging.

Tourism is a critical industry in Jordan. The country is implementing plans to enhance the quantity and quality of its visitors. Jordan has a large number of highly significant cultural heritage sites. The Ministry of Tourism and Antiquities (MoTA) and the Department of Antiquities (DOA) are striving to improve the quality of visitation while preserving cultural heritage sites for the future (Tables 1 - 5).



Improving interpretation at the sites is one way to accomplish this. In economic terms interpretation develops a high-quality product making visitation highly attractive and of a greater value. For the people of Jordan, interpretation allows a better understanding and appreciation of their own heritage. This helps in building a protection for the sites in the future. And actually, Jordan archeological sites needs to achieve both goals.

Successful Interpretation of archaeology and heritage is one of the main reasons for visiting an archaeological site, and its the key element in any heritage tourism site development. That's why a heritage site can never reach its potential without having an interpretation plan, programs and services (Tamwoy 2007: 42).

Through interpretation the general public can be made aware of the scientific and historical values of key archaeological resources at Petra or other archaeological sites. By informing visitors about these values, the public can be enlisted in the effort to preserve the whole range of cultural resources in Petra.

## **1.2 Statement of the Problem**

The lack of interpretation and presentation in Petra is one of the major problems facing the proper management and utilization of this unique site. Several archaeological excavations have been conducted at the site and many scientific papers have been published about the archaeological back ground of the site. However, these reports and papers are individual and irregular efforts and have not reached the level of presenting a coherent and a well-constructed story of the site.

Interpretative provision in Petra is limited and not that successful:

- There are degrees of authenticity and guidance which do not provide visitors with a stimulating and enjoyable experience.
- The challenge is to find ways of engaging visitors, not only to the value and significance of a site but also to raise awareness of its vulnerability.

On several occasions, visitors to the site have observed that there is neither any true interpretation nor presentation, and if it does exist, it is very weak and fragile and needs a lot of care and attention to reach the level that an important site like Petra deserves.

Several charters, principles, conventions and guidelines have explained the original role of serious and effective interpretation in heritage conservation.

In Jordan, many of cultural sites lack for a clear interpretive methods, sparkle, excitement, fun, experience and benefits to the visitor. Visitors leave the site without a full understanding, experience, communication and involvement within the site. In the case of Petra, the existing interpretation and presentation focus on some parts of the city through ineffective practical techniques without enhancing the attraction and the drawing the attention of the visitor.

Petra visitors satisfaction were noticed by the Ministry of Tourism in Jordan (MoTA) which indicates un-satisfaction with the experience of visiting Petra that is lower than one would expect, regarding the spectacular nature of the site. This undoubtedly is related to the quality of interpretation at the site. Some visitors leave with at best a partial understanding of what they have seen, who built it, and why it is important.

There is also widespread concern from the Ministry of Tourism that visitors are not spending enough time at the site to provide income to hoteliers, restaurateurs, and others associated with the tourism industry in the area. While very precise studies of visitor behavior have to be undertaken, for those who have taken a day or two, to observe this behavior it was noticed that visitors simply are not very aware of the significance of the sites beyond Al-Khazneh, or, in some cases, that these sites even does exist.

### **1.3 Significance of the Problem**

Interpretation strengthens and enforce the relationship between the community and its heritage, and may also provide economic and social benefits for the society.

Heritage can participate in presenting our country to other nations and regions in the world. It helps effectively in building the national identity and provides a huge potentials for developing links between people and site; between the past, the present and the future.

Proper interpretation and presentation of the cultural tourist attraction sites in Petra can provide additional cultural tourism opportunities and diversify the tourist product. The researcher believes that through effective interpretation the mysteries and wonders of Petra can be communicated to a wide spectrum of audiences, which will result in a large increase in cultural tourism.

The city of Petra contains remarkably preserved ancient structures and monuments of enormous aesthetic and historical value, and buried archaeological sites that contain invaluable information about the ancient world. The city was originally the creation of the Nabataeans, Arab nomadic pastoralists who developed interests in the desert caravan trade hundreds of years before constructing the city.

From a general point of view, most of the sites in Jordan (10,400 listed sites and monuments) (Savage 2010) are of outstanding cultural and historical importance and must be considered as being in danger of loss, and the process of deterioration has increased dramatically over the last 15 years. The destruction of the monuments is induced by natural causes such as weathering and erosion as well as the impact of human activity, particularly tourism.

The agents and mechanism of destruction are totally obvious, and if we could guarantee that the preservation and conservation operations are done properly on these sites, we should take into consideration the behavior of the local community. Some areas in Jordan do not gladly accept any archaeological excavations or preservation due to poor economic conditions and the persistence of old stories of hidden gold underneath in certain archaeological sites.

Resistance to archaeological activities and illicit excavations could lead to ruin the site. This requires efforts to explain the importance of any archaeological site to the local community and involving local inhabitants with the excavations. Such initiatives might prevent the site from being ruined, and are needed to assure the protection of the site from any unwelcomed behavior (Albert *et al.* 2007: 84-85).

If the destruction process is allowed to continue, unique heritage will disappear and tourism (which centers on these sites) will diminish. Until now, there is no coordinating mechanism, and little collaboration between the different agencies involved with environment and conservation in Jordan. That's why many decisions are overlapping or contradictory, and the loss of good organization and wastage of national expertise available in Jordan.

The land current situation is perhaps the most serious problem to be faced, as many environmental problems stem from it.

## **1.4 Goals and Objectives of the Research**

The main goal of this study centers on how we can effectively transfer the spirit of place to cultural heritage sites using the dynamics of effective interpretation and design (including the use of new technology). Dealing with Petra as a case study, the discussion will focus on the concept that effective interpretation safeguards cultural heritage sites and gives meaning to places, fully engages its visitors and provides a context for ownership, personal experiences and memories.

This research will establish a methodology for interpretation and presentation techniques to be used in Petra and perhaps in other cultural sites in Jordan. All the sites in Petra will be part of one interpretation and presentation plan. This methodology should lead to effective interpretation and presentation based on the proposed design for successful presentation, which in return will increase memorable visitor experience provocation, understanding and involvement within the cultural site.

The promotion through a holistic approach of strategies for the interpretation and presentation of the cultural resources of the site of Petra, will enhance the understanding and enjoyment of heritage items by appealing to different audiences, different levels of experience and knowledge and different learning styles.

The study ultimate goal is to provide an innovative interpretation plan for the city of Petra to provide a better visitor experience. The unique nature of Petra can be transformed through good interpretation and will designed presentation.

This study will strive to provide an interpretation model of Petra that not only informs, entertains and promotes heritage assets to visitors but also encourages awareness and the need for effective partnerships; thus balancing the needs of visitors, with that of protection, conservation and the interests of the strategic goals and the economic and social well-being of the community in which the cultural heritage sites are located. Which aspects play an important role in the visitor experience? Each motivates the visitor to learn more and to focus on gaining an understanding of the comprehensive nature of its history and context and fragility of the site itself.

More specifically, this study will try to achieve the following objectives:

- Strengthening the relationship between cultural sites and the visitor.
- Providing communication strategies for specialists and non-specialists.
- Describing interpretive approaches and techniques that have been effective and useful in the past and critique the effectiveness of these techniques and methods.
- Increasing visitors' understanding and enjoyment of the site: the more people understand and enjoy their visit to the site, the more active they will be in promoting its preservation, both locally and worldwide; increased awareness can be accomplished through both on-site interpretation and off-site education, including on-line studies.
- Increasing visitors leisure time and time spent on the site; the more time visitors spend at the site, the more money will enter into the local community through different ways. Providing additional interpretive opportunities and activities that will encourage repeat visitation and extended stays.
- This work holds the potential to engage the visitor even more fully with the archaeological sites in Jordan. The visitor can be offered the opportunity to observe the developments on the site by creating access between the site and the visitor with fully interpreted and presented sites that create a clear image about the site for the visitor that will always be for the visitor an experience that they will never forget.
- A well developed site interpretation and education program will offer tourists and visitors a variety of opportunities to gain understanding and appreciation of site resources and the values they represent. These opportunities will provide knowledge of both site resources and the care needed to protect that site; it will also allow visitors to participate in a recreational activity or a dialogue about site resources.

## **1.5 Research Question**

The main question that this research tackles is how to reach and maintain the delicate balance of protecting and safeguarding the unique cultural resources of Petra on one hand, and enhancing the utilization of these resources for enjoyment of the visitors and sustaining socio-economic development of the hosting communities, on the other.

What are the innovative interpretive initiatives that should be developed to achieve the delicate balance between protection and utilization? How can the visitors to the site be motivated to learn more about the site and its values and to focus on gaining an understanding of the comprehensive nature of its history and context?

What are the strategies that should be adopted to maximize the benefits of the rapid escalation in mass tourism to Petra and to minimize the adverse impacts of this mass tourism on the site preservation? How can we respond to the challenge of finding ways of engaging visitors not only to the value and significance of a site but also to raise awareness of its vulnerability?

## **1.6 Research Hypothesis**

New criteria of interpretation can be developed with a clear guideline for the setting of regional orientation objectives, which will contribute to the raising of public awareness at regional planning level in Jordan and the whole area. The researcher has chosen Petra as a case study for several reasons:

- The importance of having criteria for interpretation in Jordan and Petra because many things remain hidden if they are not well presented. Some sites in Petra are still hidden and few visitors know about them through the local tourist guides; they can visit these sites alone or with the guide, which might be dangerous for them. These sites are not prepared with an infra-super structure.
- To prove that the Nabataeans were a people of innovations through selected themes that show their achievements and the level of technology they reached.
- The need to have a new plan in presentation techniques in Petra, for the important level that Petra reached on the domestic or international level, which goes along with the modern life and world standards.

Petra is a main source of the Jordanian income receives from tourism; the current situation must be improved.

## **1.7 Methodology of the Research**

The aims and goals of this study will be achieved by the development of an interpretation plan of the site of Petra. The plan will be based on research and analysis and plans to communicate the significance of the site.

Petra is a site that is of global significance, and as such, it attracts visitors from all over the world. Visitors spend approximately short time in Petra. The current status of interpretation of the site of Petra will first be critically reviewed and analyzed. This will be done by the evaluation and assessment of all interpretation and presentation works carried out in Petra against the well-established international standards in this field.

All published materials will be critically reviewed and implemented interpretation measures will be assessed based on field surveys, existing documentation (maps, pictures, aerial photos) and direct interviews with major stakeholders including site managers, visitors and local community leaders.

This evaluation will be used as a base for the development of an effective and innovative interpretation plan for Petra. The plan will identify key themes and storylines to be developed and will provide recommendations about interpretation media. It will include practical and specific advice about how to implement the plan.

The key themes and storylines will be developed based on the synthesis and interpretation of the published literature that covers the various aspects of the past cultures of Petra. The key themes will be used to reconstruct a coherent and entertaining story of the site. This story will be communicated by the utilization of a combination of interpretation media including Satellite data, GPS systems, audio tours, portable PC's and off-site interpretive technologies such as digital technology and multimedia

## **1.8 Thesis Structure**

The thesis is constructed in nine chapters and it will be as follows: In Chapters 1 and 2, which will present an introduction and a description of Petra and the Nabataeans which will discuss the historical and social background of them, The researchers has depended mostly on historians who lived in that era like Strabo (64 B.C.- 19 A.D.), and has also found a rich amount of a data in Nelson Glueck books and articles, mainly in “Glueck, N.: Deities and Dolphins: the story of the Nabataeans” which describes the historical situation in a very detailed way.

Chapter 3 will explain the innovation and technology of the Nabataeans; the researchers have selected three elements (themes) depending on their importance. Nevertheless, there were a lot of different references spread through books and articles in archaeological magazines.

Chapter 4 talked about the scientific meaning of Interpretation and Presentation, providing a historical background for both terms.

The researcher found a lot of references and articles that explain those terms from their early beginnings, such as Freeman Tilden's books which were one of the best references used, specially "Interpreting our Heritage" which could be described as the handbook for most of the interpreters around the world.

Chapter 5 describes the relation between interpretation and sustainable tourism in Jordan and Petra, and the importance of interpretation to Jordanian archaeological sites. Some studies were carried out by the Hashemite University in Jordan regarding this topic under the name of Tourism in Jordan, which were presented in the LIFE Third Countries Development of Methods and Tools for the Establishment of Good Environmental Performance in the Tourist Accommodation Sector in Jordan – Implementation of pilot studies.

In Chapter 6 the scholar will analyze and discuss the management plans done in Petra and talk briefly about their components. The researcher has not found many books which discuss and analyze these plans; there was indeed nothing better than the plans themselves.

As for Chapter 7, the researcher have tried to present some ideas to introduce the visitors to the three themes presented earlier in Chapter 3(Hydrology, Quarries and Pottery). The researcher refers to his field work at the site of Petra through pictures taken and interviews with different tourists and stakeholders.

In Chapter 8, recommendations and conclusions were submitted for the purpose of creating a better situation, and to focus more on the weak points which were found during the field study in Petra and Jordan.

The Appendix will be Chapter 9 which is mainly presenting most of the world documents and conventions that have discussed interpretation and presentation and their major role on heritage and archaeology.

At the end, a list of figures and tables is found, and finished with the bibliography

---

**MoTA:** The Jordanian ministry of Tourism and Antiquities, its mission is to develop an advanced tourism industry capable of utilizing its comparative and competitive advantages through highly developed infrastructure facilities and superstructure services and also to develop archaeological and tourism sites and resources to enhance the tourism product, extend tourist length of stay achieve higher, tourism revenues and create new job opportunities. Finally, to develop tourism awareness of the Kingdom's culture, heritage, civilizations, and archaeological resources within the framework of sustainable tourism development in harmony with local communities and non governmental organizations



## **2. Petra: A Historical Background**

## **2.1 Introduction**

"In the third century B.C., the Nabataeans made Petra the capital of their rich and powerful kingdom, filling it with spectacular buildings and carved facades, and making water flows to every corner of the kingdom". (Parr 1978: 230)

Today people living in Petra area live in modern stone and concrete constructed hillside villages, and Bedouin encampments. Remains of Palaeolithic campsites, together with flint artefact that are some forty to eighty thousand years old, have been found on the surrounding hills.

## **2.2 Geography and Location**

Petra lies on latitude 35 37` E and latitude 30 19` in the E desert of Jordan, 260 Km south of Amman and 133 km North of the Gulf of Aqaba (Figure 1), central to the main ancient trade routes south and North from Egypt and the Arabian Peninsula to Damascus. Petra has been a place for human habitation; the Pre-historic periods are well documented, as are the later Islamic periods. (Groom 1981: 209)

At the greatest extent during the first century A.D, the Nabataean kingdom encompassed the Transjordan region, as well as large areas of the southern Levant, the Sinai peninsula, the north western area of the Arabian peninsula, and sections of the Huran region of southern Syria. This wide expanse of territory included diverse topographical settings and different ecosystems, ranging from the harsh desert of the Sinai, Arabia, and the Negev, to the fertile regions of the Great Rift Valley, Jordanian highlands, and numerous oases. This diversity in environments and resources helped permit the Nabataeans to engage in a great variety of subsistence's and economic activities, including animal husbandry, agriculture, viticulture, and ceramic and metallurgical production, as well as other craft specializations.

In addition to this wealth of diverse natural resources, the territory of the Nabataean kingdom straddled many of the primary, overland trade routes of the time. This permitted the Nabataeans to gain control of the rich trade in aromatics and spices from southern Arabia, east Africa, and India, most of which had to travel by caravan across their territory to reach the Mediterranean markets. The Nabataean kingdom was ideally positioned to collect the main economic benefits from one of the most profitable commercial enterprises of the ancient world.

## **2.3 Climate**

The main characteristics of Petra's climate reflect the transitional location of the area between the Mediterranean climate to the west and north and the arid climate to the east and south. The average annual maximum temperature is 40°C., and the average annual minimum temperature is -1.6°C. The average annual rainfall ranges from about 50 to 300mm. (Shehadeh 1985: 13) (MacDonald 2000: 29)

The summer (May to September) is moderately hot, and the winter (November to March) is cold and harsh. The climate which existed in antiquity can be determined with some accuracy from some natural characters, such as the rise of the level of the Dead Sea the first century B.C. and the first two centuries A.D. (Rababeh 2005: 15)

Some scholars (Shehadeh 1985: 14) believe that the climate from the fourth to the end of the second century B.C. was relatively moist, but that the following three centuries were somewhat drier. At the beginning of the first century B.C., rainfall improved and the first two centuries A.D. were moist, and the rainfall was probably somewhat greater than at present.

The climate of the other neighbouring districts (to the south, west and east) is similar to the climate in Petra. The Negev, Sinai, and northwest Arabia lies in the desert and suffer from a lack of rainfall, sometimes extending to total drought. However, in the north, the area of the Hawran is known to be fertile and good for vegetation(MacDonald 2000: 31).

## **2.4 History of Petra**

About thirteen thousand years ago, an early seasonal village was established at Beidha, just north of Petra. The site was rebuilt and occupied year-around by a group of Neolithic farmers in about 7000 B.C. In addition, the presence of mineral resources made the region important. Bitumen and copper were the first metals introduced to humankind, have been mined and marketed since the earliest times (Rababeh 2005:16).

Nabataean Petra was founded 300 B.C.; the city start to expand and to be in development with later Roman administration of the city starting at A.D. 106; Byzantine invasion continued up to the 7<sup>th</sup> century A.D.(Markoe 2003: 63)

In the first millennium B.C., the Edomite rose to importance, during the 7<sup>th</sup> Century B.C., they built settlements, some of which were fortified in the mountains. The most notable of these are Umm al-Biyara and Tawilan, high above the Petra Basin. Subject to Assyria, Babylonia and then Persia, Edom became the center of an Arab state : "The Nabataean Kingdom" (Wardam 2007:13) (Figure 3)

The Nabataeans first appearance in the historical records was described by Diodorus, the Sicilian historian, who wrote in the first century B.C. In his description of the military campaigns launched by Antigonos against the Nabataeans, either to force them not to form an alliance with the Ptolemies, who were their main competitors in controlling the orient, or due to the desire of Antigonos himself to take hold of the sources of the Nabataeans' wealth. One of Diodorus' main sources was one of Alexander the Great officers, Hieronymus of Cardia, who was himself, involved in Antigonos' dealings with the Nabataeans and participated in Alexander's campaign as a historian. (Belloni 1995: 15)

Diodorus Siculus (1<sup>st</sup> Century) described the Nabataeans as an Arab people living in the region between Syria and Egypt. They were involved in the trade in incense and myrrh as well as exporting the asphalt thrown up from the Dead Sea; they were expert in the construction of underground cisterns. Diodorus described them as having the typical characteristics of a nomadic life style in 312 B.C. (Diodorus Siculus (1958) trans. C. Old father, p.16)

They didn't live in houses, and they used the strong rocks. Petra though un-walled as a refuge for their families and their goods (Diodorus Siculus (1958): trans. C. Old father p.17) This account is the essential starting point for any investigation into the origins of the Nabataeans (Parr 1978: 27-37).

The exact origin of the Nabataeans remains difficult to understand. Most researchers and historians present early Nabataean history in terms of the area, not people. It is vital to discover where the Nabataeans thought their origin was, rather than where it actually was. There was no Nabataean written source mentions the origins of the Nabataeans, and without a written source about themselves it will be difficult to get an answer for the location of their home land (Rababeh 2005:23).

Generally, it's an accepted fact that the Nabataeans were not Aramaeans and the facts suggest that they might have been Arabs. The Nabataeans spoke a form of Arabic although they used Aramaic for official correspondence. Whether their heartland south of the Dead Sea was their original homeland or whether they had migrated there from elsewhere are matters on which different views have been written (Healey 2001: 28, Schmid 2001:61).

The theory of continuity from Edomite (the previous occupants of much of the later area of the Nabataeans around Petra) to the Nabataeans was suggested earlier by several scholars. The first theory was suggested by Nelson Glueck, which focused on their original home in Mesopotamia. The evidence for this is the presence of a tribe called “*nbtw*” or “*Nabatu*”, who are one of many rebellious groups mentioned in the Neo-Assyrian texts, most scholars discarded this theory because “*nbtw*” in the texts mentioned differs from that of “*Nabaiati*”.

A second theory argues that the Nabataeans came from the southwest of the Arabian peninsula, known today as Yemen (Starcky 1955: 52) (Hammond 1973: 15) (Ball 2000: 366-367), some scholars in this respect (Glueck 1965: 44), assumed that as the Nabataeans' skills in both water and architecture must have been learned in south Arabia, where urban civilization had flourished for many centuries, their origin must therefore be sought there. The argument against this is that the Nabataeans' language, script and gods have nothing in common with those of southern Arabia (Parr 1978: 27-37; Graf 1990: 87).

The third theory suggests North Arabia was the Nabataean homeland. There are two versions of this theory: the first proposed North East Arabia, El-Hafuf, opposite the island of Bahrain; this view offers at least some solution to the confusing problem of their earlier homeland and immigration to Petra, by associating them with the earlier Nabayat residing at Sabu, based on a Palmyrene inscription where a “*God of Sabu*” is termed “*The fortune god of the Nabataeans*” (Milik 1982: 34-35; Bowersock 1983: 56; Parr 2003: 27-37).

---

**Edomites:** Traditional enemies of the Israelites, the Edomites were the descendants of Esau who often battled the Jewish nation. Edom was in southeast Palestine, stretched from the Red Sea at Elat to the Dead Sea, and encompassed some of Israel's most fertile land. The Edomites attacked Israel under Saul's ruler ship. King David would later defeat the rogue nation, annexing their land. At the fall of the First Temple, the Edomites attacked Judah and looted the Temple, accelerating its destruction. The Edomites were later forcibly converted into Judaism by John Hyrcanus, and then became an active part of the Jewish people. Famous Edomites include Herod, who built the Second Temple.

The second view of the third theory suggests the northwest Hijaz region of Saudi Arabia was their homeland (Hammond 1973: 15). This is based on considering the ethnic tribe (Qedarite) as lineage of the Nabataeans (Knauf 1986: 74-86). This view fails to explain the linguistic and cultural differences between the Nabataeans and the Qedarites (Negev 1986: 49).

*“There are several factors arising from this investigation of North Arabia, which suggest that the location of the Nabataeans was Northwest Arabia”* (Graf 1990: 77). None of these theories is conclusive and so far the origin of the Nabataeans is still difficult to understand.

Before the report of Hieronymus of Cardia preserved by Diodorus Siculus (1<sup>st</sup> century), it was difficult to prove scientifically the original background of the Nabataeans. Hieronymus had been at least in contact with people he thought of as Nabataeans and Arabs. His description reflects the situation in the late fourth century B.C. When the Nabataeans first arrived to Petra, and had not yet decided to settle their temporarily, probably they lived in a mixture of tents and houses (Schmid 2001: 42).

Since there is no evidence for natural caves (neither Diodorus (1<sup>st</sup> Century) nor Strabo (64 B.C. -19 A.D.) mentioned caves), it is more probably that the Nabataeans later carved them. Hieronymus of Cardia sees Petra as an occasional refuge and market place rather than a permanent settlement.

This description throws light on the first contact since the end of the fourth century B.C. between the Nabataeans and the Macedonian rulers in Syria. Antigonus (The One Eyed), one of Alexander the Great's successors, sent Athenaeus and then his son Demetrius to take over Petra in 312 B.C. (Diodorus Siculus 1958: trans. C. Oldfather, p.17)

During the third century B.C., the Ptolemies and the Seleucids were fighting over control of the Levant, the fight between them were more than just a conflict between two Hellenistic dynasties, the Seleucids' main interest remained concentrated on the west (Syria and Anatolia), but in addition to that; they made great efforts to maintain the eastern part of their empire, Mesopotamia and beyond, under their control. This rise of the Parthians (Tarn 1966: 34; Colledge 1977: 7; Musti 1984: 51; Heinen 1984: 40; Smith 1988:11), the nomadic people (The Parthians), from the middle of the third century B.C. onwards ruined the Seleucids efforts.

During the 3<sup>rd</sup> century B.C., the Nabataeans remained independent, they didn't act as a political force, but they were preparing for that. An inscription from Priene, dated to 129 B.C., mentions a local ambassador named *Moschion* son of *Kydimos*, who undertook diplomatic missions in various parts of the Mediterranean world, including embassies to both Alexandria and to Petra (Rostovtzeff 1941: 22). This source provides us with evidence of two important possible contacts with the Attalid kingdom, of which the Priene part was before 140 B.C.; the second was with the Ptolemies of Alexandria.

It is not clear why an ambassador from Priene was called in or by whom, or if he came to act as an independent negotiator. But he may have come to solve the problems of the piracy which were recorded briefly by Athenodoros (Tarn 1966: 34). Athenodoros was Stoic (School of philosophy) in mindset, almost certainly the source of Strabo's diversion from the philosophy of his former mentors. From his own experiences he provided Strabo with information of regions of the empire that would eventually be incorporated in his Geography, specifically the cities of Tarsus, further south on Asia Minor than Strabo's Pontus, and Petra, just north of the Red Sea. Finally, Athenodoros' noteworthy relationship with individuals of influence, including Cicero and the Roman Emperor, undoubtedly aided Strabo's integration into Roman high society.

It is probable that these problems appeared when the Ptolemies tried to avoid the Nabataeans by bringing goods to Alexandria through the sea route. If so, it would have been in Nabataean interest to upset this. This also may give an indication of the competition between the caravans of Petra and Alexandria in the second century B.C.

## **2.5 Nabataeans and Trade**

The prosperity and the power achieved by the Nabataeans drew the attention of the Romans. In 64 B.C., Pompey arrived to Damascus and organized Syria as a new province of Rome. He found new cities and re-organized old ones to form the Decapolis cities, most of which are located at the northwest margins of Nabataeans' territory (Bowersock 1983, 2003: 24, 54). But it appears to have had no effect on the Nabataeans' expanding trade.

The Romans were clearly envious of Nabataean commercial power, and for this reason, Pompey's officers undertook two campaigns to take Petra by storm (Josephus, 1960: "Complete Works" (The Antiquities of the Jews, the Wars of the Jews), p.69).

In 62 B.C. Aemilius Scaurus undertook a military expedition against the Nabataeans; however, they bought him off with 300 talents of silver (Josephus, (1960): “Complete Works” (The Antiquities of the Jews, the Wars of the Jews). p.70).

In 55 B.C., Gabinius undertook another unsuccessful expedition (Josephus, (1960): “Complete Works” (The Antiquities of the Jews, the Wars of the Jews) p.79).

After this, several alliances were formed between the Nabataeans and the Romans. Probably the Nabataeans’ kingdom became a client kingdom of Rome, as interpreted from coins showing the Nabataeans king with his camel kneeling in front of the Roman ruler (Schmitt-Korte 1991: 135-145).

In the second part of the 1<sup>st</sup> century B.C., Queen Cleopatra VII of Egypt intrigued to utilize the exotic goods from India for her kingdom, she suggested abandoning the Mediterranean and ruling the Indian Seas instead (Tarn 1966: 34).

Moreover, the accumulation of trade being brought to Petra over the traditional incense route (3b) was also one of her goals. For this reason, she asked Antony to give her some of the Nabataeans’ territory (Josephus, (1960): “Complete Works” (The Antiquities of the Jews, the Wars of the Jews) p.77). Probably along the Gulf of Aqaba (Bowersock 1983: 31).

In 26 B.C., the Nabataean king Obodas III faced a military voyage under Aelius Gallus sent into south Arabia by Augustus, who wanted to control the wealth derived from routes 1c3, 2b, and 3. This could not be achieved without the help of the Nabataean military guide Syllaeus who served king Obodas III and had been to Rome twice (Hammond 1973: 20); this expedition failed (Strabo: “The Geography of Strabo”: 2000, H.L. James, vol. II, p.13). Some archaeologists suggest (Hammond 1973: 20) that afterwards Augustus diverted the incense road (3) from Petra – Gaza to Coptos – Alexandria by route 1c3a and then directly to Rome.

A full description of Petra’s prosperity towards the end of the 1<sup>st</sup> century B.C. is found in the Geography of Strabo (64 B.C.-19 A.D.). He described the city with appreciation, and said that he found many Romans and many other foreigners have went there (Tarn 1966: 35). Moreover, their homes were built from stones and were costly. Petra at that time was well governed by a king of the royal family, and had a large population who lived a peaceful life (Strabo:” The Geography of Strabo”: 2000, H.L. James, vol. II, p.13)



During the first century A.D., particularly in the reign of Malichus II, control of the Romans increased in the area, and they started to bypass routes (1c1, 3b, and 1c3b) from Petra. It is likely that the Romans fostered these routes during the rule of Rabel II, who transferred the Nabataean capital to Bosra in Syria in A.D. 93. The precise nature of this shift is unclear, as Petra continued to be major center (Bowersock 2003: 25; Ball 2000: 372- 375).

It seems that the main factor for this move to Bosra was a response to the shift to using the land trade routes (Figure 4) which split from routes 1 and 2a, at the Persian Gulf. These routes went to southern Syria by 1c1b and 1b; instead of route 1c 1a which went to Petra. Bosra and Palmyra benefited from this change (Graf and Sidebotham 2005: 49; Buranski 1995: 60).

Roman Egypt took over more of the routes, and all the goods from southern Arabia were delivered directly to Alexandria. After losing control of the trade routes, the Nabataeans started to rely more on agriculture, as happened in the Negev (Negev 2003: 101-105).

It is possible that the agricultural wealth of Hawran was one factor for moving the capital there (Hammond 1973: 22). All of this didn't keep the kingdom strong enough to survive. The situation brought Petra into a slow economic decline. Petra and its area were included into the Roman province of Arabia in A.D. 106. The annexation was apparently peaceful, on the death of Rabel II.

At this stage, the differences between Strabo's description (64 B.C.- 19 A.D.) and the earlier information provided by Diodorus Siculus (1<sup>st</sup> century) described the people of Petra (the Nabataeans) as having a nomadic life style in 312 B.C. But Strabo (64 B.C.- 19 A.D.) mentioned that in 24 B.C. the Nabataeans had costly stone houses and painted molded works (Strabo: "The Geography of Strabo": 2000, H.L. James, vol. II, p.13)

These accounts show the notable changes in the Nabataean way of life between the third and the first century B.C. Diodorus (1<sup>st</sup> century) went back to Hieronymus of Cardia, but Strabo (64 B.C.- 19 A.D.) turned to an eyewitness of his own day, Athenodorus. Both accounts recorded the situation in very different terms. The best explanation for this is that there was major development from the 3<sup>rd</sup> to the 1<sup>st</sup> century B.C.; even their location between the two great Hellenistic powers of the Seleucids in Syria and the Ptolemies in Egypt limited their expansion during this period.

This period was a formative one, in which the Nabataeans tried to establish the basic structures of their kingdom after the decline of the Seleucids in Syria at the end of the second century B.C.; the Nabataean merchants improved their contacts with Syrian and Aegean trade centers (Rostovtzeff 1941:23-24). From that time onwards, their economy diversified and agriculture developed through the increased use of irrigation.

Therefore, it is clear that Diodorus Siculus (1<sup>st</sup> century) report reflects the situation in its early stages, while after two and half centuries, Strabo (64 B.C. - 19 A.D.) described the city towards its peak when the Nabataeans had both power of wealth, which allowed them to develop their construction techniques, and brought their architecture to the level described in general by Strabo (64 B.C. - 19 A.D.).

### - **Conclusion**

The growing wealth of the Nabataeans came from Petra's location at an important connection on the incense, spice and silk trade routes, which linked China, India and Southern Arabia with Egypt, Syria, Greece and Rome. Petra provided a perfect place for traders to stop and take some rest with a plentiful supply of water, and it became a huge entry spot for exotic goods from all over the world.

The Nabataeans get richer by applying taxes on merchandise which accepted and passed through the city and in-return they offered protection from looting tribes. There is some irony in this, as no doubt in their earlier nomadic days; the Nabataeans themselves would have been caravan raiders. The Nabataeans realized after they have settled that trade required peace and security, so they adopted a policy of avoiding confrontation wherever possible with neighbors envious from their wealth.

The gradual shift to sea trade as Taylor (2001: 52) explains, led to the decline of Petra's status as an overland trade center; with Palmyra now replacing Petra for overland caravan occupation after the decline of the Byzantine Empire, the city faded from view until European rediscovery in the nineteenth century. Further historical accounts (Taylor 2001: 53; Guzzo & Schneider 2002: 23; Glueck 1959; 1965: 25,18; Hammond 1973:23; Levy 1999: 25-27; Auge & Denzer 1993: 18; Bowersock 1983: 33; Bourbon 1999: 35-41;1982: 26) detail the many cultural and developmental influences the city experienced from invasions over many centuries under Scaurus (62 B.C.) and Gabinius (55 B.C.).

Despite the chaotic political climate, Nabataean political wisdom prevailed to maintain the establishment of an important trading empire with Petra as the main administrative, commercial and religious center.

Wardam (2007: 4) presume that the Nabataean agreement in the predictability of Roman dominance, and the commercial advantages of trade across territories consolidated under Roman rule, outweighed the advantages of independence. The city experienced Roman control under Tiberius, Caligula, Claudius, Vespasian and Hadrian, with administrative consolidation and territorial status change characterizing Roman dominance (Ortloff 2005: 2).

Allied to Rome, Nabataeans, under King Malichus, were participants in suppressing the Jewish revolt in A.D. 67 (Josephus, 1960: "Complete Works" (The Antiquities of the Jews, the Wars of the Jews) p.78), Rabel II (A.D. 70) then ushered in autonomy as a Roman ally that allowed Petra to continue its trade-based prosperity. Petra was formally annexed into the Roman Empire in A.D. 106 under Emperor Trajan rule.

Throughout this period, Caravan trade from Arabia, Africa and the East, with Petra as a key intersection joint maintained the city's wealth and supported the construction of commercial, ceremonial, administrative, manufacturing and water-supply structures equal with the city's wealth and status as an emporium city (Ortloff 2005: 2). Under Roman governance of Syria, the Nabataeans enjoyed relative independence, perhaps on account of tax and taxes on caravans to Cairo, Gaza, Damascus, traffic from Silk Road destinations.

## **2.6 Golden Age of Petra**

"Petra did not last long after designation of the Byzantine bishopric seat. Recent archaeological excavations in Petra have indicated an important complex of structures associated with this last function, but by the middle of the seventh century A.D. Petra appears to have been largely unpopulated. In the 12<sup>th</sup> century, Crusader forts were built and then soon abandoned. Petra was "lost" to the Western world until its "rediscovery" during the early 19<sup>th</sup> century, an event not unrelated to European colonialism, and perhaps a desire to capture in print the last bits of the world that remained unknown to and un-colonized by Europeans"(Petra National Trust, Management Project from 1969-2000, with other projects: 2010)

In the Nabataean history, there were several Golden Ages, During the First Golden age (100 B.C. - 100 A.D.) the Nabataeans were ruled by democratically elected rulers. In that era, they developed great cities, architecture, and a worldwide system of trade.

This was their economic Golden Age; later on, some attempts appeared to reunite the Nabataean Kingdom, but they failed for several reasons – most important was the Roman invasion for Petra and the new cities and political power that changed the importance of Petra, and also the trade routes were not in use which were changed several times.

The golden age (Healey 2001: 31) for the Nabataean building activity was the second half of the first century B.C. and the first and early second centuries A.D., especially the long reign of Aretas IV: "lover of his people". Some archaeologists stated that "Aretas IV sent ambassadors to Rome where they and their king were commemorated in a grand marble inscription on the Capitoline" (Bowersock 2003: 38).

In this period the Nabataeans' kingdom reached the zenith of its prosperity and started to achieve monumentality in its architecture, with buildings such as Al-Khazneh, the Theater, and Qasr Al-Bent. After all, the Nabataeans were an economic power, not political or military. It had profound influence over the world during its time.

In 106 A.D, the Nabataeans surrendered to Trajan; the Roman general at this time, Petra became part of the Roman Province of Arabia. After the transfer of the Roman Empire Capital to Byzantium in 330 A.D. under Constantine, Petra became the seat of a bishopric and by the 5<sup>th</sup> century A.D., Petra was the administrative center of the Byzantine province of "Palaestina Territa".

Although Petra's wealth had gradually declined because of the redirection of trading goods via sea routes (518 A.D.) and the greater traffic on the northern land routes that passed through Palmyra, it remained a wealthy and important center and a provincial capital.

Exploration and recording of the secrets of Petra by several visitors is the first phase, which began with the first visit in 1812 by the Swiss explorer Johann Ludwig Burckhardt. Many visitors followed during the 19<sup>th</sup> century and the beginning of the 20<sup>th</sup> century.

## 2.7 The Nabataean Architecture

Architecture was surely one such distinctive aspect of the Nabataean civilization; speaking of the architecture displayed in the city of Petra, the Nabataean capital, Philip Hammond remarks:

*“Here is probably the best example of the desert culture that brought Petra to her zenith and made her the queen of a thousand commercial holdings, ruling the trade routes that were avenues of culture from the fourth century B.C. to the end of the first century of the present era”* (Hammond 1962: 12). The monuments at Petra reflect an international character, an diverse combination of Assyrian, Persian, Egyptian, Hellenistic and Roman elements intermixed with native Nabataean (Arab) tradition (McKenzie 1990: 58).

Much of the dating of Petra’s monuments has been based on comparisons with the architectural details of other monuments throughout the Hellenistic and Roman worlds. In particular, the second style Pompeian wall painting (1<sup>st</sup> century B.C.) and the remains of the architectural fragments and rock-cut tombs of Alexandria, Egypt have been recognized as major sources of inspiration in Petra (Hittorff 1862:18, Lyttleton 1974; 1990: 19,41, Lyttleton and Blagg 1990: 87, McKenzie 1990: 69).

Many studies and reports after excavations in Petra have analyzed the architectural details of the rock-cut and free-standing monuments in Petra. These reports were based on stylistic comparison with architectural elements recorded at the early Nabataean site. (Shaer, Aslan 2000: 18)

It was expected that an important city like Alexandria influenced the early architectural style of Petra. Alexandria was part of the broader phenomenon of Hellenization that spread throughout the eastern Mediterranean world during the centuries following the death of Alexander the Great in 323 B.C.(Wright 1969: 66)

The Nabataeans contributed their own style and traditions to the architectural flavor of Petra; the contribution of local, eastern traditions to the architecture of Nabataeans and the Roman provinces were recently outlined by (Ball 2000: 373). The Nabataeans were masters of stone masonry; the soft sand stone of Petra made it possible for them to sculpt tombs, facades and statues.

### **2.7.1 The Nabataean Graves**

The first graves used by the Nabataeans which can be dated to the fourth and third centuries B.C. were the “Ditch Graves”, usually rectangular, dug in the stone and seen virtually everywhere.

The “Pit Tombs” are thought to be from a slightly later date and are subterranean funerary chambers which reached along a sort of conduit; the bodies of the dead were laid inside graves closed with slabs.

Very similar of these are the “Dromos Tombs” or “Rectilinear Tombs”; in this case the pit is replaced by a horizontal passageway, the façade is smooth and the door framed with simple pilaster strips or the mere suggestion of an entablature. For more complex funerary monuments made an appearance in the second century B.C., and were known as “Assyrian Tombs”. The first of these were very simple, flat façade crowned with a single band of “crow steps” motif patterns which opened a door, it could be also framed with half-columns; this type of tomb was a classically Nabataean version of models common in nearby Syria. afterward, a second band of crow steps was added above the first.

More sophisticated models developed over the next two centuries embracing Egyptian influences. In the meantime a particular type had been elaborated, called the “Nabataean capital”. The result of this evolution was the “cavetto tomb”, with a façade surmounted by a large curved cornice similar to “Egyptian modeling” above which are just two monumental crow steps (they are also called Stepped Tombs).

The front is often enclosed between pilaster strips with Nabataean capitals and the door crowned with entablatures of varying complexity. An elegant transformation of the previous type is the double cornice tomb in which an additional classical cornice is introduced below the cavetto cornice (McKenzie 1990: 76).

The attic between the two cornices may be filled with short pilaster strips with Nabataean capitals, and the façade is usually marked with two or four pilaster strips that frame an elaborate doorway, often topped with pediment, tympanum and Acroterions.

In the second half of the first century B.C., Petra adopted architectural motifs from the Hellenized west on a wide scale (such as the Doric Frieze and the floral-Corinthian capital), probably introduced by artists from Alexandria.

The splendid Al-Khazneh belongs to this phase and was the first example of “Nabataean classical style”. From this point on, there was increasingly widespread use of structural elements for ornamental purposes, frequently placed one on top of the other, with disorganized results.

The provincial nature of the Nabataean art, developed in a region fairly distant from the Mediterranean basin, in the middle of the desert, justified the continued use of native and outdated elements of decoration, such as rosettes and Contra Rampant animals.

After the middle of the first century A.D., the extremely rich architectural figurative repertoire was joined by an un-mistakable desire for scenic grandeur, and the rock façade reached colossal proportions, with orders of columns placed one above the other, imitating temple façades and theatrical backdrops. The Corinthian and palace tombs date from this period, while Al-Dier seems the fruits of an isolated attempt to assert the accomplished independence of Nabataean style from the Hellenistic formal language some pediment tombs, resembling the façade of the temple and exemplified by the Roman Soldier Tomb or the Wadi al-Najr Tomb, are in “Roman Classical Style”, subsequent to 106 A.D. (Rababeh 2005: 27).

The rock structures of Petra may seem to be the product of an incredible waste of energy but in many ways it is less demanding to dig a chamber in the sandstone than erect a similar structure because the walls and ceilings stand up by themselves. Observation of the “Unfinished Tomb” has revealed that the digging proceeded from the top downwards.

After constructing wooden scaffolding, the workers first squared and smoothed the rock face with hammers, chisels and saws, once the funerary chamber had been dug, the external surface was divided into squares with plumb lines and cords and the general outline of the various architectural divisions was marked. When all the parts in relief had been completed, the most important facades were probably given a thick layer of plaster as the fragile sandstone did not permit the execution of minute decorative detail (more to be explained in the Quarry Chapter) (Figure 19).

## **2.8 Farming in Petra**

The society of Petra supported themselves by farming and raising domestic animals. They built terraces in order to grow grapes and olive trees and bred camels, sheep, horses and goats.

Climate conditions including rainfall did not differ significantly from today, but the Nabataeans were professionals in water management, storing this precious resource in great rock-cut cisterns or channeling the rich natural supply from its source (Ain Musa), several kilometers away to the heart of the city. Remains of pipes, channels and cisterns can still be seen throughout Petra (more details in Hydrology chapter) (Hammond 1973: 15).

## **2.9 The Nabataean Language**

The Nabataeans spoke a kind of Aramaic tongue, the language spoken by Christ, and wrote with an individual Nabataean inscription, the fine brush strokes of which were perhaps influenced by the soft sandstone of Petra on which it was often written. Various rock-carved inscriptions have been discovered, not only in Petra but also throughout the Nabataean Kingdom; so far no archives have been found.

## **2.10 Religion of the Nabataeans**

Although many of the remains of Petra, tombs, temples, high places, stone god blocks (Betyles) and cultic niches clearly had a religious function, the beliefs of the Nabataeans relatively were known. They seem to have had a moderately small pantheon of Gods; the major two were Dushara: it's probably adopted from the Edomites, and his female counterpart Al-Uzza: which they brought with them from Arabia under her original name of Allat.

Al-Uzza was a god of springs and water and both she and Dushara appears to be the gods of fertility. Shortly Dushara became assimilated to Dionysus, the Greek god of wine. It is easy to see how this came about, as one of the Nabataean rituals associated with the dead was the celebration of funerary banquets at which wine was served, often in rock-cut dining rooms, known as "Triclinia" which were situated near to tombs.

In the same way, Al-Uzza later on became assimilated to the Greek goddess Aphrodite and the Egyptian Goddess Isis. The continuation of several High Places in Petra explains that animal sacrifice to the gods' was a common practice. These sacrifices would have been regarded as renewing man's relationship with the gods, with blood as the symbol of life. Seems that the dead bodies have been buried in family tombs with few funerary offerings and personal belongings.



# **3. A Few Distinctive Elements of the Nabataeans' Achievement**

### **3. A Few Distinctive Elements of the Nabataeans' Achievements**

#### **3.1 Introduction**

Every kingdom or nation whose history has been worthy of preservation, were remembered because of various characteristics or achievements that made them notable.

The old Egyptian kingdom was known for its great pyramids complexes, the middle kingdom of Egypt was known for its art and culture. In fact, there were several characters that were outstanding about the Nabataean culture. As Glueck says:

*“While their turn lasted, the Nabataeans wrought greatly, developing almost overnight into builders of magnificent cities, which are unique in the history of the handiwork of men. They became tradesmen, farmers, engineers, architects and artists of outstanding excellence” (Glueck 1959: 39).*

In my work, I have chosen three different themes, which were significant to introduce them intensively for visitors who they arrive to Petra, and create a link between the three of them, which will in return, these themes will provide a foundation for most interpretive structures in Petra. I believe that there are many other different ideas, themes and sub-themes that could be driven easily from the Nabataean culture and civilization, and from a magnificent site like Petra, but I have depended on the importance of these themes and what results could we get after interpreting and presenting them to all visitors in a proper systematic technique.

#### **3.2 Themes from Petra**

To give opportunities for exploration, significances are translated into a set of stories called "Interpretive Themes." Societies have always relied on the power of story to explore, clarify, and share ideas, meanings, and values that collectively form culture. Story is at the heart of human interaction, and at the heart of interpretation.

Interpretive themes are the broad, overarching stories that enable people to explore the significances of resources. They are factual significance statements that have been considerably translated into stories. Care is taken to assemble the ideas, meanings, beliefs, and values that seem to best fit together as related groups of thought, anchored to the specific resources of a place. The set of interpretive themes is complete when it provides opportunities for people to explore and connect to the entire set of significances.

### 3.2.1 Hydraulic System

The Nabataeans knowledge and mastery of the desert was the key to their survival there; it served both as a shelter and as a residence for them. It was a shelter in times of war and when they were being pursued because they could travel through it with a complete knowledge of it, something of which their invaders knew nothing.

It served as a residence to them because they settled down and made it their eternal home and caused it to flourish in a way that it had never done before. Naturally, all this required a huge amount of water. But in the desert where the annual rain fall was only four inches (Morris 1961: 42), how could such phenomena happen? In the Nabataean water conservation system. This is without a doubt the most amazing aspect of their culture; the success they have achieved in this area is no less than spectacular. Periods of rainfall were seldom and far between, and they realized the importance of taking advantage of what little rain they did receive.

As a result, they devised one of the most ingenious systems of water control and storage that have ever been known. If they were to survive and if their enormous trade empire was to survive, they had to somehow make use of practically every drop of rain water that fell in that area. They met the challenge. (Hammond 1987: 28) wrote of the need of such water control:

*“To control and maintain this empire, outposts, villages, and shipping centers, which provided facilities more sophisticated, as did those of the larger Nabataean centers elsewhere. This tendency toward urbanization and increased population densities necessitated advances in hydraulic undertakings. Furthermore, the commercial need for out posts demanded the food production in outlying areas be increased and that is the best use to be made of available water resources”.*

They devoted themselves to this exceptional task of conserving all the water that came into their way. It was a task that took several generations to complete; their determination was not without its reward, and proved to be the secret of their survival. An interesting fact is that all the time they were laboring at this project, all the other facts of their society continued to function capably.

Their efforts and success in this area have not been ignored by historians: *“They sought out drops of moisture with the same eagerness that hunters display when stalking game. They were motivated by the drive to survive in difficult surroundings and under the most inclement conditions. They knew how to take nature at its worst and make it yield blessings for man-kind. Their endless efforts, crowned more often than not by success, was to make wheat or barley or grapevines grow where none had ever been planted before and to tap or collect supplies of water where none was known previously to exist”*(Glueck 1959: 44).

In this engineering project, they achieved phenomenal success. One of the best pieces of evidence that demonstrates their capability in this task is the fact that many of the cisterns constructed by them are still useable (they have remained water tight) today (Morris 1961: 49).

There were two phases to this system: the first phase was to catch of water and channel it into the desired areas; the second phase was the storing of the surplus. The latter was accomplished through the construction of cisterns that were dugout of the earth and then lined with plaster to make them watertight. Diodorus (1<sup>st</sup> century) wrote about them:

*“Since they have prepared subterranean reservoirs lined with stucco, it furnishes safety. as the earth in some places is clay and in others is of soft stone, they make great excavations into it, the mouth of which they make very small, but by constantly increasing the width as they dig deeper, they finally make them of such size that each side has a length of one plethrum. After filling these reservoirs with rain water, they close the openings, making them even with the rest of the ground, and they leave signs that are known to themselves but are unrecognizable by others”* (Diodorus Siculus (1958): trans. C. Old father, p.17)

The rainwater was simply channeled into these cisterns and stored; they had other methods that they put to use in mountainous country. Natural fallout points in the cliffs were enlarged, and natural basins below were dammed up. In places where there were no natural basins below, they carved reservoirs out of the rock (Hammond 1962: 50).

Terracing was another method that they often employed; this method was used mostly in connection with agriculture. There was a system used which remains somewhat of a mystery to scholars today. Hammond(1962: 51) described it:

*“A final means of water control in these areas is the strangest encountered in either hydraulic engineering or Nabataean history, this is the use of the so-called Teleilat Al-Anab (Hillocks of Grapes).*

The majority of the hills throughout the Nabataean region were lined with channels made out of stones. They were constructed according to the contour of the hill, so that the water would run off through these channels to the catchment basin below.

On another hand, Morris (1961: 51) believes that the Nabataeans increased all efforts and employed every means to capture as much as possible of the little rain they did get. The result was that they never suffered from lack of water. History indicates that they in fact always had plenty of water. Many towns had one or two cisterns per house, thus, they had a sufficient amount of water for themselves, and many towns even provided public bath houses outside the city gates to be used by passing travelers and caravans.

For many years, all this work in water conservation was credited to the Byzantines, this situation continued until George Horsfield began to write detailed facts about the Nabataean culture. There had been some attempts in this direction prior to the time of the Nabataeans but these were not sophisticated as the Nabataeans system they employed.

Excavations that have analyzed water supply and sharing system of the Nabataean city of Petra in south-western Jordan indicates progress of all possible water resources using management techniques that balance reservoir storage capacity with continuous flow pipeline systems to maintain a constant water supply throughout the year (Ortloff 2005: 2).

Trade route networks that extended throughout much of the ancient Near East and Mediterranean world which intersected at Petra, brought development for water resources and strategic and economic importance, and allow the Nabataeans to sustain the demands of increasing population and city elaboration (Teller 2006: 202)

Petra development was subject to by many different aspects like: artistic architecture, cultural and technological adaptation from Seleucid, Syrophenician, Greek and Roman civilizations. The Petra water-distribution system included hydraulic technologies derived from these contacts as well as original technical innovations that helped to sustain the high living standards of city citizen throughout the centuries. (Figure 2)

Researches on the Nabataean water network have shown a design criterion that promotes stable flows and use of sequential particle-settling basins to filter drinkable water supplies. They also support open channel flows within piping at maximum flow rates that avoid leakage associated with pressurized systems and have the design function to match the spring supply rate to the maximum carrying capacity of a pipeline.

This demonstration of engineering capability indicates a high degree of developed skill in solving complex hydraulic problems to ensure a stable water supply and may be referred to as a key reason behind the many centuries of flourishing city life (Ortloff 2005: 3).

Many influences dominated the influential Nabataean cultural landscape over time, the sacred spring created by Moses, as described in Exodus accounts, has been equated with the Ain Musa spring outside Petra although controversy exists as to its location (and historical accuracy) and sites in Sinai must also be considered.

### **3.2.1.1 Historical Background of Petra's Hydraulic Strategies**

Various external cultural, political and technological influences color the history of Petra. As a result, the water-supply system may be expected to reflect adoption from the best civil-engineering practices of neighboring civilizations and innovations resulting from the demands of the complex topography and partial water resource base of the area.(Al-Muheisen 2009: 15)

Nabataeans innovation according to Ortloff (2005: 3) is derived from direct experience of desert water-conservation measures are also to be expected given the nomadic background of the Nabataeans. Egyptian, Mesopotamian, Minoan and Greek civilizations all utilized piping systems for water supply and wastewater drainage (Wardam 2007:14).

The techniques that the Nabataeans used in collecting water, many of them have lived long in the area, as the use of the cisterns to collect rainwater from runoff areas when the Nabataean realm grew and they became more settled, they have adapted new ideas to support growing population in the area and the change of life style. There were a variety of techniques used in water preservation in Petra and al-Humeima (Al-Muheisen 2009: 16) (Foote 1999: 89)

An early example of the Nabataean ability to learn from prior technologies is the 27-km-long Humeima canal from springs in the Sharma Mountains to a Wadi Rum outpost, attributed to Oboda I (96–86 B.C.) (Taylor 2001: 54).

This subterranean canal indicates that low-angle surveying technology was already understood –perhaps adopted from Greek and Roman geometric traditions (Cohen & Drabkin 1966: 27-29).

Combined with hydraulics knowledge from earlier sources this canal demonstrated it was possible to design a canal that matched spring output to canal carrying capacity. These examples indicate that while knowledge of piping systems was widespread in archaic times, initial use was mostly associated with elite civil and temple structures (Ortloff 2005: 3) (Bedal 2004: 22).

Canal-building technology was widespread throughout the ancient Middle East and primarily used for agricultural purposes (Ortloff 2005: 4). Step by step it was extended to city-wide piping networks. An early technology base, facilitate pipeline and canal systems, existed well before Nabataean times and was surely available to aid in the planning and development of Petra's water system (Al-Muheisen 2009: 15)

Contact with many cities benefiting from the Roman restoration of water-supply systems (Ortloff & Crouch 2001:16; Crouch 1993: 41) undoubtedly accelerated knowledge of city-wide water systems that could be used at Petra. The partial water resources (springs and rainfall capture) and composite mountainous topography of the Petra area, that old ideas required new thinking to produce a distributed water system that give a stable, year-round water supply, given variations of seasonal rainfall and spring flow.

The theme here in Ortloff (2005: 4) opinion relates to the archaeological record of Nabataean solutions and innovations to the water-supply demands and requirements of a large urban population that was growing year by year. Modern computer simulations of hydraulic phenomena (Lewis 2001: 16) within ancient piping systems can reveal further knowledge underlying Nabataean pipeline design and water management and reveal subtle aspects of their contribution to the hydraulic sciences (Lawlor 1974: 37).

### **3.2.1.2 Classification of the Hydraulic System (Nature – Element- Component)**

The urban core of Petra lies in a valley surrounded by high mountainous terrain. Seasonal rainfall runoff passes into the valley through many canyon streambeds, and drains out primarily through the Wadi Siyyagh. Early stages of urban Petra depend on open channel water delivery from the Ain Musa spring outside the city along through the Siq.

The water channel crossed the entire length of the city before exiting into Wadi Siyyagh. Establishing this complicated system required changing the occasional Wadi Musa River that used to pass through the Siq, throughout dams and tunnels construction.

Later phases of urbanization reveal a built-in approach to water-system construction and management, confirmed by new features such as surface cisterns to capture rainfall overflow; deep underground cisterns; various pipeline systems and storage reservoirs; floodwater control through diversion dams and tunnels; supply system redundancy to ensure water release from multiple spring and reservoir sources; and pipeline sand particle filtration and removal basins (Figure 9).

Wardam (2007: 24) indicates that these later modifications largely reproduce the need to bring drinkable water into the city core at higher elevations to serve hillside occupation zones above the valley floor. Since the open channel in the Siq ran along a path at about the same height as the lowest Wadi Musa riverbed, its ability to supply water to outlying urban zones above the riverbed was limited ( Al-Muheisen 2009: 18)

The later changes of the Petra water system show continual development of the urban water-supply system through time and reflect the application of newly acquired technologies integrated with indigenous hydraulic innovations to provide for the increasing water needs of the city.

The technical methods to capture and store a fraction of the rainfall runoff through dams and cisterns, to build flood-control systems, to build pipelines and channels to deliver water from distant springs, and to manage these mutually dependent assets to provide a continuous, year-round water supply to the city is essential to understand the Nabataean contributions to hydraulic technique and science.

While water storage was a partial key to the city's survival, a number of springs internal and external to the city (Ain Musa, Ain Umm Sar'ab, Ain Braq, Ain Dibdiba, Ain Ammon, al Beidha, Ain Bebdbeh) provided water that was channeled and piped to the city. This constituted the major water supply of the city center.

The complexity and cleverness of the water-supply systems in Petra was commented upon in antiquity (Strabo: 64 B.C- 19 A.D) as a remarkable achievement, given the apparent lack of traditional water resources in the area. Strabo's commentary : “. . . *and the inside part of the*



*city having springs in abundance, both for domestic purposes and for watering gardens . . .*' reaffirms that springs were a vital part of the city's water resources.

The main Petra water supply originated from the Ain Musa spring about 7 km east of the town of Wadi Musa, joint with water of the minor Ain Umm Sar'ab spring. This supply still serves the modern town and the connected tourist complex, located outside the Siq entrance. The Siq is a 2-km-long narrow passage through the high mountain range bordering the eastern part of the city core; the sharp, canyon-like walls of the Siq provide nature's preface to the architectural masterpieces ahead in the city center (Wardam 2007: 25).

Nabataean urban development early phases predating the construction of pipeline systems, the main drinkable water supply derived from open channel (2 to 2.5 m wide and 1.0 m deep) transporting Ain Musa spring water through the Siq (Ortloff 2005: 4). This channel, extended through the urban center of the city as far as Qasr al Bent, with final drainage into the Wadi Siyyagh (Al-Muheisen 2009: 65).

As Ortloff (2005: 4) emphasized that Dam and flood bypass tunnel construction at the Siq entrance, together with infilling and paving of the Siq floor to reduce flooding, has left the channel under the current pavement surface. This pavement is attributed to Nabataean construction under Aretas IV and later Roman paving efforts.

Recent excavations in-front of the treasury are 5m deep, and revealed remnants of this early open channel as well as early tomb cut into mountain walls antedating later treasury construction. Hexagonal paving slabs and a water basin existed in front of the treasury location in this early phase (Taylor 2001: 55).

While this channel provided water to early phases of the city, the later attention of urban settlement in areas north and south of Wadi Musa complete with temple, administrative, commercial and civil structures, indicates a transition towards full city status and a hierarchical, stratified and cosmopolitan society involved in trade and commerce.

This created demands to increase water supply and distribution to spreading urban settlement areas resulting from population increase (Ortloff 2005:4). There was also such kind of a desire to match the city's prosperity from trade with appropriate symbols of success. Wide use of pipelines followed to bring larger amounts of water to areas not reachable by the old, low elevation, open-channel system.

Flows in poorly-designed pipeline systems are able of an astonishing number of transient, self-destructive hydraulic instabilities like: (Water hammer, pressure surges, transient wave structure, flow intermittency, internal oscillatory hydraulic jumps, turbulent drag amplification zones, vapor-pocket formation resulting from transition between full and partial flow regions).

Analysis of Petra's piping systems supplies an insight into the available technical knowledge that was applied to solve problems and the design principles that were utilized in this area. Additional considerations connected to seasonal reservoir and cistern water storage and the routing of pipeline paths to attain a constant year-round water supply to the city core.

This required a bureaucracy to manage the evolving level of complexity. Contour paths had to be surveyed through rocky, mountainous terrain, and choices made of pipeline hydraulic technical parameters (slope, diameter, internal wall roughness, sinuosity, and supply head) to match carrying capacity of the pipes to the spring flow rate.

These parameters, as extracted from the archaeological record, as well as insights into the management strategy of these assets, help to assess the level of technical achievement of Nabataean engineers (Ortloff 2005: 5)(Bellwald 2003: 5-8).

Channels from this basin fed cisterns at the base of the mountain, adding water between Jabal al Khubtha and Wadi Mataha. Surplus water, after filling the cistern, was directed to the main city fountain (Nymphaeum) through either a pipeline or subterranean channel. Although no traces of this connection have been excavated, pipeline a systems point of view, the Zurraba reservoir served principally to maintain cistern levels in the Royal Tomb area by irregular water release.(Figure 21)

The Ain Musa spring provided the continuous supply for the Nymphaeum through piping, supported in a carved channel through the Siq that collected from rainfall runoff for urban housing needs and rituals at nearby tomb complexes. While runoff capture probably supplied the Zurraba reservoir, local spring sources, including Ain Musa, were also important in the early phase of city development and may have also contributed water to the reservoir (Ortloff 2005: 5) (Bedal 2004: 18).

Even though the modern town has clean out ancient hydraulic connections to and from the reservoir, there is no topographical constraint to a channel path which would have directed reservoir water into the open channel (or into a later pipeline system) to provide additional water supply (Figure 10).

The Jabal al-Khubtha pipeline appears to be the main out-flow path for reservoir water in the area remains which suggests this connection. From replaced the earlier open channel. The Zurraba reservoir also served as a back-up system for speedy delivery of large volumes of water at short notice to Jabal Khubtha cisterns and served to raise the continuous, but declining, water supply to the Nymphaeum from the Ain Musa spring during dry seasons.

The ability to provide an ‘on-demand’ water supply from this backup source would have been most useful to large caravans entering the city that would place a sudden demand on water supply and usage (Bellwald 2003: 9-16) (Ortloff 2005: 5).

### **3.2.1.3 Significance and Values**

The Nabataeans have invented one of the most sophisticated water management systems in the world, and one absolutely suitable to their desert home. Some scholars have suggested that the Romans learned how to manage water in dry environments from the Nabataeans. There was sufficient motive for this: the Nabataeans first came to power and wealth by exploiting their knowledge of the locations of water in the Arabian Desert, and by safeguarding these precious resources.

According to papyri found at Nassana in the Negev, the Nabataean water system permitted the successful cultivation of barley, wheat, legumes, grapes, figs and dates (Evenari and Koller 1956: 99). Many of the ancient channels and terraces are still extant and some continue to be used by the local population. ( Al-Muheisen 2009: 70)

The remaining structure are those of cisterns and pools, water reservoir, either cut into bedrocks or been built. As the Nabataeans gained more wealth and prospered, their increased standards of living and settlement needed more water to meet their needs.

The Nabataeans managed water resources for Petra, and the agriculture that sustained it, through a complex system of dams, water channels and pipelines, settling basins, reservoirs, and cisterns cut into the rock, which protected the precious water from the desert sun. This concentrated and stored the heavy rains of a short wet season.

It also minimized the erosion that flash floods might otherwise have caused the city. The Nabataeans also lined the Siq with water channels and water pipes to carry water into their city from distant springs. The most productive of these is “Ain Musa” in current-day Wadi Musa.

Archaeological excavations in Petra have registered more than 200 water storage-related installations such as cisterns, tanks, with total capacity of about 40 million liters, enough to sustain a population of more than 100,000.(Edith 1986: 45)

#### **3.2.1.4 Innovation and Creativity**

Early use of spring-fed pipelines in Hellenistic cities of Ionia, mainland Greece and the Greek colonies (Crouch 1993: 50) and in contemporary Roman cities indicates that pipeline technology was well developed in many parts of the ancient world and was available for assimilation into Nabataean water system.

The Nabataean systems are unique in that water conservation practiced on a much larger scale and irregular supplies from seasonal rainfall were exploited to sustain the city through dry seasons. In essence, the Nabataeans utilized all possible above-and-below ground water supply and storage methodologies simultaneously (Ortloff 2005: 6). While water storage in contemporary Hellenistic cities also emphasized cisterns for household use, the Petra systems improved this technology to citywide systems with complicated dams and cisterns that served both water storage and flood control purposes.

Water storage in aquifers was promoted through dams; this allowed for use of wells as a backup system where should all other supplies fail. Provided a cistern could be made deep enough, it would be re-supplied from groundwater, a technique well known in Bronze and Iron Age cities of the Near East.

---

Qasr el-Bint, the temple of Dushares, has the largest facade in Petra ( 4 m wider than the Khazneh and the Great Temple). Each of the column drums of the temple must have weighed around 7 tons. The masonry, the craftsmanship and the ergonomics of its construction indicate that Qasr el-Bint was a very costly project. Wooden courses inside the masonry secured the elasticity of its walls.

Additional benefits from the Nabataean design derive from use of partial flow in the piping which greatly reduces leakage rate as compared to a pressurized system (Ortloff 2005: 6). Since particles settle in the reservoir, no particle transport occurs to clog piping –this is particularly important as access to the high-elevation piping (25 m above ground) on the near-vertical Khubtha mountain face would prevent easy cleaning (Wardam 2007: 24).

The combination of all these features indicates that much thought and experience went into the design of this system which achieved multiple goals that ensured not only system longevity but also rapid, stable, on-demand water delivery with minimum leakage. Cisterns and dams on Jebel el Khubtha (Akasheh 2003: 17) captured and stored rainfall runoff. Some of the upper-level cisterns appear to have channels leading to ground-level cisterns that fed urban housing or field areas to the west of Jabal Khubtha, supplementing the water supply from the Zurraba system (Ortloff 2005: 6).

Irregular springs located on Umm el Biyara may also have been important in ancient times; the Arabic name for this mountain translates as ‘Mother of Springs’ . As previously mentioned the Siq open channel was abandoned in late Nabataean phases and replaced by a pipeline system that extended to the area opposite the theater district and ended at the Nymphaeum. Thus at least two separate supply lines led to the Nymphaeum to ensure supply redundancy.

The construction of the Siq pipeline system is generally attributed to Malichus II or his predecessors, Aretas IV or Obodas III, in the first century B.C. or early first century A.D. (Guzzo & Schneider 2002). Water demands south of Wadi Musa were high on account of the nearby marketplace, theater, temple and housing districts and significant water resources were available from the north-side piping systems. A pipeline connection from the Nymphaeum to this area was therefore a logical use of surplus water for development of this area (Ortloff 2005: 6)( Al-Muheisen 2009: 89)

A bridge most likely carried water from the north side of the Jabal al Khubtha system in the El Hubtar Necropolis area across the Wadi Musa in the surrounding area of the theater but all traces are lost due to extensive erosion flood damage. In addition to water delivered by these resources, the theater supply was supplemented from large, upper-level reservoirs in the Wadi Farasa area and pipelines originating from Ain Braq and Ain Ammon sources (Ortloff 2005: 6) (Lawlor 1974: 38) (Bellwald 2003: 5-8).

According to Ortloff (2005: 9), all of these factors indicate built-in supply redundancy from multiple sources. Some of the larger reservoirs, therefore, appear to function in connection with a spring supply system and are situated to collect regular rainwater runoff. Therefore, reservoirs were mainly to provide water for occasional peak requirements through piping or channel systems (Akasheh 2002: 12).

On the other hand, surface cisterns appear to be placed to collect rainwater runoff; other than seasonal rain recharge, when piped water was not readily accessible. The frequent, widely scattered catchments appear to serve local community needs for supplemental supplies of lower-quality water. Traces of a south-side piping system are found in front of the theater.

Hadrian's Gate separates the spiritual district from the western sacred temple district containing the Great Temple, the Temple of the Winged Lions and Qasr al Bent. The gate reportedly had a gilded door to control traffic between sacred and secular parts of the city (Ortloff 2005: 9) (Akasheh 2002: 14). The Paradeisos water garden west of the gate consisted of an open house situated on a platform island within a large water-filled basin (Ortloff 2005: 9) (Bedal 2002: 12).

Strabo (64 B.C. -19 A.D.) mentions that the city contains many gardens', consistent with recent excavation results. The basin walls contain overflow channels as well as supply piping that may originate from both the Nymphaeum via a bridge connection and from a south-side spring supply system (Strabo: "The Geography of Strabo": 2000, H.L. James, vol. II, p.13). Overflow water from the garden may then have been directed to lower baths, chambers or workshops (Browning 1982: 38) close to the containing walls of Wadi Musa before final discharging into the Wadi Siyyagh.

Since the south side of the urban core contains the marketplace area, water requirements were high; consequently, additional supplies were channeled to this area by means of an underground channel. This drew combined flows from Ain Braq and Ain Ammon about 5 km southeast of the urban core along the sides of the Wadi Farasa to the southern part of the city. Some unexcavated branch of this system running through high-elevation channels may be part of the system that provided water to piping in front of the theater (Ortloff 2005: 9).

Water from these springs may have been supplemented by elevated cisterns in the Jabal Attuf area in one of the many high places of the city. Water for the Lion Fountain and al Haman sacred pool area in the surrounding area of elite tombs came from this supply line, which then continues on to the Great Temple area.

It is clear that a continuous spring supply was part of the system from large high cistern on a plateau above the Tomb of the Roman Soldier (Browning 1982: 39) also contributes rainfall runoff water to this system.

Details of the Wadi Farasa water system in this area have been investigated (Schmid 2002) and include large reservoirs and piping systems that not only serve local areas, but also have sufficient capacity to transfer water further west to the Great Temple area.

Numerous channels, pipelines and multiple cisterns within, and leading from the Great Temple, indicate that water supplies within the temple were abundant (Joukowski 1999; 2001; 2003: 17,33, 5). Pipelines from the Great Temple to the marketplace area and the Qasr al Bent region served as part of the water system.

Ain Braq, Ain Ammon, the spring in Wadi Turkmaniyah, multiple cisterns as well as a pipeline that may have crossed Wadi Musa from the north side all contributed water to the Great Temple and Qasr al Bent districts. A bridge abutment on the north side just west of the Temple of the Winged Lions contains some piping elements. These may represent just such a connection but the total configuration cannot be confirmed without further excavations (Akasheh 2002: 17).(Figure 20)

### **3.2.1.5 Network Management Operations of the Water Supply System**

The incorporation of piping networks transformed the water system to meet the demands of a large urban population (estimated to reach 30,000: Guzzo & Schneider 2002: 58). The Nabataean water system served both intermittent, on-demand supplies piped from large reservoirs or drawn from cisterns and continuous supply systems from remote springs to provide the daily requirements of city inhabitants.

These supplies were intentionally to meet demand fluctuations arising from special events in different areas of the city, superimposed upon daily requirements delivered to urban fountains (Bellwald 2003: 17-20).

Water supplies were brought close to population areas so that all were only a few minutes' walk away from fountains or supply basins (Ortloff 2005: 10). Regulation of the system required bureaucratic oversight, as decisions regarding storage or release needed not only day vs. night but also seasonal adjustments.

Efficiency dictated that no water could be wasted. As a consequence, transfer piping from north-side systems (Jabal al-Khubtha and Siq pipelines to the Nymphaeum) provided water that could be transferred to south-side downhill locations for further usage or storage before final release into the Wadi Siyyagh (Ortloff 2005: 11). In addition to spring systems mentioned thus far, water from springs in the Wadi Kharareeb and Wadi Ma'asara north of the city may also have been channeled as far as the Great Temple and Qasr al Bent areas although excavations have not yet verified the total configuration of pipelines and channels.

Additional water supplies were available from the spring at Wadi Siyyagh and elevated piping or channel systems above tomb facades east of the Wadi Siyyagh spring may also have fed water to a large terminal cistern in addition to piping originating in nearby valleys containing springs. An elevated channel probably supplied large cisterns in the area from either rainfall runoff collected behind dam structures or through connection to the springs in this vicinity (Ortloff 2005: 12) (Wardam 2007: 17).

Such a well-planned system required equally well-planned management that involved measurement of stored water as well as flow rates. The simple rectangular geometry of major reservoirs made water volume easy to calculate. Measurement of flow rates may have used techniques developed by Hero of Alexandria (Ortloff and Crouch 1998: 24) in previous centuries.

To add to this complexity, dam-based water storage presents yet a further aspect of Petra's water system (Ortloff 2005: 13). On the north side of Wadi Musa, numerous high-status structures in the quadrant "Temple of the Winged Lions, Royal Palace, North Defense Wall and Fortress, Conway Tower" are logically associated with a dam at Wadi Turkmaniyah that may have trapped and stored sufficient runoff to provide water to the lower reaches of the Temple of the Winged Lions, although no excavation data is available.



As emphasized by Ortloff (2005: 14), prior excavations reveal that lower portions of both the Temple of the Winged Lions and the Great Temple spanned the Wadi Musa stream by a bridge. A destroyed bridge abutment nearby contains pipe work that may have transferred water from the south to the north side of the city (or vice versa). Supply redundancy, achieved by laying pipelines from different water sources that crossed from one to another part of the city, is an aspect of the Nabataean design approach. This design philosophy ensures that water supply to any area may be composed from different sources depending upon variations in individual spring flow rates and reservoir or cistern supplies. Management oversight must have been in place to monitor and to control the system network efficiently.

The Nabataean state of mind sought to utilize all water resources. On-site dams constituted yet further complexity to water management. Local histories mention the existence of large dams one on the Wadi Mataha (Taylor 2001: 57), the other on Wadi al Nassara. Remains indicate that these dams provided water storage from rainfall runoff within urban Petra. Most likely, dams were in place in other valleys to store water and to limit erosion or depositional problems within the urban environment. The water stored behind dams additionally served to raise the water table, supplying wells as a backup for the cisterns.

A well exists in the Byzantine church, and there may have been others; as yet, none are reported from the limited excavation data. Judging from Nabataean placement of the Wadi Mataha dam, it must have been an additional third backup water source to the Nymphaeum.

The Nymphaeum could therefore be fed by water from the Wadi Mataha dam, by canal or pipeline from Ain Bebdbeh, by the pipeline along the western face of Jebel Al-Khubtha, and by the north-side Siq pipeline. This degree of redundancy indicates that planning for water-supply variations was a foremost consideration. It was addressed by a complex design that could tap into various water resources depending upon relative availability (Ortloff 2005: 14) (Wardam 2007: 18).

### **3.2.1.6 Technical Innovations Characterizing Nabataean Piping Systems**

The piping systems east of the Great Temple reproduce late Roman modifications to supply additional water for market and commercial structures along the Romanized Cardo. Sections of lead pipe running at the base of the platform of the Great Temple continued eastward towards this area. Lead piping usually indicates Roman manufacture so that identification with Roman modifications is probable. Low-fired clay pipes with fairly thick walls and socket ends are also characteristic Roman work (Bedal 2002: 80).

Wall thickness can range from 1 to 6 cm while piping segments range from 30 to 100 cm in length. Internal diameter usually ranges from 20 to 25 cm for most typical urban pipes and, while the internal surfaces are generally smooth, the socket ends involve significant constriction of the bore (Al-Talhi 2000: 45).

Roman pipe diameters (Vitruvius(1999) "Ten Books on Architecture", Book VIII,) are usually standardized throughout areas under Roman occupation; observed Roman piping in Petra generally conforms to standard categories.

In compare, some (but not all) Nabataean piping is made from high-fired clays with thin walls usually on the order of 5 mm or less with piping lengths of 30 cm or less (Ortloff 2005: 15)(Al-Talhi 2000: 46) (Bedal 2002: 18).

Short Nabataean piping segments are often the ideal design as they match more easily to sinuous paths and allow for near flush connections that limit leakage. For applications where piping is laid in long excavated channels (e.g., Jabal al Khubtha mountainside, Siq walls), flush mortar infilling was used to reduce leakage. While the Great Temple is of Nabataean origin, elements of Nabataean piping remain along with Roman piping (Ortloff 2005: 16).

Excavations have shown thick-walled Roman piping butted onto earlier Nabataean piping, most likely to push additional water to market areas of the Cardo from Great Temple sources. A further characteristic of Nabataean piping is that it is usually placed within channels cut into stone including channels cut into mountain slopes, The Siq walls and civic masonry then mortared over to yield a water seal and improved aesthetics for civil structures and greater security. Subterranean channels are found elsewhere in the Nabataean domain (Levy 1999: 28), and the concept of hiding water channels and sources served as a defensive measure to protect vulnerable water supplies, particularly spring sources distant from the city center (Ortloff 2005:17) (Lawlor 1974: 39).

Nabataean short piping elements are characterized by a relatively slight constriction at the junction and, within the piping interior, by sinusoidal ripple patterns with wavelengths of about 1.0cm and amplitude of 3mm. (Ortloff 2005: 18) piping in the Great Temple area and theater shows rippled interior patterns of this type. Experiments (Walsh 1980: 10) indicate drag reduction for ripple geometry similar to that observed in Nabataean piping elements. The use of such drag-reduction methods in Nabataean piping designs permits in Ortloff (2005: 18) opinion a higher flow rate (on the order of 5 to 10%) for the same head than for smooth interior piping.

This may constitute the earliest empirical observation that minor internal roughness in piping can increase flow rate, particularly where connection joints are smooth. Questions arise as to whether the ripple patterns are deliberate or simply a by-product from manufacturing processes, but their appearance in conjunction with smoother joint connections may represent a design refinement to improve flow rate, perhaps revealed just by empirical observation. (Figure 8)

If the piping lengths are very long, wall friction limits flow rate and increases in pressure head do not translate proportionately into flow rate increases (Ortloff & Crouch 2001: 25). For this reason, long pipelines, where feasible, are usually interrupted by open basins placed along their length, effectively to create short piping segments between (cleanable) head basins (Ortloff 2005: 17)(Bellwald 2003: 17-20).

Such a system permits higher flow rates than a continuous pipeline with no intermediate basins. Although this practice is experiential in Roman piping networks (Ortloff & Crouch 2001: 27), it is probably an innovation of pre-Roman times. The piping on the north side of the Siq provided the main potable water supply. The south-side channel, on the other hand, was probably meant for animal watering purposes and may have been supplied by a channel from Ain Braq and supplemented from a cistern atop the bluffs with a drop hole to this channel. This may have fed the south-side systems in the theater district but it is not possible to verify this connection at present (Lawlor 1974: 39).

### **3.2.1.7 Piping Design in Petra**

There are several different designs in the piping systems in Petra. For the Jebel al- Kubtha system, the Nabataeans can choose a slope on the mountain sidewall for the pipeline system and they select a slope that ensures a partial flow in the piping at critical height to ensure the maximum flow rate obtainable in the piping matches that of the spring source (Ain Musa). As there are about 30,000 piping joints along the 8+ km length of the piping, partial flow eliminates the hydrostatic/dynamic pressure that a full flow system would have thus reducing the possibility of leakage- here the partial flow system is at atmospheric pressure.(Figure 9)

The Siq piping system had 4 open basins along its length- presumably to easily remove sediments for better quality water for the city inhabitants as well as provide drinking basins for travelers walking in the Siq (the Siq opposite side water system is for animals). It is noted in antiquity that a long, full flow piping system has flow resistance that prevents higher flow rates even for large head increases.

Here short piping lengths (< 400 m) show that increases in head (water height in a supply basin) lead to proportional increases in flow rate. So what the Nabataean engineers do is to divide the piping into ~400 m segments connected by open basins to reset the head by the water height in the basins. Here the system can function in full flow mode as the basins submerge the outlet flow from a piping segment and then submerge the inlet flow into the continuing downstream piping segment. In short, the system can function in full flow mode but has "head resets" along its length through the open basins connecting piping segments. In this manner a higher flow rate is possible than if a continuous, uninterrupted piping length (of ~ 2 km length) were to be used. So the full flow exists in the Siq piping- but in a manner that incorporates open basins to obtain a high flow rate.

At one point where sinter deposits have clogged the Siq piping, the Nabataeans break open the top part of the piping and get open channel flow at reduced flow rate- this can be seen in the Siq piping today. We are not sure how many variations of Siq piping existed over the years and how much has been replaced in time as only the latest system that been found is all we have available for study.

The fact that few, Roman additions were made to the water-supply situation may be an indication that the Nabataeans had already browbeaten all available water sources and that Roman technological improvements could not considerably advance upon existing Nabataean technologies.

### **3.2.1.8 Condition Assessment of the Hydraulic System in Petra**

Several important academic researches and excavation projects are ongoing. The best agents to preserve Petra are the visitors themselves. Informing visitors of their potential impact can make a real difference in attitudes, encouraging tourists to see themselves as stewards of the incredible archaeology of the park.

The researcher have noticed that there are few interpretive messages beside the areas that may include a hydraulic system or part of it, and if there was, its most of the time distorted, and the sign is always facing the wrong direction of the point of interest that need to be interpreted. Most of the aqueduct needs a conservation preservation plan, you can hardly find a complete one there, and if so, it's not well preserved.

The most important sites that presents a great evidence of the water preservation techniques are neglected and absent like Siq al-Barid, where you can't reach it alone, with no signage and tour guides, where you can find there one of the complete systems of hydro-technology in Petra.

### **3.2.2 Quarries**

#### **3.2.2.1 Introduction**

The Nabataeans were masters in preparing the rocks that have been used in their buildings. They knew what type of stones they might need depending on the weathering stone factors and on the geological factors in the site. Each building or façade has its own type of stones, sometimes other factors could be a reason, like the distance, because it's expensive to carry a stone for long distance, therefore, the type of stone available in the region has usually been used for building within that region. The Nabataeans used high level technique in this process. They used different type of tools depending on the stone nature.

Quarrying is the very important part of the processes of stone masonry in Petra; stone blocks with exact size are the head product of quarries. Egypt played a major role in the development of quarrying techniques since the second dynasty, the quarrying technique, which originated in Egypt, consisted of isolating blocks from the parent rock by cutting narrow trenches around them (Adam 1994: 20-29, Arnold 1991: 31-33).

Quarrying was basically a technology developed in the Bronze Age and then developed in later cultures, once the appearance of metal tools facilitated and improved stone-working and the development of stratified societies that fostered the development of stone architecture and luxury objects. Because most quarries were open pits, prospecting, ventilation, and lighting presented fewer difficulties than in mining, and even drainage was easier to deal with (Abu-Jaber 2007: 5) (Adam 30-31)

From Egypt these techniques have spread throughout the eastern Mediterranean, including in the Aegean. Egypt, the Neo Hittite Empire of the north Levant may have passed some quarrying techniques on to the Greeks in the archaic period. The blocks quarried were not only used for building, but also for sculptures (Wealkens 1990: 60).

It is generally agreed, that the basic principle of quarrying remained almost un-changed from early dynastic times throughout the classical period (Ward Perkins 1992: 18). But the ways of splitting off the blocks show much greater variation (Wealkens 1990: 53-54).

In Petra, the city has been explored and archaeologically surveyed; the quarries have not been studied adequately. None of the studies talked about them or even mentioned something about them. (Pflüger 1995: 78, Shaer and Aslan 1997: 219-231, Linder and Gunsam 2002: 34) shed light in great detail on quarries. Up to the present, not all the sand stone quarries have been located.

### **3.2.2.2 Typology and Location**

Quarries in Petra are widely spread in the sand stone mountains, the Nabataean quarries were opened in every area of the city but there were certainly different factors which played a significant role in choosing quarry sites, some of these factors were:

- 1- The distance from the building.
- 2- The geomorphology and geological settings.
- 3- The effect of landscape.
- 4- The reason for opening any particular quarry.
- 5- Quality and the dimension of the blocks required.

### **3.2.2.3 Quarry Types in Petra**

Primary quarries were excavated in the hillsides mainly to produce blocks of sand stone. Quarries of this type have survived in some areas of the city, giving clear indication for them (Figure 15). Although sand stones resistance to weathering is low, the traces of the removal are very well preserved, luckily, it appears that these quarries were in use only in antiquity, since no later buildings using the same stone have been found. Moreover, there is no sign of the use of either explosives, or mechanical drills that could indicate that they have not been used in modern times.

The first group of primary quarries is Wadi Siyyagh quarries, which located west of the city center and northwest of Al-Habis, on the other side of Wadi Al-Siyyagh, in the south-west of Petra. The name of the quarry was derived from the name of the Wadi Siyyagh where it is located. It is composed mainly of sandstone which is related to the Umm Ishrin Sandstone Formation which forms a part of Rum Sandstone Group (Abed 2000: 131; Jasar and Barjous 1992: 10) (Figure 14)

The distance between Qasr al-Bent and Wadi al-Siyyagh quarries is at most 500 m., these quarries were mentioned by a number of scholars. The quarries consist of three zones and shapes:

- 1) The east part cut in vertical steps.
- 2) The west part with Conchoidal niches.
- 3) Central one cut in vertical curved surface.

The out-crops of the east and the central quarries lie in the smooth sandstone layer, whereas the west part of the quarries extends about 80 m. vertically from the smooth into the tear sandstone.

The Wadi Al-Siyyagh quarry has a vertical stepped shape with an average height of 25 m. the extraction area cannot be determined easily since the area in front is planted with olive trees.

Wadi Al-Siyyagh west quarries have a Conchoidal shape, which is unique to Petra. The surface of these quarries consists of Conchoidal excavations, like niches, each niche is about 14 to 25 m. High, 20 m. wide, and a maximum of 8m (Rababeh 2005:66).

These niches lies on the vertical rock, faces on either side of the Wadi, the purpose of choosing this shape of quarry was to extract building blocks from the huge and high quality smooth sandstone without having to cut down through the tear sandstone to reach it.

This smooth layer is uncovered in the lower (most 35 m.) of the 250m. tall south west cliff of Mountain Al- Dier and the north cliff of Umm Al- Biyara. The last zone, the central quarry, has a vertically curved shape, and extends along most of the southern side of the lower Wadi al-Siyyagh, between east and west quarries (Abu-Jaber 2007: 12).

The stone blocks used in the building can be traced back to separate quarry sites from specific sand stone types, Pflüger found (on the basis of a variety of petro-logical and sedimentary characteristics) that the fine to medium grained yellowish rose-colored sandstone used in building the Qasr Al-Bent probably came from the Wadi Al-Siyyagh quarries, in result, Wadi Al-Siyyagh quarries were in use from the second half of the 1<sup>st</sup> century B.C. it is estimated that, after subtracting the waste, a total of 31,500 m<sup>3</sup> of stone, was extracted from these quarries, 7000m<sup>3</sup> of which would have been required for the Qasr Al-Bent (Abu-Jaber 2007:33). The sandstone forming the quarry is characterized by mauve to red-brown color, hard, massive, and medium to coarse grain size. The quarry is located in the position that extends from 30° 32′ 991” to 30° 33′ 212” N latitude, and 35° 43′ 130” to 35° 43′ 531” E Longitude. The quarry has 401m of length and 221m of width. It's situated at about 840 to 862m above sea level.

Wadi Siyyagh Sandstone Quarry has a tendency that extends from east to west direction, which is parallel to the trend of Wadi Siyyagh. In the southern side of the quarry there is a ladder which had traces of pointed chisel.

The cutting blocks in Wadi Siyyagh Sandstone Quarry have a length that ranges from 1 to 46m. The sum of the length of the cutting block is about 1020m.

Access to Wadi Siyyagh Quarry can be through The Siq entrance and along the Colonnade Street which leads to Qasr al-Bent and then down to Wadi Siyyagh. The second way can be from the west through Wadi Siyyagh itself.

The second primary quarry is the Turkmaniyah quarry, which is located 300m south west of the Turkmaniyah tomb, about 200m North West of the city center. The out crop of this quarry lies in the lower third of the light colored, yellowish honey comb sandstone layer (Abu-Jaber 2007:34).

The hill extends from west to east and shows artificial stepped cuts the quarry contains three quarried areas surrounding the hill on the north and east, the total volume extracted, after subtracting the waste from this quarry is approximately 22000 m<sup>3</sup>.



The Turkmaniyah quarry is a new discovery, which contradicts the remarks of Browning (1982: 55) who described the back of a large double cornice tomb “cut a way to form a deep couloirs” but it really fits into our picture of using the back of the tomb as a quarry. Only the upper third of the tomb belongs to the quarry outcrop, whereas the lower part belongs to the tear sandstone layer.

The third primary quarry is Umm Sayhoon quarry, lies north east of the civic center in the extension of the Turkmaniyah valley, on the main road just below the new village of Um Sayhoon. The distance between the civic center and the Umm Sayhoon quarry is about 2km. the rock extracted belongs to the upper part of the honeycomb sandstone layer of reddish and mauve red colors.

The name of these quarries is derived from the village of Umm Sayhoon, which is situated close to them. Based on visual examination and the previous studies done on the area, it's clear that the quarries formed from sandstone. This group includes three quarries; Q1, QA5, and QA6, the largest one was Umm Sayhoon Sandstone Quarry (Q1) which is located in the northeast part of the study area between the international coordinates 30° 34' N latitude, and 35° 45' E longitude.

The access to Umm Sayhoon Sandstone Quarries can be through the road leading to Qasr el-Bent Monument from Umm Sayhoon Village. Umm Sayhoon Sandstone Quarry (Q1) is about 300m far from the main road, while QA6 is about 80m and QA5 is 100m far. Quarry Q1 is easily accessible while the way to QA5 and QA6 is rather difficult.(Figure 13)

#### **3.2.2.4 Umm Sayhoon Sandstone**

- **Umm Sayhoon Quarry (Q1)**

The Importance of Umm Sayhoon Sandstone Quarry (Q1) is being composed mainly of sandstone sedimentary rock. It is characterized by its relative hardness, and variation in color covering the range from red to yellow. It has a medium to coarse grain size. The exposed sandstone in Umm Sayhoon Quarry (Q1) is of Umm Ishrin Sandstone Formation (IN) which is related to Rum Sandstone Group (Abed 2000: 131; Jasar and Barjous, 1992: 55), particularly to the upper part of the formation. This quarry can be attributed to the "Honeycomb Sandstone Unit".

Umm Sayhoon Sandstone Quarry (Q1) is located between the international coordinates that extend from 30° 34' 107" to 30° 34' 185" N latitude and 35° 45' 000" to 35° 45' 022" E Longitude. The length of the quarry was 87m. (Rababeh 2005: 45) (Figure 16).

GIS mapping enables the calculation of the quarry stone cutting range which is between 1m to 18m facades length. The sum of the lengths of the cutting blocks was about 102.5m. The cutting blocks in Umm Sayhoon Sandstone Quarry were parallel to the joint surfaces (Jasar and Barjous 1992: 40).

The field investigation and the GPS recording data showed that Umm Sayhoon Sandstone Quarry (Q1) extends on one line with north to south trend. The quarry forms two separate flanking blocks that have the same orientations.

- **Umm Sayhoon Quarry (QA5)**

Umm Sayhoon Sandstone Quarry (QA5) is considered of being hard, massive, and has medium to coarse grain size. The color of the quarry is mainly mauve to brown. The sandstone of this quarry is related to Umm Ishrin Sandstone Formation (IN) which is related to Rum Sandstone Group (Abed 2000: 132; Jasar and Barjous 1992:41).

Umm Sayhoon Sandstone Quarry (QA5) is located between the coordinate 30° 33' 461" to 30° 33' 542" N latitude, and 35° 44' 392" to 35° 44' 410" E Longitude, and is 81m long and 18m wide. The length of the quarry was 90m. Based on the data recorded by GPS and the digitizing of contour line map, the quarry has an altitude of about 942m above sea level.

The GPS data and the GIS map show that the quarry had a cutting block that ranged in length from 4 to 52m. While the sum of the cutting block length was about 101m. The trend of Umm Sayhoon Sandstone Quarry (QA5) extended from north to south.

- **Umm Sayhoon Quarry (QA6)**

Umm Sayhoon Sandstone Quarry (QA6) is formed mainly of hard, massive, reddish-brown color, and medium to coarse grain size sandstone. QA6 is related to Umm Ishrin Sandstone Formation (IN) which is related to Rum Sandstone Group (Abed 2000: 132; Jasar and Barjous 1992: 42).

Umm Sayhoon Sandstone Quarry (QA6) is located between the international coordinate that extend from 30° 33' 621" to 30° 33' 633" N latitude, and 35° 44' 513" to 35° 44' 553" E Longitude. The quarry has a length of 40m and a width of 12m. The lowest point in the basal of the cutting blocks in the quarry was 943m above sea level.

The GPS data and the GIS map show that the quarry had a cutting block that ranged in length from 9m to 26m. While the sum of the cutting block length was about 46m. The trend of Umm Sayhoon Sandstone Quarry (QA6) extended from north to south. It's about 145m far to the northeast from Umm Sayhoon Sandstone Quarry (QA5).

Kennedy (2000: 23) mislabeled the quarry as a cultic site because he identified the blocks with trenches around them as "Idol Blocks". It appears from the stepped plan and the herringbone pick marks (used for quarrying rather than finished work) on the faces that the site was used as a quarry. (Figure 18)

Other quarrying activities can be found in a few scattered places showing traces of stone cutting. But these are smaller quarries and possibly were used to provide a limited product. Examples of these are the quarries located on the stepped path between the Street of Façade and the High Place. The rock extracted from these quarries is of the honeycomb and Disi sandstone types. The total volume extracted from the primary quarries excluding waste is 78,900m<sup>3</sup> (Rababeh 2005: 51).

### **3.2.2.5 Leveling Site Quarries**

Additional material seems to have been quarried from the city center itself, by leveling the site for further development, for example, the back of the great temple, the pool complex, and the middle and upper markets, also the leveling process seems to have been used in several places creating rock-cut monuments such as the high place, and the nearby obelisks. The outcrop on which these quarries are based is honeycomb sandstone.

Comparable activities can be seen in the Nabataean sites of the Negev, for example, at Oboda II period, where this method was used in order to level off a site for construction, and the builders were able to extract large blocks of stone. The terraces were quarried and leveled off to provide an even surface for the foundation of the buildings (Rababeh 2005: 52).

It's clear that the quarrying activities on these sites resulted in the structure of flat surface for the foundation of buildings, the same time they provided stone blocks for construction. It is estimated that total volume extracted from the back of the "Great temple", the "pool complex", and the "market" area is about 25,000m<sup>3</sup>, whereas the volume extracted from the high place and the obelisks 2500m<sup>3</sup>. This will give a total volume of 27500m<sup>3</sup>, excluding wastage.

### **3.2.2.6 Tomb Quarries**

Petra tombs were carved using the same techniques as those used in primary and leveling quarries. But their main aim was to cut the slope sufficiently to obtain a flat vertical surface for carving the façade. In order to prepare the vertical rock surface for carving a monument, a great deal of the extraction has to be removed from the tomb quarries, a total of 63,000m<sup>3</sup>. The largest volume of stone came from the tear sandstone (25,600m<sup>3</sup>) whereas the total volume extracted from al-Disi sandstone was the least 1700m<sup>3</sup>.

The discoveries from excavations in Petra these days are too few to re-construct plans for all Nabataean freestanding buildings; therefore, the volume of stone blocks used in the freestanding buildings can't be calculated exactly, but a rough estimate can be made from Qasr Al-Bent, which is still standing to its full height. The volume of stones use in a building is calculated by multiplying the total length of the walls by their width and height. This gives 7000m<sup>3</sup> for Qasr al Bent. This procedure can be applied to several excavated buildings such as the Great Temple and the Temple of the winged lions where the volumes are 15000m<sup>3</sup> and 3000m<sup>3</sup>, correspondingly. The footprint of these three buildings covers only 10% of the total area of the city center (Rababeh 2005:53).

### **3.2.2.7 Tools Used in Petra Quarries**

The Nabataean masons tried to get this important solid material by the easiest and fastest ways ever. In Oboda temple, in order to level the rock area to vertical the temple level, holes were dug to about 10-15cm deep. After that, pieces of wood were determined into the holes. Then, the wood was soaked with water and as it expanded, it created a crack. If the wood pieces were set in a line, then the whole line would crack. The rest of the work of cutting the stone is then done by hand with a chisel and hammer (Rababeh 2005: 45) (Figure 17).

The stones which were used to build the temple of Oboda were cut from a quarry about 1 km far from the site. At the quarry site, there were natural layers of stones (about 80-100cm high), similar to the course height of the temple. Stones were cut according to a border; this was noted on one of the stones which bore a rectangular mark made by a sharp tool to guide the mason. The stone was left on site and not used in the construction due to a crack at its corner. The size of stones varies from one area or building to another. (Rababeh 2005: 45)

The main quarry in Petra is in Wadi al-Siyyagh, the mountains where of solid sandstone. It seems that the required working area was firstly cut to make a flat vertical elevation. after that, steps were cut in the vertical elevation which made it easier to reach the top of the mountain. There are holes towards the top where the steps end probably to provide hand holds for better security. Stones were cut in a slab shape, and then wooden wedges were used to separate them from the rock.

On Al-Khubtha mountain there is a drawing of an axe incised on the mountain, a tool which might have been used in stone work. The Nabataean masons used chisels and hammers for their stone work. They smoothed the rock face by creating parallel lines of 15-30. Spaces between these lines vary between 6mm and 1cm according to the space of the working area. The spaces are usually larger on big areas (Shaer and Aslan 1997: 219-231).

There was no Nabataean texts or inscriptions dealing directly with the quarries have survived, only two iron tools for quarrying and finishing of stone rocks have been found: a pick and a chisel, tool marks on the faces and the bed of the quarries and the rock cut monuments provide clues to how the blocks were extracted from the rock. Such marks are still visible on the quarries of Petra.

The good preservation of the rock cutting allows us to study the quarrying techniques. The kind of conclusion that maybe reached by examining these marks will indicate what kind of technical methods were used to obtain the stone required. The technical knowledge of quarrying by the Greeks, Romans, and Egyptians, also helps to throw light on the quarrying techniques used by the Nabataean masons.

### **3.2.2.8 Extraction and Tools**

Normal steps of removal are similar, the quarry site should be arranged to extract the stone, roads had to be constructed, and the places where the waste could be discarded had to be marked (Abu-Jaber 2007: 89).

These are the general rules necessary for the quarries of today as in the past. Since most of the quarries of Petra are in the hills in the open air, the first step was to establish access to the top of the quarry. Then the top surface of the hills had first to be cleared of weathered rock debris, probably by picks and spades. Structurally, it is safest that the extraction should be from the top down. This leads us to examine the kind of scaffoldings that might have been used.

Cutting trenches into the rock to make blocks can be seen in different places in Petra, the width of the trenches range from 20 to 30 cm. it is likely that these trenches were carved with a pick, which left curving furrows corresponding to the quarryman hands movements. The traces are usually arranged in a herringbone pattern. The grooves are always slightly curved, and the spacing between them varies between 2 and 4cm. whereas those made by a chisel and mallet are generally straight or quite irregular (Rababeh 2005: 66).

One complete iron pick was found inside the uncompleted tomb of Al-Habis, it has two pointed ends with a total length of 32.6cm, and its width and thickness at the middle are 4cm and 3cm, correspondingly. It looks larger than those illustrated in martin. Bessac and Nehme suggest that the pick was probably left by one of the stonemason when the tomb was abandoned (Rababeh 2005: 66)

They suggest that the Nabataean masons used it in initial phase of carving the chambers and was probably not suitable for work in the quarries. Bessac suggested that this shape of pick is very specialized and used in south France for cutting narrow trenches. Similar to the shape of this pick is the incised pick found on the way to the high place. Another incised drawing of a pick found on the rock mountain of Al-Khubtha implies its use by Nabataean quarrymen.

In Wadi al-Siyyagh quarries, no trenches have been found, but the maximum depth of the trenches can be suggested based on the height of the drums of the columns of the pronaos of the Qasr el-Bent, c. 12 m. this height indicates that the maximum distance between natural faults is greater in the smooth sandstone than that in the tear and the Honeycomb sandstone, because the maximum height of a block depends on the vertical distance between the natural cleavage planes.

Information from local people in Jordan shows that this technique was in ordinary use until the 1960s; the wooden wedge technique is based on forcing very dry wooden wedges into the carved grooves, then soaking them with water.

This cause the wood to puff up and stand split the block from its parent. Cracks normally form at the base of the channel. The wedges would have been forced into two adjacent side of the block, to avoid the effect of opposing forces which would have been created by placing wedges on opposite side of the block. Quarrying using this method normally took place in steps as can be seen in the Umm Sayhoon quarry.

There are several advantages in using stepped or different level quarries. The first is that at least the top and front planes of the block are already clear before it is quarried, and this allows much quicker operation. The second is the high efficiency afforded for the quarrymen in splitting blocks from the edges of different areas at the same time.

This advantage allows more than one crew to work on the site, so that the amount of stone produced can be increased and time saved.

### **3.2.2.9 Technological Innovation in Petra Quarries**

It's clear that the Nabataean masons cut their monuments from the top down. But did they used one stage in cutting the facades, or carried out the work in several different levels, each of which would have required working on specific area of the facades or chamber. A further unexplained problem is the kind of scaffoldings used during the work. The aim of this section is to discuss the scaffolding techniques used in the quarries, the primary and the tomb quarries of Petra.

If they had difficulty in getting up, they curved steps in the steepest parts of the hill, in addition to this, after they started quarrying, sometimes the quarrymen needed to go up or down from one level to another within the quarry. For this they carved vertical single or double rows of slots as hand and footholds, as seen on the surface of the primary quarries, these prevented slipping while workers were scrambling up the cliffs (Rababeh 2005:78).

In some cases, the workers possibly climbed up with help of ropes, these ropes could have been attached by threading them through pairs of holes higher up the cliff such as a hole recorded in the façade of tomb 825, this method was used by Dalley and Goguel (1997:53), to explore the Neo-Babylonian rock relief of Sela', 50km north of Petra.

Part of their study was to find out how access was obtained and what kind of scaffolding had been used to carve the relief. Using ropes, three professional rock climbers reached the relief sculpture. No traces of any substantial scaffolding were found, but some small holes 3 to 6cm across, were observe in the rock, as a result, Dalley and Goguel (1997:53) concluded that “*The use of ropes must have been well-known, combined with agility and ingenuity*”.

The technique of using ropes for scaling cliffs was traditional in the Edomite era, and could have been continued by the Nabataeans. Even today, to go up, the leading climber usually climbs unaided to take a rope to the top of the cliff and secure it for the rest of the team. There is also a possibility of letting rope down from the top. It would be possible to lower men on a suspended stage. If the cliff surface is very smooth and steep, footholds can be cut. In Petra traces of such slots, steps and holes can be seen in all of the primary quarries.

The Conchoidal quarrying of the Wadi al-Siyyagh, the stone was extracted from the near vertical central part of the slopping cliff. It was difficult to find way in from above, this indicates that the masons must have used scaffoldings, Pflüger hesitatingly suggested that the use of wooden scaffolding (Pflüger 1995: 99).

The Nabataeans solved the problem of access in the tomb quarries. The use of natural access is clear in most of the tomb quarries, and even now is good enough to use as a means of access to the top of the monument. This access was used by the Nabataeans masons to reach the top of the working areas to carve the different elements required.

### **3.2.3 Pottery**

#### **3.2.3.1 Introduction**

The Nabataeans were nomads, they had little use for pottery and used water skins and wooden bowls, as a result, Nabataean pottery does not generally exist before 100 B.C. They began to produce their own pottery, both common-ware pottery for everyday use and very fine thin pottery for the wealthy, religious usage. It has been stated that pottery is a very sensitive product of human inventive power. Nabataean pottery is one of the most fascinating products of ancient technology in Jordan (Bestock 1999: 87).



This kind of pottery, especially the later type, was shaped and manufactured in huge quantities, and large mounds of broken Nabataean pottery could be found easily in Petra today. (Orton *et. Al.* 1993: 23)

Some archaeologists believes that the discovery came about by accident, when clay bowls or mud-lined baskets were placed too close to the cooking fire and were baked as a result, others guess that religious figures made of clay left-over or sacrificed in the fire, and found hardened in the ashes, could have tipped-off early peoples, still others think that early humans could have discovered that fire pits dug in clay were more efficient than those dug directly out of sand or soil due to the clay being baked, and transferred the technology to creating pots( Amr 1987: 15).

It's not only served in everyday needs of its user, but also serves as an indication of progress or lack of progress in a given culture. The distinctive Nabataean pottery was the key that unlocked the door to the reconstruction of their history.

Petra was a major center of pottery production, as attested by the discovery of a large kiln at al-Zurraba. Distinctive Nabataean pottery was found in large quantities not only in the Nabataean kingdom, but it appears beyond its boundaries. The manufacture of pottery may be a skill to the nomadic Nabataeans who has learned it from the Edomite.

For a long time, the ability to develop a precise classification of the pottery related to chronological development was delayed due to several factors:

- A) Most studies of Nabataean pottery focused on the stylistic development of painted ware.
- B) The lack of continuous and well-dated stratigraphy from Nabataean sites, made it difficult to associate shapes and/or styles of decoration with narrow windows of time.
- C) The excavated material did not provide enough of representative sample to permit differentiation (Schmid 1995: 29).

The Frequency with which the Nabataean sherds have been found is an indication of the widespread nature of their civilization and it's an indicative of another factor, which points clearly to the progressive nature of their culture.

Sir Flinders Petrie said: “*once settle the pottery of a country and the key is in our hands for all future explorations*”. George and Agnes Horsfield, according to Glueck were able to identify over five hundred Nabataean farming communities in "Trans Jordan" as well as literally dozens of villages in the Negev (Petrie 1906: 28).

Dr. Glueck presents a description of Nabataean pottery which was known as “typically Nabataean”:

*“Most of the fragments of Nabataean pottery which we found belong to unbelievably thin beautifully shaped plates, bowls, cups and jugs of various kinds, many of them were ornamented with painted designs. They consisted usually of stylized floral or leaf patterns in a solid, reddish, brown color, superimposed over very delicate parallel or crisscross lines. Sometimes, leaf and floral designs were most faithfully depicted, and at other times represented a highly stylized form, one of the partly reconstructed Nabataean bowls from khirbet Tannur was decorated with pomegranate, palm leaf and date or grape design in reddish-brown paint on a buff back ground, other forms of decoration included bands of rouletting”*(Glueck 1959:37).

### **3.2.3.2 Importance of Nabataean Pottery in Defining History**

The study of pottery artifacts is helpful in the development of theories on the socio-economic circumstance and the cultural development of the societies that shaped or acquired pottery. The study of pottery may also allow inferences to be drawn about a cultures daily life, religion, social relationships, and attitudes towards neighbors, attitudes to their own world and even the way the culture understood the universe.

### **3.2.3.3 Nabataean Pottery Geographical Distribution**

The geographic distribution of Nabataean ware is generally focused on the southern part of the Nabataean Kingdom “southern Jordan” the Negev and into the Sinai (Glueck 1959: 29, Schmitt- Korte 1968,1971,1980: 13,17,55 ) in the north, Nabataean pottery was found only in isolated sites, Philadelphia (Amman) (Harding 1958: 35), Gerasa (Jerash) (Kraeling 1938:70), and Bostra (Bosra) (Glueck 1959:41) rare examples were found in the area of Mada’in Saleh (Winnet and Reed 1970: 151-159) and in south Arabia (Al-Ansary 1982: 58-70).

Nabataean pottery appeared in the 2<sup>nd</sup> century B.C. and was inspired by the modern decorated Hellenistic wares in Palestine, Syria and Egypt (Parr 2003: 203-209). The earliest examples of

Nabataean ware vessels were especially fine and their shapes and painted designs are definitely Nabataean (Patrich 1990: 293-306).

The large quantities of pottery found in separate stratified units associated with residences on Al-Zantur, have been subject to a typological and statistical analysis (Stucky *et al.* 1995:298-315) this work has led to a precise classification of Nabataean fine wares into major phases and sub-phases which were found between 1<sup>st</sup> B.C. 2<sup>nd</sup> A.D. (Schmid 1995, 1996, 1997: 14,31,22). In addition, the study of the Al-Zantur findings has allowed a rough classification of Nabataean coarse ware produced within that same general timeframe (Gerber 1995: 87) and Roman period pottery of the 4<sup>th</sup> century (Gerber and Brogli 1995: 20).

Pottery was spread on the surface in large quantities over a large area, as well as over the whole settlement area. After the surface material was collected, a high mass of pottery continued to appear during the excavation at different layers but diminishing at the lower layers.

#### **3.2.3.4 Nabataean Pottery (Previous Studies and Excavations)**

George Horsfield and Agnes Conway In their excavation have found a large quantity of fine red ware with some painting and called it "Eggshell Pottery". They believed it was in common use by the people, and not only for religious services. They dated it 100 B.C.-100 A.D. (Horsfield 1930:25). (Ilf 1934:66) described and re-presented some types of Nabataean pottery from Negev in Palestine, particularly at Auja, Al-Khalasa, Kurnub, and Tall Al-Sabi. Most of the pieces were fragments but represented different typical Nabataean patterns (Ilf 1934:66).

In 1959, Hammond published an article about pattern families in Nabataean painted ware. He studied the decorated motifs of the painted ware, classified them in different groups and presented them with illustrations (Hammond 1973: 36). After three years, Hammond published another article about the classification of Nabataean fine ware in which he classified the ware into major groups according to forms.

Different studies were carried out of the painted Nabataean pottery from Oboda Temple, including the chronology of the painted ware by Negev (Negev 1963: 101). One of the first strong attempts to establish a chronology of Nabataean pottery was that of Parr (1970: 348-381). His article on a sequence of pottery from Petra gave a clear idea about the stratigraphy of the excavation and developed a chronology of the pottery using dated coins.

His study contained 138 illustrations of the pottery according to the different phases of the excavation (Parr 1970: 348-381).

Nabil Khairy studied the objects exposed in the excavation at Petra, particularly the form of the ware and surface treatment. Most of the material came from stratified deposits and represented one step further in developing the chronology of Nabataean pottery (Khairy 1990: 14).

Zayadine (1982: 365) wrote about the excavation work which he conducted in Petra 1979-1981. He discussed the pottery, and especially the oil lamps. Khairieh Amr made a neutron activation analysis study of the pottery from Petra (Amr 1987: 15). Francois Villeneuve studied the pottery from the oil factory at Khirbet Al-Dhariah and evidence of dating derives from bronze coins. The pottery of the factory was dated to the period A.D.100-150 (Villeneuve 1990: 367-384).

### **3.2.3.5 Clay and Raw Material**

The clay is the result of weathering on granite, limestone, decomposition of feldspar, clay is primarily formed of the mineral Kaolinite (Aluminum Silicate Hydroxide) it is a combination of aluminum oxide, silicon oxide and water. Accessible by riverbanks or dug up close to the earth's surface, clay was one of the human races earliest resources. Easily worked up by hand or with the most basic of tools, clay forms could be quickly molded and dried in the sun. These early figurines and pots weren't very durable until prehistoric people discovered fire and how to fire clay (Amr1987: 19) (Gerber 2000: 73).

The archaeometric analysis results showed that the clay that best matched the ancient Nabataeans ceramic shreds come from Al-Zurraba and Ain Al-Tinneh site near Petra (which are considered as ancient Nabataean production centers of pottery and fine ware), and also Al-Tayyiba and Al-Rajif road. The site of Ain Al-Tineh went under several analytical excavations and studies which conclude that Nabataean painted fine ware is the probable source of clay used by the Nabataean potters (Amr 1987: 29).

The coarser particles in the clay acted to hold-back shrinkage within the bodies of the ware during cooling, which was carried out slowly to reduce the risk of thermal stress and cracking. In the main, early bonfire-fired wares were made with smooth rounded bottoms, to keep away from sharp angles that might face cracking (Akasheh 2002: 6).

### 3.2.3.5.1 Nabataean Pottery Clay Distinctive Characteristics

Ain Al-Tineh clay was deposited in shallow waters during semi arid geological periods (during the Cenomanian 98.8 – 93.5 million years ago) the clay has a high expansion/shrinkage rate, and is extremely plastic thus enabling the manufacture of the characteristic “egg shell” Nabataean wares under proper manufacturing procedures. The high iron contents of the clay result in bright red-colored pottery which is also typical of the Nabataean wares (Amr 1987: 11).

### 3.2.3.6 Nabataean Pottery Features (Characteristics)

Characteristics of the Nabataean Pottery was originally studied and recognized as Nabataean during the first systematic excavations in Petra, which were conducted in 1929 (Horsfield and Conway 1930). The association of this unique style of painted and unpainted versions of “Egg-Shell” pottery with the Nabataeans, made it possible to classify many of their sites that were until that time unidentifiable due to the lack of inscriptions or references in the classical literature (Glueck 1959: 9).

Nabataean pottery is recognized by the thinness of its walls, which were sometimes only 1.5 mm thick. It was a pinkish/red color, decorated often by hand with dark brown flower and leaf designs. The painted ware had an interior decoration based on simple burning palmetto and feather motifs in a light red paint. The pottery became with time coarser, designs more stylish, intensive use of the brush, until it went out of production by the end of the Roman period. Hammond quotes R.J Charleston as saying that: “*The especial value of Nabataean pottery lies in its painting*” certainly this was one of the out-standing characteristics of Nabataean ware, not all the Nabataean pottery was of this genre, there was some that was coarser and less decorative (Hammond 1973: 54).

Another characteristic of the Nabataean pottery is that it’s extremely thin. The typical “Egg-Shell” Pottery, were mostly shallow open bowls were very difficult to be produced on the potter’s wheel, demonstrating how skilled their craftsmen were. A kiln was recently excavated at Wadi Musa indicating that Petra itself was a center of production. The quality of this pottery declined from the late 3<sup>rd</sup> century A.D. onwards, maybe as a result of a larger scale production. Its development as being of “Egg-Shell” thickness and at the peak of its development similar to the finest porcelain, one might think that it was extremely fragile, but actually it was quite “durable”(Ward-Perkins 1992: 87)

Nabataeans normal ware pottery was simple and comparable to the pottery used by the civilizations around them, its distinctive characteristic was the use of red clay that gave it a bright red color, Nabataean pottery was well made, with little decorations, this was not true for their fine, thin-wares. Nabataean fine thin ware pottery was all made locally, and some was plain, but the majority was painted (Bedal 2000: 19). Nabataean fine thin-ware could be the finest ceramics produced in the Middle East up to that time. It has been suggested by some that their taste in fine pottery came from pieces they might have imported from China (Hammond 1973: 14)

### **3.2.3.7 Decoration Technology Used in Nabataean Pottery**

The type of clay used by the Nabataean potters enabled them to make thin ware on a "fast" wheel. A number of vessels could be made from one lump of clay on the wheel. After a period of drying, the vessels were put upside down on the wheel, and the thickness of the base was reduced by "shaving" off any surplus clay, thus forming the required base. Careful attention had to be given to the making of such a product, especially in this "shaving" process, to keep it from breaking.

The Nabataean painted pottery was unique and one of its kind, with figures of ancient mythology, flowering vines, flowers, and even birds with bright plumage (Tuttle 2008: 163). Some of the finest and thinnest of Nabataean painted pottery was found underneath the paved floor of the central altar-shrine of Khirbet al-Tannur, and was dated at end of the first century B.C. Recently archaeologists have discovered near complete pottery trays, bowls, and other objects in an unrobed tomb in Jordan (Figure 12).

There is a variety of decorations and designs noted on different pieces. It seems that the most popular method was incision. Decoration method was usually applied to the Pottery object before firing, when the clay was still soft. The incision was made by either a sharp or a rounded tool. The tool could be of metal or bone or any other suitable material enabling the potter to make the desired grooves. The grooves are shallow or deep, depending on the amount of force which the potter applied with the tool. Sometimes deep grooves were created by a very sharp thin tool. Much wider and shallower grooves were made by a rounded object.

The most popular style of incised decoration consists of straight horizontal lines. The reason was perhaps that such a design could be easily created by holding the tool horizontally to the vessel while rotating it. This type of decoration appears more frequently on coarse texture.

This style of decoration appears with buff, red and brownish color paste; but it is not noted on pieces with fine or very fine texture. Horizontal lines were not always executed accurately. The space between them is not the same all the time. Multiple lines could consist of three or four lines or more.

Another design in incision decoration is the wavy line. It appears on pieces of coarse and medium texture. The paste color on such decorated pieces is usually red, pink, brownish or buff. Wavy single lines are created above thin horizontal engraved lines. The curves of this line are executed carefully, wavy lines also occur in double rows, a piece has been found under two horizontal parallel lines. The wavy lines are thicker than the horizontal ones (Figure 11).

#### **3.2.3.8 Innovative Technology in Producing Standard Sizes of Vessels and Plates**

The Nabataean potters work is improved by indication of their skill at shaping, probably some caliper-like tool was employed to insure regularity of rim diameters among the various ware types. A further technical achievement, also obvious in terms of "standards," is that of section thickness. This was done so evenly, and in such good proportion to size, especially in the finer-ware classes, that it is a clear indication of "quality control" in both fabrication and firing (Schmid 1995: 18).

The Nabataeans fine "egg-shell" wares are the most characteristic products for the Nabataean culture; they had a thickness from 1-3 mm, and metallic hardness. These fine wares were either plain, slipped or decorated with painting, impressing or rouletting, or combinations of these decorative techniques (Amr 1987:17).

#### **3.2.3.9 Kilns and Firing Temperatures Technique**

The firing techniques of the Nabataeans were related to those of the Edomite (Hammond 1962: 6), since this technique is a matter of ceramic chemistry and skill and similar results need to be loans.

The earliest pottery was hand built and fired in bonfires. firing times were short but the peak-temperatures achieved in the fire could be high, perhaps in the region of 700° C and 800° C and in some other results were probably between 725° C and 775° C, and were reached very quickly, clays tempered with sand, grit, crushed shell or crushed pottery were often used to make bonfire-fired ceramics, because they provided an open body texture that allows water and other unbalanced components of the clay to escape freely.(Hammond 1962: 14)

The painted wares were generally fired close to the 800° C temperature range and the paints used in the Nabataean painting on wares were not organic, nor were the slips which were commonly used (Hammond 1962: 14). The earliest constructed kilns were pit-kilns or trench-kilns, holes dug in the ground and covered with fuel. Holes in the ground provided insulation and resulted in better control over firing.

Firing times were short but the maximum temperatures achieved in the fire were high (900 ° C) and were reached very quickly. Clay were heated with sand, grit, shell or crushed pottery were usually used to make bonfire ceramics, because they provided an open body texture that allows water and other unstable components of the clay to escape freely. The coarser particles in the clay also acted to restrain shrinkage within the bodies of the wares during cooling, which was carried out slowly to minimize the risk of thermal stress and cracking. Early bonfire fired wares were made with rounded bottoms, to avoid sharp angles that might be susceptible to cracking.

---

Nabataean pottery is distinguished by the thinness of its walls, which were sometimes only 1.5 mm thick. It was a pinkish/red color, often decorated by hand with dark brown flower and leaf designs. The typical (egg-shell) shallow open bowls production were very difficult to make on the potter's wheel, demonstrating how skilled their craftsmen were. A kiln was recently excavated at Wadi Musa indicating that Petra itself was a center of production. The quality of this pottery declined from the late 3<sup>rd</sup> century A.D. onwards, maybe as a result of larger scale production.(Tuttle 2008: 165)



# **4. Interpretation and Presentation of Cultural Heritage Sites**

## **4. Interpretation and Presentation of Cultural Heritage Sites**

### **4.1 Introduction**

NPS have identified Interpretation as: *“The process of helping each park visitor find and opportunity to personally connect with a place”*. Each individual may connect to the place in a different way, some may not connect immediately, but everyone should have an opportunity to explore how a park is meaningful to them.

The idea of interpretation could be a useful way of managing heritage visitors and their possible impacts. Many archaeologists have identified interpretation depending on their own experience and knowledge about it. Basically, interpretation is a process of communicating or explaining to visitors the significance of the place they are visiting (Alderson and Low 1985: 7).

Archaeology is the humanistic and scientific study of ancient, historic and modern cultures. Interpretation provides opportunities to inform any site visitors about how and what has been learned from archaeological study concerning the ancient or historic past and what meanings and significance they hold for visitors in the present. Together, archaeologists and interpreters can help to ensure protection of the archaeological record for future generations (Ham 1992: 1-12).

### **4.2. Interpretation**

#### **4.2.1 Interpretation: Definition and Terminology**

*“An educational activity that reveals meaning and relationships through the use of objects, by direct experience, and by informative media, rather than simply to communicate facts and figures”* (Tilden 1977: 7-11). Tilden also noted that personal interpretation is the most efficient form of interaction, but he cautioned from that poor-quality live interpretation which is worse than nothing at all (Risk 1994: 8-10).

Interpretation is usually seen in as a positive idea, as it educates and entertains visitors and causes them to reflect on environmental values. The most common concern is that interpretation interferes with visitors own experience of a heritage place. According to O’Toole (1992: 39), the whole idea of the interpretive center can be seen as the creation of an overactive mind, which must always replace meaning of experience.(Pearson 1995: 293-306)

The core of this discussion lays in the belief that sites that are seen by managers to need interpretation could actually stand on their own, and once an individual experiences someone else's interpretation he/she will never be able to have his/her own direct experience (Moscardo 2000: 42). The faulty assumptions in this argument are that people have sufficient background and ability to understand the significance of the place on their own and that they come without their own partial interpretation already recognized (Barrie 2001: 28).

Moscardo (2000: 43) points out that it's possible that interpretation might obstruct with an experience when an over reacted interpreter provides false information instead of presentation. Barmwell and Lane (1993: 55) mentioned a number of additional problems, like when interpretation is pushed by economic motives, there is a danger that it is done for the wrong reason "Profit making". Also, the heritage events and places are sometimes simplified to meet the hurried needs of visitors. And there is a big risk in over-interpretation, which can lead to trivialization of historic events and places and reduce the personal pleasure in visiting the site (Urry 1990: 104-107). Finally, it's problematic when interpretation turns into a show where significant places are been marketed into charming tourist landscapes, where the show itself becomes more important than the message which aims to transmit to visitors (Alderson and Low 1985: 20).

With an increasing number of visitors forecasted, more pressure on the delicate natural environment and wildlife is expected. Interpretation panels and offsite interpretation will assist in educating visitors on appropriate behavior and give them a sense of being part of preserving this unique area.(Clarke 2000: 39)

*"A communication process which aims at helping people to discover the significances of things ,places, people and events , helping people change the way the perceive themselves and their world through a greater understanding of the world and themselves"*(Ham 1992: 18-30).

After several readings, the researcher would like to define Interpretation as:

***"A communication process, that presents an educational enterprise, which concerns about how to educate the visitors and learn them things about the site, they didn't knew before, in a technique that makes it an unforgettable experience"***

## **4.2.2 Founders of Interpretation**

### **4.2.2.1 Historical Background**

Interpretation originated very early with ancient storytelling by hunters, fishermen, traders, and artisans of the Middle East and Asia. Later Greek and Roman philosophers (Aristotle, Democritus and Socrates) began to explain “Natural Cause of Supernatural Phenomena” to their students (Weaver 1982: 18). An early predecessor of cultural heritage interpretation was present in the Grand Tour, which involved travel within Europe between the sixteenth and nineteenth centuries, where young men of British and European gentry travelled for educational purposes to get some experience about important cultural and historical sites, including art collections, museums, historic sites and universities (Towner 1985: 297-303).

Such movements, which were with no doubt influenced by the religion, philosophy, natural science, literature and the arts, have been reinforced and developed throughout history by exploration, discovery, record keeping, and scientific research into what is known today as interpretation (Weaver 1982: 22) (Mirriman, Brouchu 2006 : 5-8)

Modern day interpretation has its roots in nature guiding during the 1800s, and early 1900s in the Rocky Mountains of western North America and in places like New Zealand and Australia (Booth and Simmons 2000: 25, Hall 2000: 41, Molloy 1993:: 66, Weaver 1982: 22). As the national parks developed in North America, many of the principles of interpretation that were created spread throughout the western world, and many have been adopted in the developing world too (Light1991: 72). Later in the 1900s, following this initial phase and largely in response to it, interpretation of the built, or cultural, environment was developed. (Lewis 2005: 11-13)

Old buildings, museums and archaeological sites began to be the focus of intense interpretive efforts, taking off from the principles and practices developed in the realm of nature (Light1991: 65, Weaver 1982: 23). Finally Light argues that a third phase has occurred in the development of interpretation, that is the growth of the heritage industry, which is marked by changing aims and interpretive philosophers and advances in new forms of interpretive media (Light 1991: 44).

Interpretation has passed through different forms and periods of growth in different countries, for a long time. The clearest development on interpretation occurred in the United States. A few people were specialists in interpretation. They were the pathfinders for it; they gave it a name and described how interpretation was rarely and occasionally used in the early years. With time, the terms have been changed, but the meaning and function kept the same as they were. The interpreters in the early 1920s were called “lecturers”; most of them were scientists in universities during winter (Alderson and Low 1985: 40).

### **1- John Muir (1838 – 1914)**

He was one of the earliest modern preservationists. His letters, essays and books are telling a lot of his adventures in nature and wild life, especially in the Sierra Nevada Mountains of California which were read by millions and are still popular today. He wrote “*I will interpret the rocks, learn the language of flood, storm and the avalanche, I’ll acquaint myself with the glaciers and wild gardens, and get as near the heart of the world as I can.*” (Wolfe 1946: 25-26)

Several archaeologists treat this inspirational quote as an early reference to interpretation and an approach for communication. Muir direct activism helped to save the Yosemite Valley and other wilderness areas. The Sierra Club, which he founded, is now one of the most important conservation organizations in USA. But more than that; his vision of nature's value for its own sake and for its spiritual, not just practical benefits to humankind helped to change the way we look at the natural world (Alderson and Low 1985:63).

### **2- Enos Mills ( 1870-1922)**

He is the founder of the profession we call interpretation. He was born in USA. In 1890 he met John Muir, the famous naturalist. Mills pay attention to different advices from Muir to become a skilled observer of nature and culture, and then to write about it. Also Muir encouraged Mills in becoming a practiced public speaker, and he did just that.

According to Brochu and Merriman (2002: 24), Mills developed principles and techniques which formed a foundation of interpretation; he promoted guides to concentrate on inspiring visitors by communicating big ideas rather than masses of unrelated information. He started one of the first nature-guiding schools in the world and personally led 257 groups up Long’s Peak in what is now Rocky Mountain National Park. His nineteen books, including the 1920

volume, *“Adventures of a Nature Guide”*, provide a lasting legacy to the interpretive profession.

He was a keen advocate of monitoring visitor’s behavior and responding accordingly. He was the first to write and teach interpretation, and was instrumental in getting the National Parks Service to license two interpretive guides in the United States. Also he was the first modern writer to identify the role of a guide as an interpreter; someone who translates what is seen and experienced to others with less experience (Brochu and Merriman 2002: 12).

Mills suggested that information alone is not sufficient, an idea locked into one of Freeman Tilden’s six principles of interpretation in 1957. Interpreters are trying to tell a more complete story. Mills said of a guide, *“His chief aim was to arouse a permanent interest in nature’s ways, and this by illuminating big principles.”* (Mills 1922: 17)

Mills became more direct in setting up a future definition for interpretation in saying:

*“The aim is to illuminate and reveal the alluring world outdoors by introducing determining influences and the respondent tendencies. A nature guide is an interpreter of geology, botany, zoology, and natural history”.* (Mills 1922: 19)

This reference to illuminating and revealing the world became a common description of the role of the interpreter. It’s almost a definition of interpretation, though it is not delivered to us as more than an observation. And Mills was first to say, *“A nature guide is an interpreter”*. (Mills 1922: 21)

### **3- Freeman Tilden (1883-1980)**

Born in 1883 in Malden, USA, graduated from Harvard University, and learned several languages there, to become afterward a foreign correspondent. His journalism career took him to the Boston Herald Newspaper in 1904. During the period 1920-1923, he was a European correspondent for several newspapers (Knudson, Cable and Beck 1999: 9-21).

In 1945, he starts writing for the NPS; he worked with them to formulate a plan for public relation and interpretation. During subsequent years he studied and reported on the national parks, the state parks, and interpretive programs in national, state, and local parks.

Tilden travels had left him impressed with the things he saw in the parks, with one notable exception: The state of interpretation. Tilden believed that more attention needed to be paid to this critical interaction with visitors, and so in 1952 he urged NPS director Conrad Wirth to undertake a study of Interpretation.

Wirth agreed, and once a grant was secured, Tilden was contracted to do a “re-appraisal of the basic principles which underlie the program of Natural and Historical Interpretation in the National Park System”. As preparation for this mission, Tilden led tours at Castillo de San Marcos National monument in St. Augustine, Florida. He was seventy two at that time.

His book (*Interpreting our Heritage*) was published two years later, 1957. Other books followed. Tilden(1977: 12) have defined interpretation in his book as: *"An educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information."*

Tilden did not stop working, he was a frequent guest speaker at the National Park Service Mather Training Center west Virginia, where he asked students to watch less TV, which will be more useful for them and concentrate on their work, which will help visitors understand themselves not by knowing the name of a flower or a date of a battle, but by finding meaning through the inspiration and mystery of nature.

In 1982, the NPS established the Freeman Tilden award for excellence in interpretation, which is the most popular appreciation of an interpreter’s work.

#### **4- Sam Ham (1956- )**

Sam Ham published “*Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets*” in 1992, and it has become one of the most respected texts in the interpretive field. Ham quotes Tilden’s definition, but did not have a definition of his own. He did make a statement of description that is often quoted as a definition by others. That is: *“Interpretation is an approach to communication... translating the technical language of a natural science or related field into terms and ideas that people who aren’t scientists can readily understand”* (Ham 1992: 12)

Ham’s description of interpretation is functional and oriented toward the environmental fields, though; his approach to thematic interpretation has been as useful to cultural interpreters as those working with natural history and science. It does appropriately describe the job of the interpreter working for a natural science agency or organization. Translating ideas into the

language of diverse audiences to create understanding is very similar to Tilden's idea: "*To reveal meanings and relationships*".(Ham 1992: 12)

## **5- Ted Cable (1956- )**

Professor of park management and conservation in the department of horticulture, forestry and recreation resources at Kansas State University, is an expert interpreter.

Cable specializes in taking facts about the environment and turning them into stories and experiences that help in the understanding of the world's natural resources. He helps museums, zoos, parks and public and private industries present information to the public that is interesting and educational. He has helped national park programs in the U.S. and abroad, including in West Africa, Mexico and Paraguay.

Cable received his bachelor's degree from the University of Illinois-Chicago, and a master's in wildlife ecology and a doctorate in forest recreation management, both from Purdue University. He joined K-State as an assistant professor in 1984.

He received the "Master of Interpretation" Award from the National Association for Interpretation in 1996, and was named a Fellow of the association in 2000. His other honors include the William C. Everhart Award in 2005 from Clemson University for achievements in fostering appreciation of cultural and historic heritage, and K-State's International Educator Award in 2008.

Cable has published widely in the fields of Natural Resource Management and Environmental Interpretation. He has authored or co-authored 10 books, several book chapters and more than 150 articles and presentations on conservation-related topics. Four of his books are about birds, including the recently published "Birds of the Great Plains." Two of his three heritage interpretation texts are now in second editions and are part of the reading set for professional certification from the National Association for Interpretation. One of these books, "Interpretation for the 21st Century," has been published in Chinese and is being used in Taiwan and the People's Republic of China.

It also has been used to train tour guides and park rangers in countries including France, Laos, Honduras and Paraguay. (K-state, Ted Cable, 2011)



## 6- Larry Beck (1951- )

Larry Beck is Professor and Advisor for the Outdoor Resource Management emphasis. His teaching assignments include conservation education, environmental interpretation, wilderness management, and cross-cultural perspectives of tourism.

Professor Beck uses technology to advance student learning through two educational grants: as a Faculty Fellow (People, Information, and Communication Technologies) and Academic Scholar (Universal Design for Learning). Beck designs and teaches blended and distance education courses, and publishes and presents his findings about the effectiveness of online learning.

Professor Beck's research and writing also addresses optimal experience theory, communication theory, environmental interpretation, and the symbolism and management of protected areas. He has written more than 100 abstracts, articles, research papers, reviews, grants, and technical reports.

The following books are authored or coauthored by Professor Beck: "Interpretation of Cultural and Natural Resources" (2nd Edition, 2003), "Moving Beyond Tree line" (Revised Edition, 2010), "Interpretive Perspectives" (2010), and "Interpretation for the 21st Century" (3rd Edition, 2011). The last book is used by the interpretive profession internationally and has been translated into Chinese.

In 2009 Beck received the National Association for Interpretation "Meritorious Service Award" for his contributions to the body of knowledge in interpretation. He is currently working with the National Park Service in the area of interpretive planning for the Centennial in 2016.

Professor Beck serves on numerous university committees. He was elected to the University Senate and Senate Executive Committee. He chaired the University Personnel Committee, College Curriculum Committee, College Academic Planning and Policy Committee, and College Reappointment, Tenure, and Promotion Committee. He has served as a consultant on various interpretive planning and environmental stewardship projects in the community, and on the executive board of the Cabrillo National Monument Foundation. (San Diego State University, 2011)

### **4.2.3 Who Offers Interpretation and for Whom**

Interpretation includes any form of presentation of accurate material and interpreted meaning about a site or other heritage item, whether on site or off-site (Alderson and Low 1985: 114).

Brochures, websites, media coverage, and advertising campaigns all involve interpretation. It should be noted that even in the presentation of a small number of facts, in whatever form, interpretation is involved: as someone has selected these facts, and presented in a chosen form using particular words and graphics. Thus, no presentation of material is objective or value-free (Aplin 2002: 110).

Heritage items add meaning through an interpretation that is often our own. We do not always have the knowledge base to provide our own interpretation, or our knowledge and experience which in return can limit our ability to consider a range of possible interpretation of a particular site or artifacts, and we depend on the interpretation provided by others. There is of course, normally more than one possible interpretation, although different interpretations will usually all be used on a single body of factual information, such as dates, names of people associated with the item, species lists and former uses.

These facts and one or more possible interpretations are often generated by heritage experts and presented to the public. Heritage experts have their own knowledge and experience bases, as well as their own prejudices, and thus it is important to be aware of who is doing the interpreting. It is also crucial for the interpreter and the visitor to be aware of the target audience for the interpretation, as interpretation does, and should, differ to accommodate the needs of different audiences (Aplin 2002: 112).

### **4.2.4 Why we do Interpretation? Purposes and Values**

Interpretation was designed to reveal meaning and relationships of our cultural and natural heritage to the public through firsthand experience with an object, artifact, landscape, or site. The main purpose of Interpretation is to assist tourists and other visitors in experiencing a resource or event in a way they might not otherwise experience without it (Hammit 1984: 17). Interpretation involves many aspects of town and country planning (Protection and access), marketing (user groups and visitor wants and desires) and education-related theories (user groups and visitors wants and desires) and education-related theories (what people learn, how they learn, and what to teach) (Barrow 1994: 13) (Fennell 1999: 24).

The site manager would always look for a good interpretation of the site, because their meaning and significances are often difficult to understand without such good interpretation. The site manager would use interpretation to improve and develop the visitors understanding and appreciation of the place and the experience of visiting it. This may range from a simple explanation, to a complex interpretation of the site (Brochu and Merriman 2006:15).

The site manager will ask for using the place to convey a certain message, or a lesson, that doesn't relate simply to the physical attributes of the place, or to its significance. It could happen sometimes that the argument is put by the manager of that site, that this site could talk about itself and does not need any kind of interpretation, that could happen but the site will talk different thing to different kind of visitors, depending on their individual back ground. Few things could be read into the place without interpretation, but in return, it will increase negative perceptions, and be reinforced by going unchallenged.

Cultural Resources possess meanings and relevance, but they are difficult to interpret because visitors see various meanings in the same cultural resource. The visitors are always looking for something special about resources, something of an exact value or character to them that is interesting, unique, or entertaining. While the interpreter's first goal is to provide accurate, balanced access to meanings, interpretation's prime goal is to inspire visitors to care about the resources. Visitors must be allowed to form their own passions and understandings aside from the interpreter.

Through Interpretation things can be more facilitated by building a connection between the interests of the visitor and the meanings of the resource. Visitor's interest and preservation go side by side: The tourists must care about a resource before people will value its preservation and, as a conclusion, archeological resource preservation depends on the audience's access to the meanings of the resources.

## 4.2.5 Principles and Techniques of Interpretation

### 4.2.5.1 Tilden Principles

Tilden has introduced a concept in his book "Interpreting our Heritage" in 1957. Tilden Principles have been found to be excellent rules of the trail and tour, and these principles were:

***1- Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.***

Interpretation should speak about what is being displayed or described to something within the personality and life experience of the visitor. If what the interpreter presents to the audience does not activate a cognitive model from within the experiential realm of the visitor, it will be of little interest to the visitor (Hammit 1984: 12) (Tilden 1977: 3)

***2- Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.***

It's critical to provide visitors with new information and transmit it in a way that inspires them. It is different for each individual, and different stimuli might be necessary for different Cognitive models in different individuals (Hammit 1984: 12). According to Nuryanti(1997: 52) this is why: "*it's fundamental to interpretation to realize that meaning lays within the observer or participant ... rather than as some objective quality inherent in the object itself*".

***3- Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.***

The art of interpretation brings together many other arts, whether the materials being presented are historical, architectural, or scientific. This highlights the importance of good people and communication skills. The art that Tilden referred to is the creativity and imaginativeness of interpreters to present the emotional and enjoyable side of interpretation (Hammit 1984:13).

***4- The chief aim of interpretation is not instruction, but provocation.***

One of the most important responsibilities of heritage managers is to provoke positive action on the part of tourists. This can be done by bringing the past alive for people and, as mentioned in the first principle, drawing out personal meaning for visitors (Knudson, Beck and Cable 1999: 22-58). The job of interpreters, therefore, is to assist visitors in developing relationships of their own between themselves and the heritage place being visited. Tilden's provocations also means to get visitors involved physically and mentally in the interpretive process (Hammit 1984:13).

***5- Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase.***

Interpretation should be more holistic rather than be made up of simple parts; Hammit (1984:13) explains it that interpretation needs to target the whole person, by relating to many different sensory and cognitive facets of information processing. Tilden is also referring to holism in the sense that entire natural and cultural areas are essentially one ecosystem that needs to be considered singly and in its entirety.

***6- Interpretation addressed to children (say, up to age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program.***

Interpretation is targeted to different visitor groups, which should follow a fundamentally different approach. Tilden here refers to varying degrees of capability in understanding history, cultural system, and natural processes. Children, for example, process information differently from adults, and these differences need to be considered in interpretive planning.

#### **4.2.5.2 Cable and Beck Fifteen Principles**

Ted Cable and Larry Beck embraced Tilden's Principles completely but then they added nine more important ideas. They have emphasized in their fifteenth principle that passion is an important issue to success. They have explained to interpreters that they are working in this field because they are passionate about the resources and their importance, and each interpreter has to employ his impatience and energy in his program, because it makes his own interpretation more powerful and motivational.

Cable and Beck's updated principles bring to light many important points relevant to today's interpreters:

- 1- To spark an interest, interpreters must relate the subject to the lives of the visitors.*
- 2- Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.*
- 3- The interpretive presentation (as a work of art) should be designed as a story that informs, entertains, and enlightens.*
- 4- The chief aim of interpretation is not instruction, but provocation.*
- 5- Interpretation should present a complete theme of thesis and address the whole person.*
- 6- Interpretation addressed to children (say, up to age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program.*

The new added principles by Larry Beck and Ted Cable:

- 7- Everyplace has a history, interpreters can bring the past alive to make the present more enjoyable and the future more meaningful.*

Narrative is essential for a user to build meaningful connections and basis of learning (Astleitner and Wiesner 2004:44). Difficult or abstract concepts can be tied to concrete experience through the use of narrative. The use of narrative can engage a user's emotions, and facilitate questioning, reflection, and retention (Beck and Cable 2002: 33-38).

- 8- Technology can reveal the world in exciting new ways; however, incorporating this technology into the interpretive program must be done with foresight and care.*

They have Suggest here that technology can be a valuable tool; however there is no reason to use equipments for its own sake (Machlis 1986: 28). If the technology supports and enhances the program, then by all means take advantage of it. But if it detracts from, or overrides the message, pull the plug.

***9- Interpreters must concern themselves with the quantity and quality (selection and accuracy) of information presented; focused, well-researched interpretation will be more powerful than a longer discourse.***

Art, audio, video, and text all count towards the content in a multimedia program, and should be considered, collected, and managed as a whole.

***10- Before applying the arts in interpretation, the interpreter must be familiar with basic communication techniques. Quality interpretation depends on the interpreter's knowledge and skills, which should be developed continually.***

This stage should be completed by the other interpretation team members: graphic designer(s), animator(s), programmer(s), with support as needed from the instructional designer (Aldrich 2003: 28-29).

***11- Interpretive writing should address what readers would like to know, with the authority of wisdom and the humility and care that come with it.***

Instead of a personal link, a learner must depend on the computer (that is, the multimedia designer) to recognize teachable moments, to offer sorted, relevant information, to provide response, and to adapt to the user's needs. All of this falls under the heading of interactivity.

***12- The overall interpretive program must be capable of attracting support – financial, volunteer, political, and administrative – whatever support is needed for the program to flourish.***

It is increasingly important in an economy that often forces us to make difficult decisions about what we can and what should we provide the public with.

***13- Interpretation should instill in people the ability, and the desire, to sense the beauty in their surroundings—to provide spiritual uplift and to encourage resource preservation.***

Good interpretation, with a successful performance must get a great feedback from people visiting the site, and discovering and feeling the beauty of the site, which will give them a chance to preserve and protect the site more.

***14- Interpreters can promote optimal experience through intentional and thoughtful program and facility design.***

Educational websites surfers usually have the same profile (expectations, goals, interests) as visitors to parks and museums (Chadwick 1998:35). Yet as a recent National Park Service study illustrates (Forlst *et. Al.*: 58), visitor satisfaction with the online experience is generally lower than satisfaction with other interpretive materials (visitor center exhibits, wayside exhibits, brochures) Federal web standards (McClure *et. Al.* 2000: 95) reveal the problem: design guidelines are geared toward technical specifications for visual design and programming rather than towards structuring content appropriately to make the best use of the medium.

***15- "Passion is the essential ingredient for powerful and effective interpretation - passion for the resource and for those people who come to be inspired by the same".***

An informal evaluation should answer the following questions:

- 1- Does this program make me feel eager? Do I think it is fun?
- 2- Does this design meet the client's expectations and goals?
- 3- Will the user really experience what I want her/him to experience? If it is used in a way that I do not expect, will it still function?

Share the findings with the client and the rest of the development team. Do they agree with the findings? *"If these answers are not answered satisfactorily, then don't be afraid to return to the design process or abandon the project altogether"* (Jameson 1997: 105)

#### **4.2.6 Types of Interpretation**

There are essentially two ways to deliver interpretation: personal services and media (non-personal) services. Personal services can provide opportunities for visitors to cooperate with an interpreter in person. They include such things as informal contacts, talks, guided walks and demonstrations.

However, personal services reach only as much as 22% of the visitors. In contrast over 62% of visitors receive interpretation through media services such as brochures, newspapers, audio tours and exhibit labels. Regardless of the type of interpretative service being provided, the definition of interpretation remains the same. (Forlst, *et.al.* 2003: 74).



Interpretation is a bridge between the meanings of the resources and interests of the visitors. It connects the tangible artifacts, collections or natural resources of a site to the intangible concepts they can symbolize. It is the role of the interpreter to ensure that those connections are built on the interests of the visitor. And it is the role of the visitor to determine which bridges will be crossed.

Personal interpretation it just like it sounds like (one person interpreting to another person or persons) if some part of the usual job involves talking directly with the public, so you are working on the area of personal interpretation, you may be presenting formal programs to school or civic meetings, or in amphitheater, guiding on a trail, you could also be responding to guest need at an information desk, answering questions on the phone, chatting with people on museum floor, conducting demonstrations in an ecological exhibit at a site.

Personal interpretation is one of the most powerful approaches to interpretation because the interpreter continually adapt to each audience. The opportunities here to make emotional and intellectual connections are numerous, because one can learn about the guests and apply what they learn to enhance their personal experience.

Personal interpretive service is usually available for a limited amount of time each day and is perform variably, depending upon the skill of the interpreter and how he feels at any given time. A personal interpretation is usually more expensive, than non-personal approaches, when one considers the cost per visitor contact (Brochu and Merriman 2002: 29).

Non personal interpretation includes brochures, exhibits, signs, audiovisual shows, and other things that do not require an actual person in attendance. Freeman Tilden believed that personal interpretation was always more powerful when done properly, and he cautioned against using gadgetry that cannot be maintained properly. He did grant that non-personal approaches are all right if an interpreter is unavailable and that in certain circumstances non-personal media could be effective. Tilden even suggested that: *“a good result by device is better than a poor performance by an individual”* (Tilden 1977: 5).

But he was concerned that a poorly performing gadget actually minimizes an experience to the extent that it would be better to have no interpretive service at all.

The decision to use personal or non-personal interpretive service is usually made by program managers and planners. A combination of both sometimes is the best choice for a particular situation. Interpreters may find it helpful to develop non-personal interpretive items as aids to personal programs, such as interpretive brochures or wayside exhibits. It's important to note that the same interpretive principles discussed for personal interpretation also apply to non-personal media (Brochu and Merriman 2002:30).

## **4.3 Presentation**

### **4.3.1 Presentation of Cultural Heritage: Definition and Terminology**

The World English Dictionary has defined presentation as:

*"The manner of presenting, especially the organization of visual details to create an overall impression: the presentation of the project is excellent but the content poor"*

As for Crane Bag They define Presentation as: *"The options for presenting heritage which can range from the provision of simple attractive signage to full-scale thematically-driven Visitor Parks. The focus should be very much on developing an interactive approach, creating a visitor experience rather than just an attraction"* (Crane Bag: 2011)

At the same time we are dealing with the Heritage Presentation as a communication process which is designed to convey the significance of a heritage site to visitors and local community in order to increase public awareness, enhance understanding of a heritage site and acquire public support in the activities directed at its management and preservation (Shalaginova 2008: 4).

Presentation and publication of the cultural heritage is an important set of activities, which comes after interpretation to complete this communication approach, in return, a largely influence will concentrate on understanding and awareness of the society about the preservation, protection, and use of ancient buildings, monuments, art and other items related to the cultural heritage site.

There are a lot of historical sites that give visitors printed brochures to read while they are waiting for the tour to begin, this is not only to fill their time, but also it help them to prepare themselves for a greater understanding of the tour and considered to be a presentation, which will be discussed later.

The Presentation and information should be conceived as a popular interpretation of the current state of knowledge, and it must therefore be revised frequently. It should take account of the multifaceted approaches to an understanding of the past (ICOMOS Charter 1990).

#### **4.3.2 Purposes and Values of Site Presentation**

The presentation of the archaeological heritage to the general public is an essential method of promoting an understanding of the origins and development of modern societies. At the same time it is the most important means of promoting an understanding of the need for its protection.

The shared competency does not replace the competencies for either field; rather it complements and expands basic competencies for archaeologists and interpreters to create opportunities for audiences to learn about archaeological interpretations and how they are made, to ascribe their own meanings to archaeological resources, helping to increase public understanding and concern for preservation and protection of archaeological resources. The shared competency to reach the goal:

##### **- Embraces the Links between Interpretation and Presentation**

According to Callebaut, Killebrew and Silberman (2004: 43) Interpretation of the archaeological sites presents to the visitors a variety of perspectives to reach a greater understanding and appreciation of past human activities. Archaeologists and interpreters work together and use their knowledge and skills to create opportunities for the visitors to form educational and emotional connections to the meanings and significance of the archaeological site and the peoples who built it and create it, also:

- Interpreters gain knowledge of archaeology necessary to develop presentations and media about archaeological resources.
- Archaeologists collect the base of knowledge and skills in interpretation, which is necessary to develop interpretive presentations and media about cultural resources.
- Both groups gain knowledge and skills through increased dialogue and interactions between archaeologists and interpreters for joint development of effective interpretation of archaeology (Jameson 1997: 29-31).

### **4.3.3 When do we use Presentation?**

Most countries approaches to presenting the past reflect the role and culture of managing organizations in protecting the archaeological resource, and the agenda of such organizations in presenting the resource to the public. There are a number of appropriate activities that can hold the visitor attention while they are waiting an exhibition and help them to forget the long waiting period.

The archaeological site should be open for the tourists on a regular basis and on specific days at designated hours. It's important that the staff actually open the site at the specific hours; a few things can be annoying for the tourists and especially for visitors with a tight schedule, arriving to the site on the advertised opening hours to find the doors are closed would be one of these things. Tourists and visitors don't like to stand in line for long periods of time, waiting to enter to the site, also they don't like to be ignored on a rush visitation day, both problems could be noticed, also could be difficult to avoid, but the good interpreter can solve this problem through making the delay seems a bit shorter.

The visitors should be told always how long they are going to wait for their tour, and why, then another staff member should stay with tourists, chatting informally about such things as where they are from and what other places they have visited in the country of the site.

The conclusion of all discussions of objectives and all the planning of the interpretation is the "Presentation" of the site to the visitor, if the tourists have been made to feel welcome and have had a tour that has real substance, they will return home having learned what the site wants to teach, and from then on that tourist will always be an adviser through word of mouth to future visitors over the coming years (Grater 1976: 11).

Presenting archaeology is essential if we are going to provide increased access to an input about the past. The public must participate in this process through their own evaluation of the interpretations that are presented to them.

#### **4.3.4 Techniques and Principles used to Present Cultural Heritage Sites**

##### **- Signs**

Using the signs on the sites is very important technique can never be replaced, it is important for both site and the visitor management, and for giving an efficient data, the sign must be well placed, eye catching, attention grabbing. In the sign there is a need to achieve a balance between shortness and detail, as lettering and graphics generally need to be of size easy to read from all sides and from at least 1 meter (Keyes 1984: 36)

Since they have a limited capacity in terms of the information that they can express, unorganized signs are effective sometimes especially in crowded areas where large numbers of tourists gathered around them. In many cases graphics can carry much of the information load, but they often need some text and same keyword, labeling on or next to the diagrams, maps, and photographs, and this additional text also needs to be large enough for easy reading.

Data-giving signs work best, especially when they are potential, so that the object they relate to can also be seen making the relationship between signs and heritage, feature easier for visitors to establish. Signs filled with information are more suitable in an introductory role in preparing the visitor for what is to come and what is waiting for him out there on the site(Lindner 2002:66)

The concepts involved in heritage interpretation are often complex, whether they relate to natural processes or cultural ones. Signs should be seen as the frontline of information and guides as appropriate and practical and adding further information.

Many visitors will only want a minimal amount of guidance, so signs should be directed to them, with any additional details being provided through other media. This would specifically be for the groups that want to know more, as giving a lot of knowledge to every tourist and visitor who are merely seeking entertainment and enjoyment should be avoided. Basically, most tourists don't like to find a lot of signs on the site (Jameson 1997: 94- 96).

Carefully conceived and well-designed signs are a key management tool for keeping tourists and visitors on elected routes and out of sensitive areas, for promoting heritage friendly behavior, and for preventing damage and injury. A brief explanation of the resource behind the message is often appropriate and frequently makes a sign more effective than would be a

straight-out prevention or cautious. Giving such reasons also adds an educational dimension to a primary management tool (Figure 5).

- **Steps to be considered when designing a sign**

- Large font size, long in text, designed to tell a complete story itself.
- It must be attractive to do an effective job (color shape), at the end it must have an eye appeal (Regnier, *et. Al.* 1992: 5).
- Must be made from material in harmony with the surroundings.
- It should have an exciting thought, if possible, to stimulate further study.
- It should have an attention, getting lead, in statement, and on equally interesting closing thought.
- It should be short and clear to present the message fast.
- It should be readable from at least 1 Meter.
- It must be easily understood; if the reader has to figure out what the guide is saying, it has failed.
- It must be friendly in tone and content for the surrounding area and visitors.
- The message should be an entity unto itself, and at the same time link in with the overall area interpretive story (Regnier, *et.al.* 1992: 6)
- The signs should call attention to the trail, and make people want to explore the trail environment.
- The good sign: orient people to the theme of the trail, and it give a brief introduction to the trail environment and hints at what is awaiting the visitor inside.
- Must include other languages than the site language (English, German)

- **Guides and Guided Tours**

Trained professional or voluntary guides, usually accredited in some way, are used in many heritage sites, to give an on-the-spot commentary outlining the main features of the site, and providing a degree of entertainment.

**Advantages for using trained guides:**

- They provide information as one moves around the site which is a very useful thing; otherwise it will require a large number of signs, which will be too disturbing in any place on the site (Grater 1976: 12).

- The well trained tour guide with his experience can adapt the content of their presentation to each group they lead, and according to their demographical features (age, sex, geographical scope).
- Guides by their mere presence and official standing can influence visitors' behavior and dissuade harmful, dangerous, or disruptive activities, and when necessary explicitly comment on behavior and request compliance; in this way they act as managers and interpretation personnel.
- Visitor tourist can question guides if they require further information; the best guides provide interactive interpretation (Grater 1976:12).

The tour guides need to be interested in the visitors and tolerant of their faults, including their lack of knowledge; also they need to be well knowledgeable about the site, and to have and display an enthusiasm and affection for it. A good guide never gives the impression of “just going through the motions”.

Guides need to present the basic information clearly and concisely, reserving details for answers to specific questions, they certainly need to remain interesting so that visitors maintain their engagement with the guide and the information presented, rather than switching off and letting their minds wander to other things.

Guides are often accredited and are almost invariably trained, although enthusiastic amateurs are invaluable in smaller, more local sites, lacking the financing and infrastructure for paid staff and training (Brochu and Merriman 2002: 16).

### **- Printed Materials**

Printed materials in different kinds is a common way of interpretation, and are used to express both on-site and off-site information, it can be in different forms and styles, with many different levels of information, sometimes with elements of entertainment. Brochures and leaflets can be used either as advertising material to draw visitor attention to the site, or to give an introduction briefly to the visitors to that site; these two targets may result in various types of brochures being produced.

On-site, brochures can often provide more info than that presented on the signs; nevertheless their content is still strictly limited, but they can be carried around the site, and referred to as necessary, especially if features are numbered or named using signs.

Most archaeological sites provide these brochures as souvenirs in addition to the leaflets and single sheets provided by the site managers. Some visitors like to have them and others do not. Some sites ask the visitors to return the brochure when they are finished or pay a minimum fee for it. Sometime it could be included in the ticket price, which might be because of budget constraints. Sites should cater for the purchase of brochure materials by those who want to retain it.

The brochures are usually concise, and the comments made about brevity, clarity, and eye-catching layout in relation to signs also apply to this type of printed material. There is also a place for more extensive printed material like books, booklets, CD's, DVD's, postcards, they all cost a lot, and it is hard or impossible to make them available for free for all the tourists; they are always for purchase and provided frequently by commercial entities other than the site management or the agency it represents (Regnier, *et. Al.* 1992: 6).

Having such outside providers, may mean a loss of control over content, but management should attempt to reach a cooperative agreement, to ensure accuracy and maintain a positive image of the site, a graded range of printed material perhaps in several languages, is a good way of providing for the diversity of visitors needs, printed material also cater for non-visitors who have an interest in the site.

#### **- Audio-Visual Aids**

Many heritage and archaeological sites around the world provide to visitors some form of audio guide, although financial constraints mean that this is more common at heavily visited sites. The use of electronic devices in interpretation can be extremely helpful, and goes far toward presenting a well-balanced program, there is no real alternate for the interpreter in guided activities and presentation of talks, PowerPoint™ presentations, films, 3D exhibits, can turn into most valuable assistance (Regnier, *et. Al.* 1992: 7).

People process information in different ways: some people are verbal learners who need to read the material, while others are auditory learners who prefer to have someone telling them what they need to know. Visual learners need to see the actual object or a graphic representation for it for comprehension: these people are good map readers, because they generally thinks in terms of symbols, the good interpreter will have the ability to deal with different types of illustrative techniques and to choose the best one that works with a certain topic and group.



Lately the development in technology and electronics offered additional tools to the imagination of the interpreter, because these devices are considered important for grabbing a lot of attention and interest from the visitors and tourists to the site (Grater 1976: 20).

### **- Slide Program**

It's one of the standards in the interpreters tool presentation kit, with modern technology, the slide projector with its carousel of slides might be going the way of the cave man, yet many interpreters still use them, the interpreter must use the best images in his slides, the interpreter should also check the internet or computer clip-art catalogues for professional quality images, the images must make sense for the presentation, copy rights of the photos presented should be aware off, it's better to get permission to use illustrations or find ones that are available at no charge (Grater 1976: 21).

One of the simplest ways to develop a slide program is to create a story-board card; these simple three-by-five-inch index cards can help the interpreter in practicing for his presentation. According to Regnier, *et. Al.* (1992: 6), Slide programs are one of the standards in the interpreter's tool kit, but like everything else, there are appropriate ways to use them:

### **- PowerPoint™ Presentations**

Presentation with PowerPoint™ can provide some added elements of interests. These computer-based presentations can include video clips, music and quotes. To use the program well, it takes a good practice, but the presentations can be saved easily and used again later, or adapted to a new situation.

Also the new digital cameras can offer interesting opportunities to photo the group while walking and then incorporate them into a PowerPoint presentation later allowing the visitor to enjoy a feeling of 'celebrity'. Digital cameras allow quick and easy photographs to be taken of maps, art and crafts that are too fragile to be handled.

**Inappropriate** would be like saying to the tourists on the main entrance of a site: "I have prepared for you a presentation tonight about my visit to Athens, I will present 250 slides about the site, and I will talk for two hours about it, you really do not want to miss it"

The guaranteed result of this is that all of the tourists will end up bored and suffering from headaches.

**Appropriate** would be that the guide welcome the tourists and thank them for joining this presentation program, then use 30-70 excellent shots slides to illustrate a half hour of thematic presentation

## **- Visitor Center and Museum:**

### **-Visitor Center**

A visitor center at a specific attraction or place of interest, providing information (such as trail maps, and about camp sites, staff contact, restrooms, etc.) and in detail, educational exhibits and artifact displays (e.g., about natural or cultural history). Often a film or other media display is used. If the site has allowed requirements or guided tours, the visitor center is often the best place where these are harmonized.

Visitor centers in the historical environment play a key role in the interpretive process; the major objective is to give visitors on-the-spot information's and details which will persuade them to go out and see things for themselves, rather than remain inside like in a city museum or library, they usually serve as the portals through which visitors enter the interpretive experience of a resource (Figure 7).

They serve as a headquarters for interpretation, the place to check on what, when, and where things are going to happen, the starting point for interpretation; they may also house the reference collection for visitors who, having experienced the resource at some level, want to come back for more information, check details, verify their personal interpretation on identification of the land. Overtime the visitor centers' orientation role grew and their reference role diminished, with these changes came the name 'visitor center'.

### **- Museums**

A museum is *“Institutions for the preservation of those objects which best illustrate the phenomena of nature and the works of man, and the utilization of these for the increase of knowledge and for the culture and enlightenment of the people”*.(ICOM 2009)

**The International Council of Museums (ICOM) defines a Museum as:**

- A non-profit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment (ICOM 2009).

**The federal government in the Museum and Library Services Act defined a museum as:**

- A public or private nonprofit agency or institution organized on a permanent basis for essentially educational or aesthetic purposes, which, utilizing a professional staff, owns or utilizes tangible objects, cares for them, and exhibits them to the public on a regular basis(ICOM 2009).

---

**Federal Government:** Is the common government of a federation. The structure of federal governments varies from institution to institution. Based on a broad definition of a basic federal political system, there are two or more levels of government that exist within an established territory and govern through common institutions with overlapping or shared powers as prescribed by a constitution.

## **- Functions of Museums**

The educational purpose of museums was atypical of many early museums, it started when wealthy individuals collected and stored precious metals, art, artifacts in castles or churches, few people saw these treasures. Later displays took precedence and then interpretation and education become important.

The move away from private collection to public education was most clearly marked by the opening of the British Museum with a stated mandate that its collections were “*not only for the inspection and entertainment of the learned and the curious, but for the general use and benefit of the public*”.(ICOM 2009)

Interpretation and presentation in museums and visitor centers bring the objects and the people together in a meaningful way – the people see and study real objects. Object-based learning has several advantages over word-based learning, among them, objects emphasize the role of things in our own lives, “*Things from our world and are as significant to us as language for comprehending it, they aid us in obtaining food, water, warmth, and shelter*”(ICOM 2009) objects help us link our lives to other societies, past and present, objects also provide a concrete experience that illuminate abstract thought. Objects also provide a creative and emotional stimulus for art, writing, or drama. Real objects, as compared to abstract ideas, aid the memory through physical sensations. Finally everyone can use objects, whether they can read or not.

## **- Websites and ITS Technology**

Websites are an exceptionally powerful method of site presentation. Many archaeological sites, museums and art galleries have their own comprehensive websites offering virtual tours. This facility allows more visitors to experience the site, even if they live on the other side of the world. Websites can offer versions in several languages, and the best ones allow users to navigate their way around the site in their own time and in which ever sequence they choose.

These websites sometimes can be conveyed on signs or in most printed materials, they allow each visitor to choose the level of information they wish to access, CD-ROMs can also provide similar experience both on/off site.

There are number of problems with the use of information technology, cost is the obvious one, and it's clear that large well-patronized sites can do much more than others. Also electronic equipment is difficult to make weatherproof and will almost always be housed in visitor centers. However, computers housed in sheltered kiosks and with touch-screen or voice recognition capabilities, rather than keyboards, may overcome this limitation. Most importantly, visitor frustration must be minimized (Regnier, *et.al.*1992: 7).

There needs to be enough machines to cater for peak visitor periods. Equipment must be in working order, and when it is not, it should be rapidly repaired.

### **- 3D Dimension Presentation & Virtual Reality**

Archaeological sites and exhibits are static by nature and presenting them and their history to a public audience always involves additional media to add information about their original state and the findings of the researchers working on the site. (Crawford 2002: 30).

For presenting whole buildings or a historical settlement, two approaches are possible: to have the visitors walk around on the site and examine its remains by themselves, or to present an overview of the findings on maps and scale models (Brochu and Merriman 2002:17)

The first approach offers visitors a more direct impression of the dimension and environment of the findings, and a lot more space for placing additional information to accompany them. This requires visitors to travel to the site themselves, but they are rewarded with a unique impression and possibly a nice day in the countryside.

3D modeling as a form of reconstruction has recently been popular, as the photorealistic models of built structures and landscapes can provide, an accurate model can be used and accessed more easily than hundreds of photogrammetric images to make comparisons with the monument as it changed over time (Jameson 1997: 114).

The accurate models can be viewed on a monitor, through a headset, in virtual projection domes, or in fully immersive environments in which the imagery is projected onto the entire surface around the visitor.

## **- Demonstrations**

Demonstration as part of presentation is one of the most effective methods available to give the visitor a clear understanding of what is being interpreted. Various reasons as to why this shows up when a going program is reviewed, reason is simple that no one happened to think of any activity where a demonstration was the obvious answer. There is also the interpreter who is unsure of himself, or simply reluctant to “put on a show” before a group of people arrives. Many interpreters can give a great performance if all he has to do is to give an oral presentation, but the thought of showing as well as describing something is uncomfortable to him (Brochu and Merriman 2002: 18).

This does not mean that the demonstration is essential for a good interpretive program, for sure the demonstration offers a good tool for the interpreter to use, but the interpreter have to notice that this technique cannot be fit in every situation, and must be used selectively, it must be tastefully presented, as anything with a side atmosphere will strike the visitor as being cheap, also the interpreter should notice that there is a danger in this technique, by being too attractive, it must not detract from the main values of the site, or any structure in it being interpreted, it must be pertinent to the main story, not an entertaining entity by itself, it should be relatively simple.

## **- Benefits from Interpretation through Demonstration**

- 1) It offers the visitor an opportunity to see one or more phases of the story as well as hear about it.
- 2) It encourages questions.
- 3) It holds visitors attention, seldom does one find the visitor in different to a good demonstration.
- 4) It can show the involved story when an oral description would be very inadequate.
- 5) It offers the interpreter an opportunity to involve one or more visitor in the program by using him/her as a part of the demonstration, also the visitor becomes a part of the tour, and not simply a spectator, some care must be exercised, as the visitor must be a willing aid in the demonstration, and not a reluctant participant (Callebaut, Killebrew, Silberman 2004: 45).

## 4.3.5 Advantages and Disadvantages of Various Presentation Techniques

### 1) Graphic Panels

#### **Advantages**

- Need no supervision.
- Can reach to a large audience.
- Low maintenance.
- Easy for the audience to use.
- Can combine text and pictures.
- Can help orientate visitors.

#### **Disadvantages**

- Are becoming ubiquitous and people might be starting to ignore them.
- Can have a negative landscape impact.
- Can be prone to vandalism.

### 2) Guided Walks

#### **Advantages:**

- Very effective for of interpretation.
- Flexible.
- Can present a complex story.

#### **Disadvantages**

- Only reach a small audience.
- Need good marketing and administration.

### 3) Publications

#### **Advantages**

- Can be used on and off site.
- Can contain more detail than a panel.
- Can aid orientation.

#### **Disadvantages**

- Must be effectively distributed.
- Regular reprint may be needed.
- Maybe discarded as litter.

#### **4) Audio Tour**

##### **Advantages**

- Can be multi lingual.
- Can use narrative to tell a story.
- Potential for creative characterization.

##### **Disadvantages**

- Isolate users from each others.
- Relatively expensive.
- Important operational considerations like the hiring of headsets.

#### **5) Computer Interactive**

##### **Advantages**

- Encourages interaction.
- Modern appeal.
- Creative combination of pictures, text and sound.

##### **Disadvantages**

- Expensive to program, install and maintain.
- Technology can be out-of date quickly.

#### **6) Visitor Center**

##### **Advantages**

- Introduce a complex story.
- Can be a major attraction.
- Reaches a large audience.
- Can contain a wide range of media.

##### **Disadvantages**

- Very expensive to build and run.
- Much competition.
- Needs highly professional management.



# **5. Interpretation and Tourism in Jordan**

## **5. Interpretation and Tourism in Jordan**

There are some main problems and threats regarding tourism development in Jordan, by referring to some previous reports (ESCWA 2001:6, El-Roudan *et. al* 2000:4, JICA 2004:5); these can be summarized as the following:

- 1- The unawareness by a big sector in the Jordanian society about the importance of tourism and its activities.
- 2- The lack of inclusion of Jordan within tour operators' catalogues; it has been treated as an extension of neighboring countries regarding tour packages and trade.
- 3- The lack of facilities in many sites and destinations, and if existed, there is an inadequate distribution of them.
- 4- The lack of promotional campaigns and marketing representatives abroad. The high cost of domestic tourism, especially with the low income of a considerable segment in the Jordanian society.
- 5- The weak organizational structure for many frameworks involved in tourism development with lack of funding.

There are some other major problems, especially for what is related to some particular kinds of destinations, such as archaeological and historical sites, which form a basic component in the group of attractions in Jordanian tourism. Such problems are characterized by agricultural expansion, urban development and rapid population growth. These problems in addition to the high unemployment, the lack of awareness about the importance of archaeological remains, which occurs among large segments of the population, are all creating real threats to archaeological sites (El-Roudan *et al.* 2000:9).

Also the inappropriate behavior of visitors in some destinations, which characterized by littering, vandalism and uncontrolled movement within the site, this will affect the satisfaction and the experience of tourists, and then losing both, the site and the tourist

## **5.1. Tourism and Interpretation**

Tourism and Interpretation can serve many purposes, such that any new tourism initiative should, in every case, take stock of the objectives (Kuo 2002: 22).

To have a fine archaeological site that people should see is not reason enough to make it available to visitors (Badia Project 2009: 10). Some of the following objectives seem applicable in Jordan:

1. Providing income to local people.
2. Increasing a sense of local ownership.
3. Bringing people together (those who previously thought they had no interest).
4. Protecting and managing the site (Preservation).
5. Conservation of both wildlife and human way of life (Badia Project 2009: 10).
6. Improvement of the landscape (taking away of unwanted human mismanagement & waste).
7. Educating visitors and locals about (Interpretation - providing understanding).
8. Research and Educational Studies.

## **5.2. What Benefits does Interpretation bring to Historic Site Management in Jordan**

- Interpretation shows the visitors why the heritage site has value – to them (the visitor), to the community, and perhaps regionally or nationally. (Veverka 2000: 15)
- Interpretation can inspire visitors and create a sense of individual and community pride
- It is the interpretation (programs, living history, guided tours, exhibits, etc.) that visitors come to the heritage site for – the story and site experience. Without interpretation a historic site is, in the eyes of the visitor, just another old site (Mason 1997:22).
- Interpretation gets visitors to care about heritage (theirs or other cultures) (Veverka 2000:15).
- Interpretive services are the reasons visitors come back to heritage sites (Kuo 2002:12).

- Interpretive programs and services can increase visitation by increasing the perception of Benefits tourists receive by going to a particular heritage site.(Veverka 2000:15).
- Interpretive programs and services can produce reductions in site maintenance, and related management issues when used as a management tool
- Interpretive programs and services can make money!
- Interpretive programs and services provide added value to any heritage tourism experience, and heritage site marketing efforts. (Veverka 2000: 15)
- You cannot have heritage tourism without interpretation. Heritage tourism depends upon the story of the site and the willingness of visitors to want to travel to see, learn about and experience the site.(Heritage destination consultant, 2010)
- Interpretation brings in more visitors, more repeat visitors and more income.
- Interpretation helps visitors create their own unique choice of ways to experience and learn about a site and its story (Kuo 2002:15).

Education services for visitors, known as “interpretation”, may play an important role in facilitating tourism operations and let it meet visitor expectations. But is there any evidence that interpretation can make a substantial contribution to tourist fulfillment and improving sustainability.

### **5.3. Roles for Interpretation in Sustainable Tourism**

Interpretation can play a serious role in achieving sustainable tourism. For many visitors the information they encounter while at vacation may offer the only opportunity to learn about their bonds to the environment (Kuo 2002:20)(Causle 2003: 13-16), or to their history and culture. Successful interpretation can contribute to sustainable tourism and recreation in two main ways:

- 1) Interpretation can develop the quality of the experience for visitors and encourage continued visitor interest in the activity, thus creating economic sustainability.

|

- 2) It can also support in the management of visitors and their impacts, thus contributing to the continued quality of the environment and way of life of the host community.

Tourism is heavily based on the environmental and cultural resources of the destinations, which experience growing pressure due to the constantly increasing volume of tourist arrivals and the geographical spread of this activity (Mason 1997:16).

The sustainable use of natural and cultural heritage assets for tourism has become a general concern in this sector, and appropriate policies and management plans are increasingly being developed and implemented at all levels (ICOMOS 2008). An integral part of any such strategy should include applying techniques and developing services for appropriate and high quality interpretation and communication of heritage values in tourism.

While there have been a wide range of techniques developed and literature published on heritage interpretation, its strategic role and practical application in tourism has not been examined systematically so far (ICOMOS 2008).

Appropriate interpretation and communication techniques should be considered at early stages of tourism development, in order to become an integral part of high quality tourism programs. There is a wide range of conventional techniques, modern multimedia and ICT tools that can be applied for heritage interpretation in tourism (ICOMOS 2008).

Interpretation and communication of heritage values in tourism can serve multiple purposes in ensuring the long term sustainability of this activity and the heritage assets it depends on:

1. Raising awareness on heritage values among tourists, thus encouraging their responsible behavior during visits and their collaboration for conservation efforts
2. Increasing pride and appreciation in host communities for their heritage, thus fostering the preservation of traditions and sustainable use of resources.
3. Creating an added value and high quality learning experience for visitors that would contribute to the competitiveness of related businesses and tourism destinations in general (ICOMOS 2008).
4. Ensuring that local communities have a role in determining the appropriate presentation of their cultural values (McCool and Lime 2001: 100)
5. Creating services and goods using innovative techniques (e.g., guiding, thematic programs, and merchandising) that will generate revenues for the maintenance and preservation of heritage sites and features.

6. Controlling the high number of visitors in heavily visited and popular heritage sites, thus minimizing negative impacts of tourism.
7. Creating strong tourism products in lesser known and smaller attractions and destinations that will enable a vibrant and varied local tourism sector, based on typical and distinguishing local heritage features

To develop criteria based on an integration of interpretation, orientation and communication techniques and activities on natural and cultural heritage in tourism development and management processes. These Criteria must target:

- (i) Policy makers and practitioners dealing with the management of heritage sites and features.
- (ii) Tourism professionals in the public and private sector.
- (ii) Training and development institution assisting heritage management and tourism development processes (McCool and Lime 2001:53).

### **Potential Threats**

- Without an integrated strategy for interpretation we lose the opportunity to present this multifaceted nature of the site both to tourists and to local people, which eventually decreases the integrity of the site.
- This difficulty forecasts that in a few years time capital investments want to use these great potentials (Mowforth and Munt 2003: 38-41).
- Abuse of carrying capacity and degradation of the site

### **Steps to be taken**

- The management of the site has to be prepared for such foreseen trends and should provide alternatives in its strategy.
- Since tourism seems to be a key issue on the long run, tourism management planning and visitor management planning should be more comprehensive.
- Visitor management provides opportunities for raising awareness of the World Heritage site (this specific one, but in a general sense, too)
- Enhancing cross-border links and cooperation

Interpretation is one aspect of tourism management, but at present my observation is that lacking an interpretation strategy greatly hinders proper tourism management.

#### **5.4. Baseline Information on the Interpretation Activities**

1. To become aware of the gaps which need to be filled, the present day condition and its historic background have to be analyzed through: (UNESCO Documents: 2009)
  - A historic retrospective: history of tourism as such to one of the World Heritage Qusayer Amra, discovered in 1806. Since that date the volume, the approach, the service and many other features have changed dramatically, but some of the present day practices are a Legacy from those days. (UNESCO: Documents 2009)
  - Legal approach: the various legislative aspects and their changes in the course of time up to the present day have to be examined. (UNESCO: Documents 2009)
  - Economic approach: no doubt tourism has been and will be always an important economic factor, but, and especially in such a sensitive area, to establish sustainable tourism, the limits of utilization has to be stated clearly.
  - Social approach: what role the Qusayer Amra have played in the life of local population, what is the social carrying capacity of the region as far as tourism is concerned, and how these caves are perceived, what values they represent in the broader society.
2. Present practices in interpretation: based on a SWOT analysis the many aspects of Interpretation can be revealed.
3. Identifying gaps:
  - Infrastructure: the site already has certain infrastructure for visitor reception. In the context of this study the focus should be put on the facilities with immediate relation to interpretation tasks.
  - Human capacities and skills: the assets to be interpreted and the target groups of interpretation require certain skills and capacities at the manager organization. Predictably some of the deficiencies of today's interpretation practices are due to adequate skills and/or capacities.

# **6. Management Plans and Interpretation for Petra - Jordan**



## **6. Management Plans and Interpretation Plans for Petra-Jordan**

In response to the impact of growth, the Jordanian Government invited international institutions and interested organizations, to prepare management plans for Petra on four different occasions, and they are as follows:

- “Master Plan for the Protection and Use of the Petra National Park” The United States National Park Service’s (1968).
- “Petra National Park Management Plan” UNESCO (1994).
- “The Study and Management Analysis and Recommendations for the Petra World Heritage Site” USA/ICOMOS’s (1996).
- “The National Park Service’s Operating Plan” (2000).

### **6.1. First Plan**

This plan was created by the National Park Services (NPS) and it states that Petra’s historical “site and scene” is the site primary resources, and that the provider of natural resources is vital in protecting this primary resource. In respect to the significance of the site and its environs, the NPS team took the lead in recommending the establishment of a National Park, an independent park division, and zoning within the park. It addressed other issues through specific project proposals in the field of tourism development, archaeological protection and preservation, and social and administrative issues (PNT Management Plan 2010)

The site was prepared for visitors in the 1960s, toward that end, the plans proposed projects involve everything from roads, electricity, water, hotels, visitor centres, parking lots, and vendor activities to special uses. The majority of these projects were realized, and those that were not continue to pose nagging problems, as in the case of vendor activities and special park uses. Some of the building developments proposed at the park’s entrance have resulted a blocking of that area, triggering the construction of large hotels in sensitive areas that affect the natural landscape and scenic views.

In the field of conservation and preservation, the NPS study recommended the restriction of excavations until such time as exposed ruins were consolidated, an inventory of historic structures established, and a historic base map developed. Although excavations were never stopped, consolidation and protective measures are being implemented in earnest as of late. The social dimension concerning the peoples inhabiting the region is addressed by the NPS Plan in as much as it affects the antiquities.

The plan recommended the relocation of the Bdul Tribe, to a location outside the archaeological site. The reason given was the need for preservation of the resources of Petra from the destructive effects of human habitation. Both this plan and a later study of 1978 conducted by the UNESCO consultant Sherif Al-Hakim stress on the necessity to precede any relocation by studying the socioeconomic dimension and by providing the community with agricultural lands in order to maintain their livelihood (PNT Management Plans 2010).

## **6.2. Second Plan**

The second management plan was created by the UNESCO and was assisted by and presented in coordination with the Petra National Trust in 1994. This plan, devised some twenty six years after the NPS plan, addresses many of the same issues. The values of the site are clearly laid out and expanded. This plan recommendations and proposals shed the light on in the impact of the management at the time on these values. The UNESCO plan identifies the major issues threatening the integrity of the park from a combination of cultural, socioeconomic, and environmental factors, and presents recommendations and proposals to remedy these threats. The proposal are comprehensive and cover zoning, archaeological conservation, conservation of biodiversity, park infrastructure and personnel, tourism physical planning , sustainable rural development, mitigation measures, training and communication, research and monitoring (PNT Management Plans 2010). Although official governmental approval is not granted, the plan has and continues to serve as a guiding document for all projects and activities since then, and a large number of the project proposals have been executed(UNESCO 1994: 200-204).

The plan attempts to present the criteria for the choice of project site and some of the conservation works being undertaken. There is no formal strategy to date set by the Department of Antiquities for Excavations. The criteria for selection, which are generally determined by the applicant and his or her field of interest, range from research interest to providing a baseline data and from enhancement of sites for tourist presentation to the protection and preservation of the monuments (PNT Management Plans 2010).

The numerous aspects of this subject have been addressed in all management plans and await implementation integration into the site management and monitoring procedures.

### **6.3. Third plan**

This plan has provided the basic framework for a management infrastructure in Petra, this included a declaration of significance for Petra along with management values and objectives, and it also included a draft text for the authorization of a Petra National Park.

The Petra Management Analysis (1996) presents the most vital issues and problems, provides management analysis and recommendations to deal with these problems, and outlines actions and procedures in detail for the successful management of the cultural resources at Petra. The Management Analysis recommends a set of objectives for the park based on the significance of the resources there, in addition to staff responsibilities and authority, and principles for management and planning. It suggests how these recommendations might be implemented. It also makes recommendations concerning how PAP should be comprehensively organized.

The Management Analysis describes actions and procedures for the effective management of the cultural resources at Petra in detail, including the staffing and training required. The issues identified in the Management Analysis are (PNT Management plans 2010):

#### General Site Management:

- Unsuccessful Management Structure at Petra site.
- The Need for a Comprehensive Organized Operation for the site of Petra.

#### Cultural Resource Management (CRM):

- Acquiring and Making Accessible Baseline Data
- Research Priorities and Procedures
- Monitoring
- Treatments for Preservation
- Interpretation and Tourism Strategy
- Public Involvement and Support

Based on the issues listed above, the Management Objectives are as follows:

- Preserve the archeological artifacts, monuments and sites at Petra.
- Protect the beautiful quality of the site.
- Provide for visitor education and appreciation with the opportunity of a high quality experience in such a way that archeological resources are not significantly impaired.
- Ensure that visitor facilities and services are adequate to meet basic needs, are maintained to the highest standards, and provide for visitor safety.
- Ensure that local people are involved in planning and management of the site and that opportunities for employment of local people are provided whenever possible.
- Ensure that the park supports local communities as much as possible without adverse effect to park resources or the visitor experience.
- Support research activities and ensure that research activities do not impact the preservation of archeological resources or the visitor experience. All researchers should provide for proper conservation of artifacts in accordance with the law.
- Ensure that local populations and the Jordanian people understand the role of Petra in their cultural identity and history.

The Management Analysis also outlined several interpretive themes. They are listed below:

- The reason for the occupation of the Petra area by different groups that displayed cultures unusually complex and sophisticated for their times over almost 10,000 years of human history (with special attention to early Neolithic inhabitants, biblical Edomites, and Nabataeans).
- The geology and biology of the Petra region, and how this is related to the theme just above.
- Development and control by the Nabataeans of a key segment in the trading network that linked the great urban centers of East and West.
- The technology necessary to live and travel in the desert, and the uses to which this was put by the Nabataeans in establishing their empire.

- The construction of the complex hydrological system at Petra, how and when the technology was acquired, how the construction of the system was accomplished, and how this is related to the establishment of a city by a nomadic people.
- Important aspects of Nabataean cultures visible today in the practices of the Bedouin, specifically the Bdul.
- The role of the visitor in preserving the site.

#### **6.4. Fourth plan**

The National Park Service's Operating plan was conducted in year 2000. The Operating Plan differs from its predecessors in that it consist of the main steps towards the founding of inclusive management policies, detailed operating measures and standards, a training plan, and the recommended position of the (PAP) within the organization of the (MoTA).

Some very important pre-requisites such as the financial and human resources, essential to making the Plan feasible were missing and it is clear that the practicability of the Plan depends on the government's commitment for providing the necessary resources. Furthermore, the by-laws governing the Park were not endorsed.

The direct effect of this delay is that the Park Director was not empowered to take decisions and remained in the position of receiving instructions from several government and parastatal departments whose interests often conflict with each other and those of the Park (PNT Management Plans 2010).

The Petra Archaeological Park Operating Plan (2000) provides a strategy for permitting special uses (PNT Management Plans 2010). The permission shall be denied if any activities would:

- Cause damage or injure to park resources;
- Be opposite to the purposes for which natural, historic, development, and special use zones were established, or unreasonably spoil an atmosphere of peace;
- Unreasonably interfere with interpretive, visitor service, or other program activities, or with the administrative activities of Petra Archaeological Park;
- Substantially impair the operation of public use facilities or services of Petra Archaeological Park concessionaires or contractors

- Present a clear and present danger to the public health and safety; or
- Result in significant conflict with other existing uses.

The Director must reject initial or renewal requests upon finding that any of the above conditions will not be met. Existing activities that do not meet these conditions must be phased out.

The regulations in the Petra Archaeological Park Operating Plan (2000) also state that an request for such a permit shall set forth the name of the applicant; the date, time, duration, nature, and place of the proposed event; an estimate of the number of persons expected to attend; a statement of equipment and facilities to be used; and any other information required by the Director, Petra Archaeological Park. The application shall be submitted so as to reach the Director, Petra Archaeological Park at least two weeks in advance of the proposed event (PNT Management Plans 2010).

As a condition of permit issuance, the Director, Petra Archaeological Park may require the following:

1. The filing of a bond payable to the Director, Petra Archaeological Park in an amount adequate to cover costs such as restoration, rehabilitation, and cleanup of the area used, and other costs resulting from the special event. In lieu of a bond, a permittee (one who receives a permit) may elect to deposit cash equal to the amount of the required bond.
2. The acquisition of liability insurance in which Petra Archaeological Park is named as co-insured in an amount sufficient to protect the park.

The Petra Archaeological Park Operating Plan (2000) states that the permit may contain such conditions as are reasonably consistent with protection and use of the park for the purposes for which it is established. It may also contain reasonable limitations on the equipment used and the time and area within which the event is allowed. Violation of the terms and conditions of a permit issued in accordance with this section is prohibited and may result in the suspension or revocation of the permit (PNT Management Plans 2010).

## **6.5 Interpretation Plans in Jordan**

Very few plans made in Jordan have discussed interpretation were recently conducted by SIYAHA project. These plans have begun in Madaba city south of the Jordanian capital Amman. This plan has discussed how to raise the level of interpretation in the site of Madaba through discussing several issues which were related to this subject, and after understanding the importance of interpreting and presenting the archaeological site to tourists through some themes in Madaba and show what it might need from improvements and what are the weak points, the strength, and threats facing these themes.

Another plan was prepared by SIYAHA project in May 2008. This plan entitled Interpretive Plan for Petra Archaeological Park, and it discussed the interpretive media prescriptions and some interpretive themes on the site of Petra.

### **6.5.1 Interpretation Plan of SIYAHA project:**

This Plan The interpretive program was designed to educate the public about the site values and so to enlist the support of the visitor in the preservation effort.” The Plan identifies the following as values that can be seen at Petra:

- Identity values, which are the exact meanings emotionally involved to a cultural site by human groups.
- Scientific and historical values, which are largely resolute by the potential for research at the site to contribute to scientific and historical knowledge.
- Uniqueness and rarity values, which comprise the degree to which the site represents type, style, builder, period, region, or some combination of these better than comparable sites.
- Aesthetic or artistic values, such as those of architectural composition or the addition of man-made and natural topography to form an outstanding cultural landscape.

---

**SIYAHA PROJECT:** The USAID/Jordan Tourism Development Project is a \$28 million, five-year project (2008-2013) that is working to improve Jordan’s competitiveness as an international tourism destination. The project works in partnership with the Ministry of Tourism & Antiquities on such initiatives as developing a new national hotel classification system, improving tourism research and destination marketing, enhancing ecotourism, developing better handicrafts and upgrading vocational training in tourism. The USAID/Jordan Tourism Development Project II is supporting the ministry in developing tourist sites by upgrading archaeological site management, interpretation and investment promotion at key sites, especially Petra and the Amman Citadel.

### **The plan also presented several interpretive themes**

- The reason for the occupation of the Petra area by different groups that displayed cultures unusually complex and sophisticated for their times over almost 10,000 years of human history (with special attention to early Neolithic inhabitants, biblical Edomite, and Nabataeans).
- The geology and biology of the Petra region, and how this is related to the theme just above.
- Development and control by the Nabataeans of a key segment in the trading network that linked the great urban centers of East and West.
- The technology necessary to live and travel in the desert, and the uses to which this was put by the Nabataeans in establishing their empire.
- The construction of the complex hydrological system at Petra, how and when the technology was acquired, how the construction of the system was accomplished, and how this is related to the establishment of a city by a nomadic people.
- Important aspects of Nabataean cultures visible today in the practices of the Bedouin, specifically the Bdul.
- The on-going program of ruins stabilization and conservation of artifacts.
- The role of the visitor in preserving the site.
- The influence of Mediterranean, mid-Eastern, and Eastern civilizations as seen in the material culture, especially architectural, of Petra.
- Features in the landscape of Petra, both natural and those made by humans, related to traditional Islamic, Christian, and Jewish histories.

### **6.5.2 Assessment for SIYAHA Interpretation Plan:**

According to the Petra Rapid Assessment, conducted in August 2007 by Siyaha project, it is estimated that the subsistence of approximately 70% of the district's inhabitants is dependent on this sector. For example:

- 40 lodging establishments provide employment opportunities to the people in this area.
- Horse riding fees provide for approximately 365 owners who in turn support approximately 700 families in Wadi Musa.
- Camel and donkey riding fees provide the lion's share of income earned by the population of Um Sayhoon.



The plan of SIYAHA project didn't succeed in dealing with the current situation and shifting it to a better one, nevertheless the plan have focused on the gaps at the site of Petra regarding the interpretation techniques done there but it ended up like any other management plan done for Petra, very few noticed changes done through the recommendations presented at SIYAHA plan, and the rest were sustained.

The plan should present the following questions like, "Would you recommend this tourist destination to your friends?" (This can be followed with, "Why, or why not?") These questions should be supplemented with others that deal with issues of special importance to Petra, such as satisfaction with visitor facilities like the visitor center, comfort stations at the site, accessibility of food and drink. Information about the effectiveness of the interpretive program would also be helpful; this could be obtained by questions about what the visitor expected to learn from his or her visit and what was actually learned by the visitor. It is important that surveys be conducted so that results are valid and useful. They should be stratified according to groups about which information is required, that is, questions should be filled out by international, national, and local tourists, who should be identified as such on the questionnaires.

If informative answers are not forthcoming to written questions, a statistically valid sample should be obtained through oral interviews. Nationality, age, and length of stay information should be obtained on each questionnaire, and occupation and income information if possible.

As important is that questionnaires be obtained at different times of the day, week, and year. Visitor satisfaction may well vary considerably according to crowding at Petra or in the visitor zones there. Furthermore, satisfaction may be found to correlate especially well with PAOT crowding at certain locations for which visitation figures have been obtained as suggested above (Al-Khazna, Siq, Theater, and so forth).

## **6.6 Issues Affecting Interpretation in Petra (Status Quo)**

During my work on this thesis, I have went to the site of Petra several times and have noticed most of the problems that need to be solved in Petra whether on administrative levels or on preservation and conservation level.

On my field study in Petra, and through the personal contacts I have made their and interviews with various nationalities of tourists groups, I have noticed an indication of a shocking rate of satisfaction with their experience of visiting Petra that is lower than one would expect

regarding to the given spectacular nature of the site. Much of this is a caused by not having an effective interpretive program. Some Issues that have been identified were as follow:

- Most visitors leave with at best a partial knowledge of what they have seen, who built the site, why it was built and why it is important?
- There are also wide concerns that visitors are not spending enough time at the site to provide income to hoteliers, restaurateurs, and others associated with the tourism industry in the area. While the exhausting nature of the walk through Petra is one reason for these low percentages, another reason is that visitors simply are not aware of the significance of the sites beyond Al-Khazneh, or, in some cases, that these sites even exist. Generating profits from visitor spending Interpretation and Presentation the Site Properly encourages tourists to stay longer at a site and thus spend more money there (Veverka 2000:11).
- Unclear fee structure: The visitor often does not know that the price of a horse ride is included in a group tour ticket. Prices for other services are not prominently posted, leading to haggling and conflicts between service providers and visitors.
- Degradation of archaeological resources: People and animals have caused the poverty of the site. Donkeys in particular are responsible for the significant damage to the steps to Al-Dier and to the High Place of Sacrifice.
- No orientation to site: Little in the way of signage and interpretive messages is provided. 32 interpretive signs at the site, although some messages are distorted. Over 60 percent of the signs are facing the wrong direction from the point of interest they are interpreting (Figure 6).
- Large number and expansion of sales area: There are now 79 concession stands throughout the park.
- In Petra, paid guides instead of staff interpreters usually make presentations for visitors.

### **6.7. An interpretation and Presentation Proposed Model for the Site of Petra**

Through interpretation and education programs, Petra Archaeological Park will encourage an understanding, appreciation, and enjoyment of the significance of its cultural and natural resources. Interpretation and education programs will support the development of a personal stewardship ethic and broaden public support for preserving Petra Archaeological Park resources (NPS Interpretation and Education 2010).

The purpose of Petra Archaeological Park interpretation and education programs is to present memorable educational and recreational experiences and to encourage the development of a personal stewardship ethic. The Park's programs will do this by establishing a connection between Park resources, the visitor, the community, and Park management. Programs will be successful when they use the right combination of original objects and places, immediate experience, and effective media. In this chapter, the terms "visitor" and "Park visitor" are defined as anyone who uses Petra Archaeological Park interpretive and educational services, regardless of where such use occurs (NPS Interpretation and Education 2010).

The Park will set up and maintain the organizational ability to deliver high-quality interpretive services. High-quality interpretation will be the shared responsibility of all levels of Petra Archaeological Park staff, from the manager, Petra Archaeological Park and Park chief interpreters, to field interpreters and non-interpretive staff. It will be achieved through interpretive and educational services, media, ongoing research, and planning, technical excellence in implementation, a well-trained staff, and continual reevaluation (NPS Interpretation and Education 2010).

Enjoyment of Petra Archaeological Park and its resources is an essential part of the visitor experience (NPS Interpretation and Education 2010). That experience is heightened when it progresses from enjoyment to an understanding of the reasons for Petra Archaeological Park's existence and of the significance of its resources.

In order to give the visitor experience different choices, and in furtherance of Park personnel performance evaluation programs, the levels of visitor satisfaction, safety, and understanding and appreciation will be measured.

A fully developed Park interpretation and education program will offer visitors a variety of opportunities to gain understanding and appreciation of Park resources and the values they represent. Such opportunities will provide knowledge of both Park resources and the care needed to protect them, and allow visitors to participate in a recreational activity or a discussion about Park resources (NPS Interpretation and Education 2010).

## **6.8. Interpretation and Education Programs**

Petra Archaeological Park interpretation and education programs will be grounded in Park resources; themes related to the history and significance of Petra Archaeological Park; and the Park's statement of significance, management values, and management objectives.

The intent will be to provide each visitor with an interpretive experience that is enjoyable and inspirational, within the context of the Park's tangible resources and the values they represent. Interpretation will accept that visitors have their own individual points of view and will encourage dialogue (NPS Interpretation and Education 2010).

Accurate information presented will be current, accurate, based on strong scholarship and science, and delivered so as to convey Park meanings, with the understanding that audience members will draw their own conclusions (NPS Interpretation and Education 2010),

Interpretation will also reach out to Park neighbors and community decision makers to rouse discussions about the Park and its values in local, regional, and national contexts. In addition, interpretive services will help Park employees better understand the Park's history, resources, processes, and visitors

An effective Park interpretation and education program will include the following (NPS Interpretation and Education 2010):

1. Information and orientation programs that provide visitors with easy access to the information they need to have a safe and enjoyable Park experience.
2. Interpretation programs that provide both on- and off-site presentations, and are designed to encourage visitors to form their own intellectual or emotional connections with the resource. All successful interpretive programs achieve significance by linking specific tangible artifacts, buildings, and places with ideas, events, and concepts. Interpretation programs facilitate a connection between the interests of visitors and the meanings of the Park.
3. Curriculum-based education programs that link Park themes to educational curricula and involve educators in planning and development. These programs usually include pre-visit and post-visit materials, address different learning styles, include an evaluation mechanism, and provide learning experiences linked directly to clear objectives. Programs will strive to develop a thorough understanding of the Park's resources in individual, regional, national, and global contexts.
4. Interpretive media that provide visitors with relevant Park information and more in-depth understanding of Park themes.

## **6.9. Interpretive Planning**

Interpretive services and facilities will be developed and operated in harmony with the Petra Archaeological Park general management plan, strategic plan, resource management plan, and **Comprehensive Interpretive Plan (CIP)** (NPS Interpretation and Education 2010).

These plans and other interpretive documents for Petra Archaeological Park will establish a balance of in-Park and outreach interpretive services, based upon criteria such as Petra Archaeological Park themes, levels and types of visitor use, the nature of Park resources, and Park management goals.

A variety of tools, such as personal services, publications, exhibits, and audiovisual presentations, will be used to enhance the Park's interpretation and education programs, provide visitors with relevant information, and ensure a high-quality Park experience. Recognition that concessioners, cooperating organizations, friends groups, and other partners may have an important role in providing interpretation and education services is most important in planning for the overall visitor services program, and those partners should be included where appropriate in the planning process

## **6.10. Comprehensive Interpretive Plan**

Petra Archaeological Park will devise and keep current a Comprehensive Interpretive Plan (CIP). The CIP, initiated by the Director, Petra Archaeological Park, will form the overall long-term vision and basis for decisions about interpretation and education programs in the Park.

It will provide both long- and short-range views and will deal with all media and personal services. The CIP will include the long-range interpretive plan, the annual interpretive plan, and the interpretive database (NPS Interpretation and Education 2010).

### **- The Sorts of Data to Collect and File should Includes**

- All reports, maps, drawings, and photographs produced by the variety of researchers active at Petra over the years, including archaeologists, historians, architects, historical architects, architectural historians, ethnographers, landscape historians, geographers, geologists, and biological scientists whose research reports are relevant to the cultural resources of Petra.

- All drawings and specifications prepared for previously done stabilization, consolidation, restoration, or reconstruction work and all associated plans or research documents.
- Aerial photographs of Petra on file at the Royal Geographic Society, the Jordan Department of antiquities, the American Centre for Oriental Research (ACOR), the French Institute for the Archaeology of the Near East (IFAPO), and similar organizations.
- Drawings, maps, and written descriptions of Petra made in historical times, and in the numerous more recent studies of the area.
- The List of Petra monuments compiled by Laila Nehme' (numbering about 3,000), copies of which are on file at the American Centre for Oriental Research (ACOR) in Amman and at the French Institute for the Archaeology of the Near East (IFAPO) in Amman.
- The more complete base map of archaeological site in Petra under preparation by IFAPO, listing perhaps 15,000 to 16,000 sites, accompanied by any commentaries on these sites written as a part of this effort.
- All visitor surveys that have been conducted in the past five years through any organization, including the Ministry of Tourism and UNESCO.
- GPS positions tied to obvious landmarks as recorded by members of the Jordan Sustainable Tourism Development Team, ACOR researchers, researchers from IFAPO, GTZ, and other research organizations.
- Jordan Antiquities Database & Information System (JADIS) inventory information for areas inside Petra.
- All studies that have been conducted for the conservation of the stone found at Petra, some of which are on file at Yarmouk University, ICCROM, and GTZ.
- All existing condition surveys of monuments and standing structures (for example, the "Pre-Feasibility Study of the Qasr al-Bent Monument," dated April 25, 1996).

- All surveys or evaluations of the Nabataean hydrological system and proposals to restore that system (for example, the surveys of the system in various areas in Petra, including the area of the Siq, currently are being proficient under the direction of the Petra National Trust (PNT).
- All proposals for the restoration of structures and landscapes (for example, the "Petra Roman Street Proposal" submitted by Zbigniew T. Fiema, American Centre for Oriental Research (ACOR) Consultant, January 29, 1996).

#### **6.10.1. Guide and Index to Data**

A guide to the data should be constructed, which should include for each site a list of the materials that have been gathered pertinent to that site. Materials should be identified by title, author, date, and a brief description of content. In addition, site forms should be prepared for each site that briefly provides all of the information listed above as essential (site location, size, topographic situation, characterization, etc.). In time, bibliographic references should be added to these forms. Finally, sites should be indexed according to location in Petra, an index that includes management zones.

#### **6.10.2. Detailed Archaeological Base Map**

Each site should be further indexed by location on a base map of cultural sites at Petra. Maps should be at a scale of 1:500 with contour intervals at a maximum of 1 meter for areas known to contain concentrations of highly important sites (the Petra Basin, Beidha, Siq Al-Barid), and 1:2,500 with a maximum contour interval of 5 meters for all other areas. The maps should be cost-effectively produced by contracting with a firm that utilizes aerial photography.

The contract should specify the production of not only printed maps, but essentially maps in electronic, CAD format. This format should be one of the industry standards. If the format is not AutoCAD, it should be one that translates easily and accurately into AutoCAD.

### **6. 11 Personal and Non-Personal Services**

#### **6.11.1 Personal Services**

Petra Archaeological Park will offer a wide variety of personal service programs that take into consideration audience characteristics and the time available. Examples of personal service programs include the staffing of visitor centers and contact stations, formal and informal

interpretation, demonstrations, performing arts, junior ranger programs, special events, and education programs (Brochu and Merriman 2006: 43)

### **6.11.2 Non-personal Services**

Non-personal interpretive services, which can reach large audiences, will maintain a consistent quality of presentation over time. In conjunction with personal services, they will provide opportunities for visitor information, orientation, and understanding of Park resources (NPS Interpretation and Education 2010). Non-personal services include media such as Park brochures and other publications, indoor and wayside exhibits, web pages, audiovisual presentations, and radio information systems.

The Director, Petra Archaeological Park will be responsible for interpretive media planning and for design and production for museum and visitor center exhibits, wayside exhibits, audiovisual productions, publications, and directional signage. The Director will delegate this responsibility to the Chief, Branch of Visitor Center, Interpretation, and Education. Plans or proposals, including privately funded projects, will be reviewed by the Chief, Branch of Visitor Center, Interpretation, and Education for appropriateness and quality of design and execution. Proposals from concessioners, cooperating organizations, and others may also be reviewed

Review process includes site bulletins, bulletin boards, and other Park-initiated or -approved small projects of a non-permanent nature.

The Director, Petra Archaeological Park and the Chief, Branch of Visitor Center, Interpretation, and Education will likewise be responsible for the conservation of historic furnishings and artifacts on exhibit in Petra Archaeological Park.

### **6.11.3. Electronic Interpretation**

Petra Archaeological Park should use electronic communications, such as the Internet and long-distance learning, to enhance information, orientation, interpretation, and education programs (NPS Interpretation and Education 2010) .Petra Archaeological Park will keep a site on the Worldwide Web to provide an opportunity for programs to reach beyond their borders to a worldwide audience.



Petra Archaeological Park will maintain a home page for the purpose of reaching this audience. The world of electronic communication is rapidly and constantly changing, and Petra Archaeological Park will take advantage of newer technologies with the potential for even greater service to the non-visiting public, as they become available.

### **6.12 Interpretive Competencies and Skills**

A high-quality interpretation and education program needs a well-trained staff. Park managers will require Petra Archaeological Park interpretive personnel and any non-Petra Archaeological Park groups or individuals that provide interpretation and education services to the public on behalf of the Park to develop the knowledge, skills, and abilities necessary for effective interpretation.

All Petra Archaeological Park interpreters will meet the certification standards for their essential competencies identified in the interpretive development program (NPS Interpretation and Education 2010)

### **6.13 Requirements and Needs for all Interpretation and Education Services**

The following must be considered in the development of all personal and non-personal services:

- **Access to Interpretive and Educational Opportunities**

Petra Archaeological Park will guarantee, to the greatest extent possible, that persons with disabilities receive the same interpretive opportunities as nondisabled persons. Accordingly, the Park will ensure that persons with disabilities have the opportunity to participate in and benefit from all programs and activities, in the most included setting suitable (NPS Interpretation and Education 2010).

The Park will take all possible steps to guarantee successful communication with individuals with hearing and visual impairments by providing suitable supplementary equipments, where needed, in order to provide them with opportunities to participate in, and enjoy the benefits of, Petra Archaeological Park programs and activities. This means that in some cases Petra Archaeological Park might need to provide sign language interpreters for visitors with hearing impairments, and provide audio and large-print versions of printed materials for those with visual or cognitive disabilities.

Efforts will also be made to ensure that interpretation and education programs meet the special needs of children, senior citizens, visitors speaking many different languages, and the disadvantaged.

- **Interpretation and Education Services Beyond Petra Park Boundaries**

Outreach services are an active part of a balanced visitor services program. A planned outreach program is essential to Petra Archaeological Park, and tightly establishes it as part of the local, national, and global communities.

Outreach should be used to distribute Park information, and interpretation and education programs, beyond Park boundaries. Petra Archaeological Park has a liability to offer interpretation and education opportunities to members of the public who are unable to make on-site visits.

- **Resource Issue: Interpretation and Education**

Petra Archaeological Park managers will be called upon to make difficult resource decisions, some of which may be highly controversial (NPS Interpretation and Education 2010).

Interpretation and education programs are a means of building public understanding of, and support for, such decisions and initiatives, and for Petra Archaeological Park management values and objectives. Therefore, Petra Archaeological Park should, in balanced and appropriate ways, thoroughly integrate resource issues and initiatives of local and Park importance into their interpretive and educational programs (NPS Interpretation and Education 2010).

For resource issue interpretation to be effective, frontline interpretive staff must be informed as to the reasoning that guided the decision-making process, and interpreters must present balanced views. Resource issue interpretation should be integrated into both on- and off-site programs, as well as into print and electronic media whenever appropriate.

The education of residents and officials of gateway and neighboring communities and the region surrounding the Park about resource issues and broad initiatives is often the most effective means of eliminating resource threats and gaining support for the Park's policy choices (NPS Interpretation and Education 2010).

- **Research**

Interpretation and education programs will be based on current scholarship and research about the history, science, and condition of Petra Archaeological Park resources, and on research about the needs, expectations, and behavior of visitors. To achieve this, a dialogue must be established and maintained among interpreters, education specialists, resource managers, scientists, archaeologists, sociologists, ethnographers, historians, and other experts for the purpose of offering the most current and accurate programs to the public (NPS Interpretation and Education 2010).

- **Consultation**

Petra Archaeological Park will present factual and balanced presentations dealing with several cultures, heritages, and histories. Consultations with diverse constituencies in developing all interpretation and education programs are critically important to ensure appropriate content and accuracy, and to identify multiple points of view and potentially sensitive issues. When appropriate, agencies involved in heritage tourism and history should be included in consultations to foster coordination and partnerships.

The Park will actively consult traditionally associated groups and other cultural and community groups in the planning, development, presentation, and operation of Park interpretive programs relating to their cultures and histories (NPS Interpretation and Education 2010). Cooperative programs will be developed with cultural groups to help Petra Archaeological Park present accurate perspectives on their cultures (NPS Interpretation and Education 2010).

Ethnographic or cultural-anthropological data and concepts will also be used in interpretive programs, as appropriate. The Park may exhibit human remains, photographs, drawings, renderings, or casts thereof, in consultation with traditionally associated groups. The Park will consult with culturally affiliated or traditionally associated groups to determine the religious status of any object whose sacred nature is suspected but not confirmed. These consultations will occur before such an object is exhibited or any action is taken that may have an adverse effect on its religious qualities.

- **Interpretation and Education Partnerships**

In planning and implementing interpretation and education programs, the Director, Petra Archaeological Park should consider the use of volunteers, concessioners, cooperating organizations, field schools and institutes, friends groups, and private individuals to supplement Park staff and funds.

Such services will not be used as a replacement or substitute for the Park's basic interpretive operation. To ensure quality control and appropriateness, Petra Archaeological Park interpretive staff will be involved with the planning, approval, training, monitoring, and evaluation of all interpretive services provided by others (NPS Interpretation and Education 2010). Non-Petra Archaeological Park personnel providing interpretive services should be offered an opportunity to complete interpretive development program training module(s) developed by or in collaboration with Petra Archaeological Park.

- **Volunteers in Petra Archaeological Park**

A program to operate volunteer services should be developed by Petra Archaeological Park in combination with appropriate government agencies. Volunteers should not displace Petra Archaeological Park employees. Petra Archaeological Park housing should be used for volunteers only if available and not needed for Park employees (NPS Interpretation and Education 2010).

- **Cooperating Organizations**

When appropriate, cooperating organizations and NGO's will join Petra Archaeological Park in presenting interpretation and education programs and in supporting research efforts. Enabled by a standard, non-negotiable cooperating association agreement, cooperating organizations may purchase for resale, or produce for sale, interpretive and educational items that are directly related to the understanding and interpretation of Petra Archaeological Park.

Cooperating Organizations may offer appropriate and approved interpretive services that support but do not displace the interpretive and educational services offered by the Park. Cooperating Organizations may accept donations on behalf of Petra Archaeological Park when appropriate and when conducted through approved fund-raising efforts.

#### **6.14. Implementation Plan (a Concept)**

For the interpretation plan to be realized, there are several phases that must progress like the design phase, construction, and the startup. To undertake the work, a multi-disciplinary team is required over a period of four to six months, understanding that the Site Management Planning Committee has placed main concern on the visitor center and the Archaeological Park.

The project team, assembled for the design and implementation phase, will be responsible for:

- Preparing the text and the designs for the panels and the exhibits.
- Specifying and sourcing the construction and installation of the panels and the upgrade of the physical infrastructure at the sites.
- Specifying the script for the audio tour. The procurement of the audio tour service will be done in second phase of the project.
- Specifying the architectural requirements to accommodate the interpretation plan at the Visitor Center, the Archaeological Park.
- Supervising the construction of the panels and the interpretation program and equipment at the sites.
- Preparing the educator’s and the student kits and the web site. The web site will be done in corporation with interested organizations in developing the PNP.

The expected team composition is as follows:

<b>Resource</b>	<b>Scope</b>
Project Manager	<ul style="list-style-type: none"> <li>• Technical and financial Management/oversight</li> <li>• Team Supervision and Management</li> <li>• Subcontractor Supervision and Management</li> </ul>
Archaeologist/Historians	<ul style="list-style-type: none"> <li>• Development and review of interpretation material for signage, printed material, and audio tour</li> </ul>
Tour guide(s)	<ul style="list-style-type: none"> <li>• Development and review of interpretation material for signage, printed material, and audio tour</li> <li>• Development of tour guide training manual</li> </ul>
Tour guide trainer	<ul style="list-style-type: none"> <li>• Development of tour guide Manual</li> <li>• Delivery of two courses</li> </ul>
Interior decorator	<ul style="list-style-type: none"> <li>• Specification, lighting and interior design</li> <li>• Oversight and support in procurement and installation</li> </ul>
Graphic designer	<ul style="list-style-type: none"> <li>• Development and design of exhibits and printed materials excluding site brochures.</li> </ul>
Multi-Media specialist	<ul style="list-style-type: none"> <li>• Specification and oversight of multimedia project implementation (film)</li> </ul>
Project Assistant/coordinator	<ul style="list-style-type: none"> <li>• Project Management Support</li> </ul>
International expert	<ul style="list-style-type: none"> <li>• Project management support and advice</li> </ul>
Educator	<ul style="list-style-type: none"> <li>• Student and teacher’s kit/curriculum development</li> </ul>
Communication specialist	<ul style="list-style-type: none"> <li>• Copywriting, translating, and proof reading</li> <li>• Oversight for web site and brochures creation</li> </ul>

# **7. A Suggested Proposal for Presenting the Selected Themes**

## **7. A suggested proposal for presenting the selected themes**

### **7.1 How to Present Hydraulic System to the Tourists:**

After a field study on the area of Petra, the researcher would suggest some ideas to develop an outreach strategy to increase public awareness of the first theme and experiences by using a variety of methods. This includes the following:

- 1) Work with tour operators to introduce visitors to the Hydrological system in Petra ,  
Like conservations. For example, tour operators could review the concepts of  
The themes on the bus to Petra and provide handouts that reinforce them.
- 2) Work with JTB to develop a strategy that conveys the interpretive concept in all the  
Hydrology spots or related to.
- 3) Ensure that the brochures developed are placed in appropriate locations, such as local  
Hotels and other visitor sites. The brochures will highlight the sites within Petra and  
Introduce visitors to the interpretive theme. The conservation theme will specifically be  
emphasized.

The oral presentations provided in guided tours and the mobile interpretive media should be thought of as being complementary. Different people respond to different sorts of presentation (written or oral) differently, and one can reinforce the other. Guides can also answer questions and can provide other sorts of interesting information. For example, while wayside exhibits will probably present information as organized by scientists and historians, guides might provide oral histories associated with the feature in question.

### **Through Media**

- Through wayside exhibits, brochures, site bulletins, guided walks and tours, education programs, and electronic media, interpret the importance of water resources and current efforts to protect them.
- Develop appropriate electronic interpretive materials that can be downloaded or transmitted to a mobile device such as a mobile phone or digital music player

## **Developing Programs**

- Review all programs, such as Petra by Night, to ensure that it is consistent with the interpretive themes.
- Partner with tour guides, the local Bedouin community, and other organizations to develop specialized tours in Petra. The subject of these tours might include the architecture of Petra, Nabataean religion and burial customs, hydrology and engineering of Petra, natural features and wildlife, and the Bedouin lifestyle.
- Offer special programs on weekends and other times that focus on aspects of interpretive themes. Programs might include sample archaeological excavations, re-enactments, showings of movies filmed in or are about Petra, tours with the Bedouin community describing their traditions, and lectures. These can be done on-site or off-site.

## **Through Facilities**

- Use specific interpretive concepts at the Old Museum, the New Petra Museum, and Nazal's Camp, developing exhibits to address the concepts.

## **7.2 How to Present Petra Quarries for the Tourists**

For the reason of the huge size that the quarries are, and the different locations situated in, there should be a tremendous work and efforts to collaborate in focusing on how to market these sites for the importance they have in building Petra, and facilitate these sites that represent the quarries of Petra, to enter to the list of interest of the coming tourist, the researcher would like to suggest some ideas to start presenting Petra Quarries in a successful way:

### **1) Do-it-yourself program:**

Specially for Umm Sayhoon quarries, because of its easy landscape and the beautiful nature beside, which will enhance for more visitors to be involved, in return, more memorable the experience will be. The interpreter involves the visitor in a number of ways. He gives concrete expression to abstract concepts through demonstration and visual aids. He physically involved visitors by asking them to try things themselves by preparing the same tools for each tourist and with the help of an expert in the beginning to show them how to start, they could then try to extract rocks the same way the Nabataeans did.



- 2) Post a clear sign, with multi language that explain about the quarry site for the tourists and the sign should be posted in a clear, obvious point for everyone.
- 3) Present a short movie on the site talking about the quarries and its importance, an audio-visual media and services offer a unique opportunity to offer visitors to inform them in `
- 4) Short movie talking about how did the Nabataeans transport these massive size stones from the quarry site to the Petra site
- 5) Find it yourself: the visitor center can supply the tourists whom are interested in Quarries with maps or GPS devices, with all different quarries locations in Petra and allow the visitor to conquer the site of Petra and try discovering these sites alone (Hiking Tour, even Guided Tours)
- 6) Establishing a quarry shop for the tourists through re-quarrying again at Umm Sayhoon:

Um Sayhoon quarry could be a real asset for Petra, and government should plan sensitively to develop and improve the site of Petra through Um Sayhoon Quarry. The impacts of re-quarrying Advantages at Umm Sayhoon means an increased income which also means that more money is likely to be put into the local economy. Quarries provide much needed employment opportunities in areas where jobs are often hard to come by. Good landscaping of the quarry site once it has been exhausted could enhance the area's natural beauty further Good landscaping of the quarry site once it has been exhausted could enhance the area's natural beauty further.

### **7.3 How to Present the Nabataean Pottery to the Tourists**

The tourist and visitor to Petra will understand the real importance of this technological invented object, and will have a complete idea if we applied the following suggested presentation plan:

Design a pottery workshop, in corporation with local interior design office, this workshop will contains all the needed components to produce a Nabataean (Eggshell pottery), with different shapes and sizes. Beginning with collecting the clay, and what was the criteria it was chosen from that certain area, and how the clay was prepared before start shaping it on the potter's wheel, how does the potter's wheel work and what technique the potter do to produce a one fine Nabataean shaped vessel. Inside the workshop we will have an artificial kiln; we can build with an open frontal façade, which can describe all the needed elements to complete this operation.

Using audio visual technology in the workshop will be very useful, a multi language short documentary talking about the beginning of Nabataean pottery production, would be also helpful.

In return we can promote a better understanding of the whole operation, for example, through this workshop we can engage the visitors with the production operation, like to let him do his own piece the way he like with the color he choose, and then he will buy it.

Inside the workshop we can prepare a small part for children and let them participate in this work through collecting some pottery sherds and ask them to reform these pieces back to the original shape (Nabataean puzzle), which will let them integrate into the workshop and the whole site of Petra.

Local community will have to participate in this operation because they know how this operation works, through re-creating the Nabataeans Pottery in establishing programs that state on using the same Nabataeans clay, same technique of shape, same Kilns, the same as CERAMED project which was conducted by the Hashemite University in Jordan.

---

CERAMED project: is an archaeometric investigations were conducted for all six types of Nabataean painted fine ware, several raw clays and colored sandstones from Petra-Jordan, aiming to understand and recover the ancient production technologies basically through the identification of the ancient materials using modern nondestructive and semi-destructive techniques.

# **8. General Interpretation Needs in Petra (Recommendations and Conclusion)**

## **8.General Interpretation Needs in Petra**

### **Guide Manual and Training**

A guide training manual to be developed and taught to tour guides who are currently operating, as well as future guides. This manual will have two sections; interpretive techniques and information on Petra and the walking tour and details about the administration of sites.

The first section will address techniques of interpretation for guides. It will detail the principles of interpretation and how to give a basic talk or presentation.

The second section will go into detail on the sights to be seen in Petra and the walking tour stops with details and human interest stories related to the archeology. It will also address other locations in Petra. The text will also address ticketing procedures, costs, which organization own and administers each site, and other specifics about the sites; for example, the Map Church is still an active church and not just an archeological site.

It is recommended that all guides have 1-2 days of training. One day will cover techniques of interpretation. The second should cover information on Petra as in the manual. Annual refresher training is recommended to keep guides to date with current information and interpretation tools.

### **General Training**

Therefore, it becomes very important that guides be well trained, informed, and made capable of providing engaging and informative oral presentations. They should be fluent in the language of the group they are guiding, provided with a solid background in the history, architecture, and archaeology of Petra, and given a yearly refresher course on Petra, the interpretive themes they are to address, the substance of those themes (including recent research findings), and presentation techniques.

It is recommended that all staff working at each site be familiar with their site and the others in Petra National Park. A two-day training session similar to that given to guides is appropriate. They don't need to learn how to give talks but they should learn the same basic information that guides receive. The Guide Manual would also fill this need.

A very effective way to supplement interpretation by guides is to have regularly scheduled lectures presented to larger groups by experts in the archaeology, history, or architecture of Petra, as well as experts in the geology and biology of the area and anthropologists or ethnologists who might lecture about the indigenous populations of the region. Some of these experts can be found among the current and recommended staff of Petra. Others can be invited from Jordanian universities and foreign research organizations.

It is important that these lectures not only be scheduled on a regular, predictable basis but that they are held as scheduled, so that tour groups can fit the lectures into their itineraries. Venues for lectures might include the lower tiers of seats at the Theater during daylight hours, the visitor center, or facilities provided by cooperating hotels in Wadi Musa in the evening.

Employees should have fundamental training about the Petra National Park and the professional interpretation. Training should emphasize a clear understanding that interpretation moves beyond a recitation of scientific data, or historical names and dates, or chronologies, or descriptions of how old or how big (NPS Management plans 2010). Interpretation is a science and art which combines the essence of the past with dynamism of the present to foster an opportunity for visitors to make intellectual and emotional connections to a place, time or people. Public recognition and support of resource stewardship opportunities is a large role of interpretation.

**Training should also include the following topics; although many others can be covered:**

- Describe ways in which meaning may be revealed by creating linkages thought tangible and intangible resources.
- Explain the interpreter's role to facilitate the visitors' experience and relationship to the resources, and how this relationship provides an opportunity for stewardship.
- Describe how interpretation meets the Petra Park and the Kingdom of Jordan's Mission/objectives.
- Establish a personal foundation to develop interpretive effectiveness through understanding interpretive purpose and techniques.
- Techniques and tools on communicating an interpretive theme to the public that facilitate stewardship.
- List of resources the interpreter can use to learn beyond what is offered in the training.

### **Printed Materials**

Brochures, flyers, and printed material are needed to inform and guide tourists. Some can be distributed by free, while others would be for a fee.

### **Audio Tours**

The walking tour will be supported by an audio tour. This tour should be on small audio devices and are built to with stand use of visitors using them often. Durability is an important aspect of this. The signage program will have to be coordinated with the script and a detailed script for the tour will need to be developed.

### **Education Program and Publications**

A curriculum-base education program should be created for the local schools. This program should include publications that could be published on a website or printed. A Web-based curriculum allows teachers and students throughout the world to learn about Petra.

All levels of publications should be created for education. Including a “Teacher Packet” which is education materials a teacher can receive and use back in the classroom for teaching. Teacher Packets could be giving out in person, mailed or download form a website.

# Recommendations

After several field studies to Petra, observing the situation of interpretation and presentation in Petra, and what kind of benefits tourism sector could have in return in case giving more care and attention to this situation, I would like to propose the following recommendations:

## **1. Provide a Sufficient Site Orientation and Introduction**

A site like Petra cannot be understood unless the tourist understands his relation to it. Effective interpretation requires that basic questions certain to occur to guests be answered as soon as possible in order to launch this relationship. Some of these questions are usually asked even before the tour to the cultural site begins others upon arrival.

Some of the best ways to answer these questions are: publications, websites, clear signage to the site; a visitor center or visitor contact station with maps or GPS devices given to the tourists and depends on what and where they want to go, and other basic information about the site, brochures, displays, orientation lectures, slide shows, videotapes, and films (all of this in two or three language available); and specialized tours and lectures for identified segments of visitors, like foreigners, local people, children, senior citizens, scholars.

## **2. Develop an Interpretive Themes from Site significance, site values, and management objectives**

Interpretive various programs and interpreters should notify the visitor about the significance and values of a site and involve him in their preservation. A number of themes that should be developed in the Petra interpretive program can be mentioned in order to provide the visitors with the context he will need to better understand and value the Petra experience.

## **3. Preservation and Interpretation Research**

Preservation is a part of Management Plan and any cultural site's story that if appropriately presented can effectively connect the site visitor. This is especially so because the visitor can be led to understand that he is a part of preservation; that his actions taken on the site and support provided after leaving the site help to decide whether or not the site will continue to exist and to improve the lives of generations to come. This understanding provides an aspect of closeness and involvement to the experience of being at the site available in no other way.

Interpreting preservation also lends an element of honesty to the visitor's experience that engenders his or her respect and trust. The visitor should be made aware of what is original and what is not, and how alterations to the original came to be made. It becomes clear then that the intent of the preservation effort is not to deceive but to inform.

The most effective, accessible, and engaging means by which research findings are presented is the oral presentation. Finally we can say that what visitors find most satisfying is the relationship engendered when an interpreter speaks to them. Staff interpreters at the National Parks in the United States are among the greatest assets.

#### **4. Enhance Interpretation of more easily Accessible Areas**

Better interpretation should be offered of what are already the most readily accessible parts of Petra. These are less sensitive to increased visitation or where increased visitation can be accommodated by increased direction of visitor activity, some of which would be provided by the interpretive program itself. Some examples are:

##### **- The Arrival Zone**

Walking through visitor center to Bab Al-Siq contains some of the most attractive architecture in Petra, like tombs that display Assyrian, Babylonian, Egyptian motifs, and the Djin Blocks. Because visitors have not been presented with information about the significance of what they pass by in this area and how it relates to what else lies beyond the Siq, the great majority simply rush by what if suitably interpreted would operate much like the proposal to a symphony. The arrival zone could not only be a rich experience in of it, but could also sensitize the visitors to the motifs he or she will encounter later on.

##### **- The Siq**

There is much information here that could contribute to the understanding of the site. The Siq was a vital element in the defense system of the Nabataeans. The tourists can observe the remaining parts of the hydrological system that brought water from the spring of Wadi Musa. The side channels of the Siq could be a point of departure for a discussion of the importance of the hydrological system to flood control, as well as to the water harvesting function of the system.



At the end of the Siq, lies Al-Khazneh. The view of Al-Khazneh from the Siq is the "signature experience" in a visit to Petra. It is an experience that will be remembered for a long time, and so should be attached to the overall Petra interpretive themes like: the visitor center, in brochures and other interpretive devices, at the museums, and in the "Basin"

#### - **The Theater**

The theater presents the theme of the integration of Petra into the Roman Empire. This is a challenging subject because it raises the issues of the position of Petra and the Nabataeans in the on-going struggle for domination between at first Persia and Greece, and then Persia and Rome; how the Nabataeans through their mastery of water were able to carve out fortresses in the desert at Petra and elsewhere; and what became of Petra after it was taken by Rome in 106 B.C.

This last is important because it prepares the visitor for the journey from the theater through the "Elbow," where some background must be provided in order that the tourist understands that the apparently empty landscape is actually the remains of numerous structures, and on to the "City Center." The visitor should be led to understand that more can be learned about the Roman/Nabataean boundary at the City Center and that this experience will require at longer time, not counting the trip back to the visitor center.

#### - **The Elbow**

The walk through the Elbow can be a interesting experience if tourist is aware that the instant landscape contains the ruins of numerous standing structures that once occupied this area near the center of Petra. Brochures with descriptions of what was once here, plan views taken from archaeological research done in the area, and line drawings informed by scholarship of what the area might have looked like are perhaps among the most effective, non-intrusive ways to convey this.

Many visitors, when they reached the Elbow after a long walk from the visitor center, might be exhausted to the extent that they are less likely than were they rested to be pleased about this experience. Adding to their discomfort will be that they will probably be walking through this un-shaded area in Early to mid-afternoon, if they have started their tour of Petra, as do most people, in the morning. This is an area more likely to be valued on the morning of a second day.

### **- The City Center**

This area holds objects and ideas that might be developed through interpretative presentations and finally through archaeological research sufficiently to draw the visitor back for a second day or a second visit. Outstanding line drawings of some aesthetically impressive structures that once stood here are in existence (Browning 1982: 57). These and similar materials should be provided to the visitor to increase his understanding of the area. Archaeological excavations in progress on both side of the Roman road will do a great deal to improve the visitor experience in the City Center.

Various finds from different excavations held in the City Center included papyrus scrolls charred in a fire that followed the earthquake of 363 B.C., which are now being conserved and translated, as well as mosaics and marble screens of high aesthetic value, now being restored.

Artifacts from excavations at this temple (The Great Temple) that demonstrate important aspects of Nabataean religion should be displayed and presented at one of the museums in the nearby "basin" area, as should artifacts taken from many excavations that were done in different locations in Petra. Colonnade Street is an entrance to provide the visitor an understanding of the changes that occurred at Petra in 106 B.C. In fact, along the road are stones inscribed in Greek proclaiming the annexation of the city by the Emperor Trajan.

### **- The Basin**

The Basin area contains many of the site touristic infrastructures, like: restaurants, museums, restrooms, and administrative offices. Museum exhibits artifacts from all over Petra; while this is a great location for such displays, more use of the museums could be made to convey information applicable to the nearby City Center, and to the ruins in the Elbow. Were this done, it would help to establish the area as one with enough experiences for a separate day's visit. Visitors should be made aware of visitor services at the Basin by all appropriate media

### **- Turkmaniyah Road**

Turkmaniyah Road provides an alternative route to the City Center, this route is closed now to all but official traffic and people carrying special permission in advance. It is slated to become a substitute entrance and way out to the site. Predictable use will be by the tourist leaving the historic area who do not wish to go back over the long way through the Siq and Arrival Zone, and those entering the historic area on the second (or later) day of their visit.(Petra Park: 2011)

Through using the Turkmaniyah Road, it will encourage a two-day or longer stay at Petra by making facilitation to visitors to return to the City Center and the western part of the historic area. Access through Turkmaniyah Road will carry some threats to the integrity of Petra. Only small vehicles should be allowed to use the road. Large tour buses would visually interrupt upon the area of the road itself. Vehicles should not be allowed in an area from which they can be seen from anywhere in the Basin.

Part of the interpretation should be a presentation of what visitor facilities are available at the destination of the drive.(Petra Park: 2011)

## **5. Adopt an Interpretive Approach for less accessible areas oriented to visitor safety Trails (Near country)**

Trails provide an opportunity to observe antiquities in the company of fewer people, and so in a quieter environment that might invite contemplation. The trails also guide one to some of the most spectacular views and constructions at Petra, like the High Place of Sacrifice and Al-Dair. But because behavior and actions of tourists on trails is less likely to be observed, vandalism and looting on sites near trails is more likely to go unchecked, and visitors who might be injured or suffer from health problems because of the rocky and harsh environment of Petra are less likely to be provided assistance quickly.

Falls are special problems on trails; site personnel have indicated that four or five persons die each year from these causes. More become lost. These people are often found by the local Bdul or police, desert guards.

Thus a very important part of the interpretive program for trails should be to make visitors aware of both the dangers and their responsibility to the resources they will encounter.

The trails to the High Place of Sacrifice and to Al-Dair, while they are not back country trails, are extremely challenging. It should be well announced that only those in very good physical condition should take these trails. Trails should also be well marked. Markers can be keyed to interpretive brochures.

## **6. Encourage local community for work and handicrafts industries**

This preference can be a building block in the construction of a revitalized local craft industry. As recommended in the 1996 UNESCO Petra National Park Management Plan, such handicrafts might include weaving of carpets, bags; stone and wood sculpture; making copies

of archaeological objects (well and indelibly marked as such); and making Petra sand bottles. Workshops in the production of these items as well as establishing marketing outlets in conjunction with the interpretive program would be valuable steps in the establishment of this industry (NPS Management Plans 2010):

- 1- There is either a decline or a slight increase in visitation by locals in many sites, which reflects the problem of low public awareness about tourism activities and destinations of the country as well as the high cost of domestic tourism considering the level of income for a big segment of locals, this requires then creating more promotional programs using different methods of interpretation to reach all segments of the Jordanian community.
- 2- The least numbers of visitors were actually for museums, which might indicate the need to focus on their promotion and the level of their services (such as their presentation methods, interpretation and promotion); the Citadel Museum (Jordan National Museum) and Folklore Museum are the only two museums recording a growth in visitation, though they still need more development.

## **7. Sustainability**

There should be more implementation regarding some tools of sustainability, the followings are some examples for such tools:

- a. Area protection: As stated by (IUCN 1994), “A protected area is an area of land and/or sea that is specially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means” . In addition to the existing reserves, many areas of significant natural and cultural features should be redesigned to become protected, especially against the rapid urban expansion and pollution problems increasing.
- b. It is important to issue and enforce more regulations regarding development and individuals’ behavior within tourism destinations.
- c. Codes of Conduct: these are guidelines of some specific aims; they describe appropriate behavior that should be shown and what negative behavior should be avoided.

Provide appropriate nature conservation interpretation and information regarding the ecological, economic, historical and cultural values of the protected areas, and to promote nature conservation awareness and sustainable living among visitors to protected areas, as well as reverence for the history and culture of the region.(Teller 2006: 205)

## **8. Acquiring and Making Available Baseline Data**

At present at least 20 organizations are conducting archaeological research at Petra. Over the past decades, many more groups have also conducted research, and numerous reports, maps, photographs, drawings, and other sorts of records have been produced. Often this material has been taken back to the country from which the researcher has come, or it is placed on file at the research office of the investigator's country of origin. While these offices may be located in Jordan, these records are not readily available to those currently most responsible for the preservation of Petra's cultural resources.

Records of previous efforts to preserve sites, including monuments and structures, have generally been treated in the same way. It will be imperative in the future to make all such material available to Petra site managers.

### **Objectives**

- Create an easily used cultural resources data base

An Index for the sites at Petra, both those with standing structures and those completely subterranean, must be constructed to make it easily used by Petra site managers, researchers, and others with legitimate interests in the cultural resources at Petra. This inventory should include the ancient hydrological structures there. The definition of a cultural site will be that used by the Jordan Antiquities Database and Information System (JADIS): an isolated or an integrated complex of human-built features older than 50 years.

A great deal of information exists pertinent to the location, nature, and condition (today and in the past) of cultural resources at Petra. This information must be gathered and made accessible as described just above. To begin with, it should be filed in a safe central location by site.

**9. Establish a High Committee for Archaeology**, which will be responsible for recruitment and contacting professionals from all over the world, conferences, agreements with organizations that care about archaeology and must be headed by His Majesty King Abdulla

## **I0. Primary interpretive themes are those ideas/concepts about Petra Park that ideally:**

Every visitor should understand. These themes, which are based on the park's mission, purpose, and resource significance, provide the foundation for all interpretive media and programs in the park. The themes do not include everything that may be interpreted, but they do address those ideas that are critical to understanding and appreciating the park's importance

### **-Recommendations for Future Research**

This study pertained to the supposed importance of heritage interpreter competencies and training courses from the perspectives of educators, interpreters, students, and tourists. Further study could investigate if the tourists were satisfied with the interpretive services provided at the heritage site and also explore the tourists' preferences of interpretive services while visiting the heritage destination. The recommendations for further study can include:

1. Extend the current study to all first-rank heritage sites throughout the year.
2. Evaluate the developed training curriculum.
3. Decide specific learning outcomes for interpreters that may result from various curricular emphases. Like, do the interpretation skills and techniques courses eventually result in improved interpretation skills?
4. Revise curriculum model according to the identified competencies from hospitality educators, and heritage interpreters.
5. Develop a curriculum, including lesson plans, incorporating the heritage interpreter competencies identified in this study.
6. Field tests the developed curriculum plan with interpreters in different areas to determine the effectiveness of the established curricula content.
7. Investigate more than one heritage destination to evaluate if the tourists favor any specific interpretive services over others.
8. Using Site bulletins: These brochures provide more extensive information about particular points of interest throughout PAP.

9. Using Signs are resistant to damage: The signs will be made of strong materials that are easy to Maintain. This includes being able to resist graffiti. Also, the replacement costs will be minimal for this kind of signs.
10. Supply the visitors with brochures and a Map of the trail. This map will clearly show the path for the visitor. The map will also indicate the location of toilets and refreshments available.

The map will show the location of points of interest along the trail, which in return will encourage the visitor to plan his own tour. The brochures need to suggest to the visitor the challenges of the landscape available. Many of the remote trails are steep and on difficult. The weather can be extreme at times. Visitors will prepare for this, telling visitors to bring sunscreen, hats, and adequate amounts of water as needed.

- 11 For audio tours, use of widely available media can be a possibility like the use of mobile phones to download and then play information about points of interest throughout Petra. On the other hand, because Petra is a draw to people from around the world, not everybody traveling the region has a mobile phone. Alternatives, such as downloadable messages on digital music players, can also be considered

## **Conclusion**

### **Importance of establishing Interpretive Themes**

All interpretive efforts (through both media and personal services) should relate to one or more of the themes and each theme should be addressed by some part of the overall interpretive program (NPS Management plans 2010).

Each major topic will have primary themes and sub-themes creating the parts of a larger story. The themes become more specific with each layer of information and location, building on the foundations of the primary themes. Each site has a sub-theme to tell part of a smaller story to make connections with visitors for that site with an understanding of how it fits into the larger themes and universal concepts.

Interpretation should be structured in a way that provides economic benefit to nearby communities. There are huge opportunities to do this for the communities surrounding Petra that are currently being ignored.

Additionally, enhancing economic benefit would also greatly improve the visitor experience. In addition, there is a strong sense among various local communities that other groups are benefiting from tourism more than they are.

- **Vision**

A vision for the future management of archaeological resources in Jordan must be expressed, taking into consideration the importance of tourism as the largest contributor to the productive economy, providing new jobs and employment opportunities, as well the involvement of the private sector in the conservation and long-term sustainability of the national heritage. In time, the various stakeholders role must be distinct, and there should be a strategy that focuses on the safe-guarding of the antiquities and archaeological management through the DOA.

Making the past and the present of the site clearer, would bring opportunities to attract more visitors, provide accommodation for educational visits and access for special-interest groups. A rich heritage experience with additional events could encourage return visits and provide word-of-mouth recommendation a cost-effective and proven benefit to tourist sites.( Figure 22)



# 9. Appendix

# ICOMOS Charter for the Protection and Management of the Archaeological Heritage (1990)

The protection of archaeological sites cannot be based upon the application of archaeological techniques alone, it requires a wider basis of professional and scientific knowledge and skills, some elements of the archaeological heritage are components of architectural structures and in such cases must be protected in accordance with the criteria for the protection of such structures (Venice Charter on the Conservation and Restoration of monuments and sites). ICOMOS charter for the protection and management of the archaeological heritage (1990) described clearly the point of view about the importance of Presenting the Heritage site could be for the site and the visitors:

- **Article 7:** The presentation of the archaeological heritage to the general public is an essential method of promoting of an understanding of the origins and development of modern societies, at the same time it is the most important means of promoting an understanding of the need for its protection. Presentation and information should be conceived as a popular interpretation of the current state of knowledge and it must be therefore revised frequently. It should take account of the multifaceted approaches to an understanding of the past.

(ICAHM)International committee on archaeological heritage management, a specialized committee of ICOMOS, was approved by the ICOMOS general assembly meeting in Lausanne, Switzerland /Oct. 1990

## UNESCO Convention

II National Protection and International Protection of the Cultural and Natural Heritage.

- **Article 4:** Each state party to this convention recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generation of the cultural and natural heritage referred in article 1 and 2 and situated on its territory, belong primarily to that state. It will do all it can to this end, to the utmost of its own resources, and where appropriate, with any international assistance and co-operation in particular, financial, artistic, scientific and technical, which it may be able to obtain.

- **Article 24:** International assistance on a large scale shall be preceded by detailed scientific, economic and technical studies; these studies shall draw upon the most advanced techniques for the protection, conservation, presentation and rehabilitation of the cultural and natural heritage.

These earlier ICOMOS charters stress the importance of public communication as an essential part of the larger conservation process (variously describing it as “dissemination,” “popularization,” “presentation,” and “interpretation”). They implicitly acknowledge that every act of heritage conservation – within all the world’s cultural traditions is by its nature a communicative act.

Presentation more specifically denotes the carefully planned communication of interpretive content through the arrangement of interpretive information, physical access and interpretive infrastructure at a cultural heritage site. It can be conveyed through a variety of technical means, including, yet not requiring, such elements as informational panels, museum-type displays, formalized walking tours, lectures and guided tours, and multimedia applications and websites.

### **-Principle 1: Access and Understanding**

Interpretation and presentation programs should facilitate physical and intellectual access by the public to cultural heritage sites.

**1.1** Effective interpretation and presentation should enhance personal experience, increase public respect and understanding, and communicate the importance of the conservation of cultural heritage sites.

**1.2** Interpretation and presentation should encourage individuals and communities to reflect on their own perceptions of a site and assist them in establishing a meaningful Connection to it. The aim should be to stimulate further interest, learning, Experience, and exploration.

**1.3** Interpretation and presentation programs should identify and assess their audiences demographically and culturally. Every effort should be made to communicate the site’s values and significance to its varied audiences.

**1.4** The diversity of language among visitors and associated communities connected with a heritage site should be taken into account in the interpretive infrastructure.

**1.5** Interpretation and presentation activities should also be physically accessible to the public, in all its variety.

**1.6** In cases where physical access to a cultural heritage site is restricted due to conservation concerns, cultural sensitivities, adaptive re-use, or safety issues, interpretation and presentation should be provided off-site

**- Principle 6: Inclusiveness**

The interpretation and presentation of cultural heritage sites must be the result of meaningful collaboration between heritage professionals, host and associated communities, and other stakeholders.

**6.1** The multidisciplinary expertise of scholars, community members, conservation experts, governmental authorities, site managers and interpreters, tourism operators, and other professionals should be integrated in the formulation of interpretation and presentation programs.

**6.2** The traditional rights, responsibilities, and interests of property owners and host and associated communities should be noted and respected in the planning of site interpretation and presentation programs.

**6.3** Plans for expansion or revision of interpretation and presentation programs should be open for public comment and involvement. It is the right and responsibility of all to make their opinions and perspectives known.

**6.4** Because the question of intellectual property and traditional cultural rights is especially relevant to the interpretation process and its expression in various communication media (such as on-site multimedia presentations, digital media, and printed materials), legal ownership and right to use images, texts, and other interpretive materials should be discussed, clarified, and agreed in the planning process.(ICOMOS 1990)

---

**ICOMOS** The Second Congress of Architects and Specialists of Historic Buildings, in Venice in 1964, adopted 13 resolutions, the first one being the International Restoration Charter, better known as Venice Charter, and the second one, put forward by UNESCO, provided for the creation of the International Council on Monuments and Sites (ICOMOS)

## **The ENAME Charter**

### **PREAMBLE**

1. It being generally recognized that public presentation, along with multidisciplinary research and physical conservation, is an essential part of the preservation of universal and local patrimony;
2. It being also observed that governmental heritage authorities and interested scholars throughout the world are becoming increasingly aware of their responsibility to communicate the significance and meaning of heritage sites to the general public;
3. It being noted that tourist authorities, private firms, and international organizations often invest in expensive and technologically advanced presentation systems as a spur to tourist development;
4. And while there are a large number of international charters, declarations, and guidelines to maintain the quality of the conservation and restoration of the physical fabric of archaeological and historical monuments (inter alia: Athens 1931; Venice 1964), there is no generalized international oversight of the methods and quality standards of public presentation;
5. And while relevant international charters dealing with Heritage Management and Cultural Tourism repeatedly stress the need for sensitive and effective interpretation, they do not define the standards for this quality.
6. Therefore, we, the governmental officials, heritage professionals, and scholars assembled at the conference “Heritage, Technology, and Local Development” at Ename, East Flanders in September 2002 strongly support the formulation of an acceptable international code of practice to ensure the scientific accuracy, intellectual integrity, and educational usefulness of public presentations at heritage sites, while at the same time showing respect and sensitivity for their cultural uniqueness and local significance.

### **BACKGROUND**

The history of the Preservation Movement has gradually expanded from awareness for the significance of heritage to recognition of the responsibility to communicate it to the public, both local and universal:

- Manifesto of 1877 by English “Society for the Protection of Ancient Buildings” notes the importance of conservation over unrestricted and unsupervised restoration.
- The 1931 Athens Conference of the International Museums office established general code of conduct.
- The ICOMOS Venice Charter (1964) sets out the standards of authenticity and good practice in physical conservation.
- The ICOMOS Florence Charter (1982) and the ICOMOS Washington Charter (1987) expand the principles of the Venice Charter to landscape and historic town centers.
- The ICOMOS Charter for the Protection and Management of the Archaeological Heritage (1990) mentions the necessity of public presentation as “an essential method of promoting an understanding of the origins and development of modern societies” (Article 7) but does not further elaborate acceptable standards or methods.
- The ICOMOS International Cultural Tourism Charter (1999) likewise speaks of presentation in positive but very general terms.
- In regards to the quality and sustainability of tourist experiences, the Charter for Sustainable Tourism (1995) and the “Agenda 21” Action plan of the World Tourist Organization, World Travel & Tourism Council, and Earth Council (1996) emphasize the importance of training, education, and cultural awareness in the development of tourist sites.

In consideration of the need for an international frame of reference for the sustainable and durable development of international tourism, the World Tourist Organization established the World Code of Ethics for Tourism, which was unanimously approved at the thirteenth session of General Assembly of the WTO in Santiago (Chile) in October 1999. This Code has recognized the necessity of reducing to a minimum the negative effects of tourism on the environment and cultural heritage, and, at the same time, of maximizing the benefits for the inhabitants of tourist destination.

This Code includes nine articles defining the accepted "rules of the game" for destinations, governments, tour operators, developers, travel agents, workers and travelers. The tenth article involves the redress of grievances and marks the first time that a code of this type will have a mechanism for enforcement.

It will be based on conciliation through the creation of a World Committee on Tourism Ethics. Among the articles of this Code, Article 4, "Tourism, a user of the cultural heritage of mankind and contributor to its enhancement," more specifically underlines the necessary equilibrium between cultural heritage and tourism.

The importance of the public presentation of heritage sites has therefore become an accepted norm of cultural preservation and tourism. Yet presentation remains to become a fully professional field of endeavor. Because of the vast range of public presentation programs currently operational at national, regional, and local heritage sites and because of the wide range of presentation techniques being utilized (signs, live guides, audiotapes, costumed interpreters, Virtual Reality, physical reconstruction, and "open air" museum recreations), it now seems appropriate – in accordance with the aims and expressions of the earlier charters –to formulate a framework of general standards to maintain the quality of public heritage communication throughout the world.

### **AIM**

**ARTICLE1.** The aim of this charter is to emphasize the essential role of public communication and education in heritage preservation. It seeks to establish professional and ethical guidelines to ensure that preserved archaeological and historical sites are valuable resources for local community cultural and economic development and that they are recognized by the general public as reliable and authoritative centers of learning and reflection about the past, not mere antiquarian curiosities, fenced monuments, or static works of art.

### **DEFINITIONS**

**ARTICLE2.** An archaeological or historical site embraces not only its physical structure, but also the human context and local historical conditions in which it was created, built, or inhabited. The environmental setting is likewise an essential part of the heritage site.

**ARTICLE3.** Heritage presentation is the carefully planned public explanation or discussion of an archaeological or historical site. Its communication medium can range from a text panel, to live guides, to a complex virtual-reality application, but it should in every case provide information about the site that would be unavailable through visual inspection alone.

**ARTICLE4.** Public interpretation is the arrangement of information about a particular archaeological or historical site into a meaningful sequence or narrative. Public interpretation should strive to contextualize the significance of the site for the visitor – not merely present disconnected statistics, dates, or technical terms.

## **SCIENTIFIC AND PROFESSIONAL GUIDELINES :**

### **A. PRESENTATION INFRASTRUCTURE**

**ARTICLE5.** The visitor facilities of a site and its presentation technology must be responsibly maintained and kept in good repair.

**ARTICLE6.** Kiosks, walking paths, and informational signs must be as inconspicuous as possible and in must not alter the visual aspect of a site in a drastic way. The light and sound from kiosks, screens, and speakers must be restricted to the immediate area of the presentation, so as not to adversely affect the surroundings or disturb nearby residents.

**ARTICLE7.** The public presentation of a monument should always make clear to the visitor the extent of the authentic physical remains. Modern recreations of missing elements or modern reconstructions of missing fabric must be clearly identified as such.

**ARTICLE8.** Buildings constructed especially for visitors' centers or other public facilities must be clearly identified as modern, and, whatever their architectural style, they must respect the historic landscape and the proportions of the visible remains. It is essential that that the architects of the new facility work closely with the site's scientific researchers from the initial planning phase.

**ARTICLE9.** In cases where the structural stability of a monument is not in danger, non-intrusive visual reconstructions (by means of artists' reconstructions, 3D computer modeling, virtual reality) should be preferred to physical reconstruction.

**ARTICLE10.** The physical recreation of destroyed or missing historic landscape features (canals, parks, formal gardens etc.), when deemed necessary (i.e. when not accomplished by non-intrusive means such as 3D computer simulations), must be placed on their original location. The incorrect placement of such reconstructed features may offer a mistaken impression of the original character or function of the site.



**ARTICLE11.** Every effort should be made to ensure that heritage presentations are accessible to the handicapped and to visitors with limited mobility.

## **B. INTERPRETATIVE TECHNIQUES**

**ARTICLE12.** The process of historical interpretation for the general public should be seen as far more complex than the mere “simplification” of scientific reports. Its aim is to explore the significance of a monument in a multi-faceted archaeological, historical, social, political, and artistic context.

**ARTICLE13.** Historical Interpretation must be based on a multidisciplinary archaeological and/or historical study of the site and its surroundings, yet must also indicate clearly and honestly where conjecture, hypothesis, or philosophical reflection begin.

**ARTICLE14.** Because the presentation of a site often involves a description of a living local community and its archaeological, historical, cultural, artistic, and ethnic heritage, representatives of the local community should be involved in the formulation of the basic presentation concept. Moreover, they should be involved in the various stages of production and be given the opportunity to offer comments and corrective suggestions.

**ARTICLE15.** The contributions of all periods and groups to the historical significance of a monument should be respected and conveyed. Although particular periods and styles can be highlighted, the recreation of a single period or event should not be the exclusive aim of a presentation. Following Article 11 of the Venice Charter, the evaluation of the relative importance of historical facets of a site – and which can be ignored – must be the result of close consultation between the site team, the local community, and academic advisors.

**ARTICLE16.** The history of the surrounding landscape, natural environment, and the overall geographical should be included in the interpretation of a site.

**ARTICLE17.** The full variety of peoples involved in the history of the site must be given a voice in its interpretation – including minorities, women, and immigrant – in addition to the familiar rulers, elite, and majority group. Special care must be taken to ensure that “generic” characters are fully based on historical research and that the monologues of historical characters connected to the site are based on verifiable texts.

**ARTICLE18.** The construction of 3D computer reconstructions and virtual-reality environments should be based upon a detailed and systematic analysis of the remains, not only

from archaeological and historical standpoints but also from close analysis of the building materials, structural engineering criteria and architectural aspects. Together with written sources and iconography, several hypotheses should be checked against the results and data, and 3D models “iterated” towards the most probable reconstruction.

*ARTICLE19.* Opening day is the beginning, not the end, of the interpretation process. The presentation should be constructed in a modular way so that content updating can be performed without substantial additional investment.

### **C. DOCUMENTATION**

*ARTICLE20.* Full scientific documentation of all elements in a presentation program should be compiled and made available to visitors as well as researchers. This documentation should be in the form of an analytical and critical report, in which the archaeological or historical basis for every element of the work of presentation is included. This record of documentation should be placed in the archives of a public institution and should be published or posted on the Internet.

### **PLANNING, FUNDING, AND MANAGEMENT**

*ARTICLE21.* The unique archaeological and historical heritage of local communities is threatened by global cultural homogenization as well as by physical threats. Therefore policies for encouraging and funding the public presentation of heritage should constitute an integral component of local, regional, and national antiquities legislation.

*ARTICLE 22.* The presentation of recent discoveries or understandings of the archaeological and historical heritage to the general public is a responsibility no less important than physical conservation. This obligation must be acknowledged through relevant legislation and the provision of funds for presentation programs connected with every public heritage project.

*ARTICLE23.* Legislation should in principle require some form of permanent, accessible public interpretation (publication, website, videos) in cases where the destruction of an archaeological or historical site is authorized for reasons of modern development.

*ARTICLE24.* The scale, expense, and technological complexity of a heritage presentation should be appropriate to the location and available facilities (roads, parking, electricity, water, etc.) of the site. The goal should be physical and financial sustainability.

**ARTICLE25.** A detailed environmental impact study should be made before the creation of any large archaeological or historical presentation site. The likely environmental, traffic, and economic effects (both positive and negative) of such a project should be realistically evaluated and taken into account in the project planning.

**ARTICLE26.** The efforts of governmental institutions, local organizations, and private firms should be closely coordinated to ensure the continued funding and maintenance of on-site public presentation programs.

### **TOURISM ASPECTS**

**ARTICLE27.** Effective and professional management is essential for a public presentation program at a heritage site to provide tangible economic benefits for the local community.

**ARTICLE28.** The raising of tourist attendance figures or increasing tourist revenue alone should not be the only criterion or goal for success. The presentation must also serve a range of educational and social objectives for the benefit of the local community.

**ARTICLE29.** A heritage presentation site should be designed to safeguard the social and physical structure of the location and to ensure the privacy and dignity of local residents.

**ARTICLE30.** The contribution of tourism to the sustainable economic development and cultural identity of a local community should entail close cooperation between tourism operators and both public and private groups, regarding formulation of tourism strategies and promotions, the flow of visitor traffic, and use of public facilities.

**ARTICLE31.** Efforts should be made to coordinate local businesses and commercial activity with the heritage site in a respectful and sustainable way. The authenticity and local origin of handicrafts, for example, should be highlighted and encouraged.

**ARTICLE32.** As a local cultural resource, the heritage presentation site should be made available for fairs, concerts, and public performances, with due respect for the character of the site.

### **HERITAGE EDUCATION AND TRAINING**

**ARTICLE33.** Every presentation program should be seen as an educational resource and its design should take into account its possible utilization in the curricula of local schools.

**ARTICLE34.** Local students should be encouraged to participate in the maintenance and operations of the heritage presentation site through special programs, events, and summer employment.

**ARTICLE35.** The local community should be regularly updated on developments and new features at the heritage presentation site through the distribution of a newsletter, website, public lecture series, or other means of public education, such as specially trained local interpreters.

**ARTICLE36.** The training of an adequate number of qualified professionals in the relevant fields of presentation technology, content creation, management, and education is an important objective. Standard curricula should be formulated for professional training.

**ARTICLE37.** As noted in the ICOMOS Charter for the Protection and Management of the Archaeological Heritage (Article 8), academic training “should take account of the shift in conservation policies from excavation to in situ preservation. It should also take into account the fact that the study of the history of indigenous peoples is as important in preserving and understanding the archaeological heritage as the study of outstanding monuments and sites.”

**ARTICLE38.** Postgraduate training programs and courses should be developed with the objective of updating presentation professionals on recent developments and innovations in the field.

## **RECOMMENDATIONS**

**ARTICLE39.** International cooperation is essential to developing and maintaining standards in heritage presentation techniques and technologies.

**ARTICLE40.** There is an urgent need to create an international forum for the exchange of information and experience among professionals dealing with archaeological and historical heritage presentation. This requires the organization of conferences, seminars, and workshops at international as well as regional levels, and the establishment of regional centers for heritage education on all levels, from primary school to postgraduate studies.

**ARTICLE41.** Regular international exchanges of professional staff and cooperation on selected pilot projects should be developed as a means of refining the methodology of heritage presentation.

## **CHARLESTON DECLARATION ON HERITAGE INTERPRETATION**

**7 May 2005**

**Charleston, South Carolina, USA**

On the occasion of the 8<sup>th</sup> International Symposium of US/ICOMOS, “HERITAGE INTERPRETATION, Expressing Heritage Sites Values to Foster Conservation, Promote Community Development, and Educate the Public,” approximately 200 delegates from all over the United States, more than a dozen nations and several disciplines met in Charleston, South Carolina, from 5 to 8 May 2005, to share experience, draw lessons and address issues surrounding the public interpretation of cultural heritage sites.

The symposium benefited from continuing scholarly and professional discussion of the methods and philosophy of heritage interpretation in many regions of the world and the ongoing review and revision process of the ICOMOS Ename Charter on the Interpretation of Cultural Heritage sites, drafted under the scientific auspices of ICOMOS and sponsored by the government of the Province of East-Flanders and the Flemish Community of Belgium. This document seeks to establish an international consensus on the scientific, ethical, and educational principles for the public presentation and interpretation of cultural heritage.

US/ICOMOS, the Ename Center, and other organizations and individuals are embarking on a multi-year program of activities connected with the charter initiative, in order to facilitate the development of site interpretation principles and techniques. Although the objectives and principles of this Charter deal primarily with interpretation at, or in the immediate vicinity of cultural heritage sites, they may equally apply to off-site interpretation.

The need for such a document has become clear in recent years, as regional governments, municipalities, tourist authorities, private firms, and international organizations have become increasingly concerned with the importance of communicating heritage values and information to the general public, investing in expensive and technologically advanced presentation systems as a spur to tourist development. Yet while there are a large number of international charters, declarations, and guidelines to maintain the quality of the conservation of the physical fabric of ancient monuments and the management of cultural heritage sites, there is no generalized international consensus on the methods and quality standards of public interpretation.

In the current draft of the charter, reviewed by the International Scientific and National Committees of ICOMOS, principles of cultural heritage interpretation were formulated in order to:

- **Facilitate understanding and appreciation** of cultural heritage sites and foster public awareness of the need for their conservation. The effective interpretation of a wide range of heritage sites across the world can be an important medium for intercultural and intergenerational exchange and mutual understanding.
- **Communicate the meaning** of cultural heritage sites through careful, documented recognition of their significance, including their tangible and intangible values, natural and cultural setting, social context, and physical fabric.
- **Respect the authenticity** of cultural heritage sites, by protecting their natural and cultural values and significant fabric from the adverse impact of physical alterations or intrusive interpretive infrastructure.
- **Contribute to the sustainable conservation** of cultural heritage sites, through effective financial planning and/or the encouragement of economic activities that safeguard conservation efforts, enhance the quality of life of the host community, and ensure long-term maintenance and updating of the interpretive infrastructure.
- **Ensure inclusiveness in the interpretation** of cultural heritage sites, by fostering the productive involvement of all stakeholders and associated communities in the development and implementation of interpretive programs.
- **Develop technical and professional standards** for heritage interpretation, including technologies, research, and training. These standards must be appropriate and sustainable in their social contexts.

The aim of the ICOMOS Ename Charter is thus to define the basic objectives and principles of site interpretation in relation to authenticity, intellectual integrity, social responsibility, and respect for cultural significance and context. It further recognizes that the interpretation of cultural heritage sites can be contentious and should acknowledge conflicting perspectives.

Based on the proceedings of this conference, we propose the following definition and recognition of the conceptual and operational difference between “Presentation” and “Interpretation”:

“Presentation” denotes the carefully planned arrangement of information and physical access to a cultural heritage site, usually by scholars, design firms, and heritage professionals. As such, it is largely a one-way mode of communication. “Interpretation,” on the other hand, denotes the totality of activity, reflection, research, and creativity stimulated by a cultural heritage site. The input and involvement of visitors, local and associated community groups, and other stakeholders of various ages and educational backgrounds is essential to interpretation and the transformation of cultural heritage sites from static monuments into places and sources of learning and reflection about the past, as well as valuable resources for sustainable community development and intercultural and intergenerational dialogue.

We also recognize that there is still much to do. The following are major areas where clarification and consensus are still needed, and to which special attention is needed:

- Incorporating stakeholder perceptions and values in interpretation programs remains a challenge.
- The interpretation of religious and sacred sites, places of contested significance, and sites of conscience or “painful memory” needs further analysis in terms of establishing acceptable boundaries and better guidance as to their interpretation.
- In spite of years of expert discussion, the concept of “authenticity” continues to be elusive. Additional research and discussion is needed to define its nature and role in heritage interpretation.
- Certain cultures and communities oppose or prefer alternative methods for the public interpretation of their cultural heritage sites. This requires a continuing dialogue and analysis of how heritage site categories and the circumstances that surrounds them should influence the decision to interpret as well as the level of interpretation.

These fundamental areas of inquiry will be the focus of discussion and other activities in the coming three years. By approaching the topic of interpretation from many geographic, cultural and professional directions, we believe that a consensus can be reached that may serve as a source of guidance in the proper interpretation of heritage sites.

*Proposal at the US/ICOMOS 8th International Symposium at Charleston, South Carolina, 7 May 2005.(ICOMOS 2005)*

# The ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites (1999)

## **Principle 1: Access and Understanding**

Interpretation and presentation programs should facilitate physical and intellectual access by the public to cultural heritage sites.

- 1.1 Effective interpretation and presentation should enhance personal experience, increase public respect and understanding, and communicate the importance of the conservation of cultural heritage sites.
- 1.2 Interpretation and presentation should encourage individuals and communities to reflect on their own perceptions of a site and assist them in establishing a meaningful connection to it. The aim should be to stimulate further interest, learning, experience, and exploration.
- 1.3 Interpretation and presentation programs should identify and assess their audiences demographically and culturally. Every effort should be made to communicate the site's values and significance to its varied audiences.
- 1.4 The diversity of language among visitors and associated communities connected with heritage site should be taken into account in the interpretive infrastructure.
- 1.5 Interpretation and presentation activities should also be physically accessible to the public, in all its variety.
- 1.6 In cases where physical access to a cultural heritage site is restricted due to conservation concerns, cultural sensitivities, adaptive re-use, or safety issues, interpretation and presentation should be provided off-site.



## **Principle 2: Information Sources**

Interpretation and presentation should be based on evidence gathered through accepted scientific and scholarly methods as well as from living cultural traditions.

2.1 Interpretation should show the range of oral and written information, material remains, traditions, and meanings attributed to a site. The sources of this information should be documented, archived, and made accessible to the public.

2.2 Interpretation should be based on a well researched, multidisciplinary study of the site and its surroundings. It should also acknowledge that meaningful interpretation necessarily includes reflection on alternative historical hypotheses, local traditions and stories.

2.3 At cultural heritage sites where traditional storytelling or memories of historical participants provide an important source of information about the significance of the site, interpretive programs should incorporate these oral testimonies—either indirectly, through the facilities of the interpretive infrastructure, or directly, through the active participation of members of associated communities as on-site interpreters.

2.4 Visual reconstructions, whether by artists, architects, or computer modelers, should be based upon detailed and systematic analysis of environmental, archaeological, architectural, and historical data, including analysis of written, oral and iconographic sources, and photography. The information sources on which such visual renderings are based should be clearly documented and alternative reconstructions based on the same evidence, when available, should be provided for comparison.

2.5 Interpretation and presentation programs and activities should also be documented and archived for future reference and reflection.

### **Principle 3: Context and Setting**

The Interpretation and Presentation of cultural heritage sites should relate to their wider social, cultural, historical, and natural contexts and settings.

- 3.1 Interpretation should explore the significance of a site in its multi-faceted historical, political, spiritual, and artistic contexts. It should consider all aspects of the site's cultural, social, and environmental significance and values.
- 3.2 The public interpretation of a cultural heritage site should clearly distinguish and date the successive phases and influences in its evolution. The contributions of all periods to the significance of a site should be respected.
- 3.3 Interpretation should also take into account all groups that have contributed to the historical and cultural significance of the site.
- 3.4 The surrounding landscape, natural environment, and geographical setting are integral parts of a site's historical and cultural significance, and, as such, should be considered in its interpretation.
- 3.5 Intangible elements of a site's heritage such as cultural and spiritual traditions, stories, music, dance, theater, literature, visual arts, local customs and culinary heritage should be considered in its interpretation.
- 3.6 The cross-cultural significance of heritage sites, as well as the range of perspectives about them based on scholarly research, ancient records, and living traditions, should be considered in the formulation of interpretive programs.

#### **Principle 4: Authenticity**

The Interpretation and presentation of cultural heritage sites must respect the basic tenets of authenticity in the spirit of the Nara Document (1994).

4.1 Authenticity is a concern relevant to human communities as well as material remains. The design of a heritage interpretation program should respect the traditional social functions of the site and the cultural practices and dignity of local residents and associated communities.

6.14 Interpretation and presentation should contribute to the conservation of the authenticity of a cultural heritage site by communicating its significance without adversely impacting its cultural values or irreversibly altering its fabric.

4.3 All visible interpretive infrastructures (such as kiosks, walking paths, and information panels) must be sensitive to the character, setting and the cultural and natural significance of the site, while remaining easily identifiable.

4.4 On-site concerts, dramatic performances, and other interpretive programs must be carefully planned to protect the significance and physical surroundings of the site and minimize disturbance to the local residents.

#### **Principle 5: Sustainability**

The interpretation plan for a cultural heritage site must be sensitive to its natural and cultural environment, with social, financial, and environmental sustainability among its central goals.

5.1 The development and implementation of interpretation and presentation programs should be an integral part of the overall planning, budgeting, and management process of cultural heritage sites.

6.7 The potential effect of interpretive infrastructure and visitor numbers on the cultural value, physical characteristics, integrity, and natural environment of the site must be fully considered in heritage impact assessment studies.

- 6.8 Interpretation and presentation should serve a wide range of conservation, educational and cultural objectives. The success of an interpretive program should not be evaluated solely on the basis of visitor attendance figures or revenue.
- 6.9 Interpretation and presentation should be an integral part of the conservation process, enhancing the public's awareness of specific conservation problems encountered at the site and explaining the efforts being taken to protect the site's physical integrity and authenticity.
- 6.10 Any technical or technological elements selected to become a permanent part of a site's interpretive infrastructure should be designed and constructed in a manner that will ensure effective and regular maintenance.
- 6.11 Interpretive programs should aim to provide equitable and sustainable economic, social, and cultural benefits to all stakeholders through education, training and employment opportunities in site interpretation programs.

### **Principle 6: Inclusiveness**

The Interpretation and Presentation of cultural heritage sites must be the result of meaningful collaboration between heritage professionals, host and associated communities, and other stakeholders.

6.1 The multidisciplinary expertise of scholars, community members, conservation experts, governmental authorities, site managers and interpreters, tourism operators, and other professionals should be integrated in the formulation of interpretation and presentation programs.

6.2 The traditional rights, responsibilities, and interests of property owners and host and associated communities should be noted and respected in the planning of site interpretation and presentation programs.

6.3 Plans for expansion or revision of interpretation and presentation programs should be open for public comment and involvement. It is the right and responsibility of all to make their opinions and perspectives known.

6.4 Because the question of intellectual property and traditional cultural rights is especially relevant to the interpretation process and its expression in various communication media (such as on-site multimedia presentations, digital media, and printed materials), legal ownership and right to use images, texts, and other interpretive materials should be discussed, clarified, and agreed in the planning process.

### **Principle 7: Research, Training, and Evaluation**

Continuing research, training, and evaluation are essential components of the interpretation of a cultural heritage site.

7.1 The interpretation of a cultural heritage site should not be considered to be completed with the completion of a specific interpretive infrastructure. Continuing research and consultation are important to furthering the understanding and appreciation of a site's significance. Regular review should be an integral element in every heritage interpretation program.

7.2 The interpretive program and infrastructure should be designed and constructed in a way that facilitates ongoing content revision and/or expansion.

7.3 Interpretation and presentation programs and their physical impact on a site should be continuously monitored and evaluated, and periodic changes made on the basis of both scientific and scholarly analysis and public feedback. Visitors and members of associated communities as well as heritage professionals should be involved in this evaluation process.

7.4 Every interpretation program should be considered as an educational resource for people of all ages. Its design should take into account its possible uses in school curricula, informal and lifelong learning programs, communications and information media, special activities, events, and seasonal volunteer involvement.

7.5 The training of qualified professionals in the specialized fields of heritage interpretation and presentation, such as content creation, management, technology, guiding, and education a crucial objective. In addition, basic academic conservation programs should include a component on interpretation and presentation in their courses of study.

7.6 On-site training programs and courses should be developed with the objective of updating and informing heritage and interpretation staff of all levels and associated and host communities of recent developments and innovations in the field.

7.7 International cooperation and sharing of experience are essential to developing and maintaining standards in interpretation methods and technologies. To that end, international conferences, workshops and exchanges of professional staff as well as national and regional meetings should be encouraged. These will provide an opportunity for the regular sharing of information about the diversity of interpretive approaches and experiences in various regions and cultures.(ICOMOS 1999)

# **The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (The Burra Charter)**

## *Preamble*

Having regard to the International Charter for the Conservation and Restoration of Monuments and Sites (Venice 1966), and the Resolutions of 5th General Assembly of ICOMOS (Moscow 1976), the following Charter has been adopted by Australia ICOMOS.

## Definitions

### Article 1

For the purpose of this Charter:

- 1.1 Place means site, area, building or other work, group of buildings or other works together with pertinent contents and surroundings.
- 1.2 Cultural significance means aesthetic, historic, scientific or social value for past, present or future generations.
- 1.3 Fabric means all the physical material of the place.
- 1.4 Conservation means all the processes of looking after a place so as to retain its cultural significance. It includes maintenance and may according to circumstances include preservation, restoration, reconstruction and adaption and will be commonly a combination of more than one of these.
- 1.5 Maintenance means the continuous protective care of the fabric, contents and setting of a place, and is to be distinguished from repair. Repair involves restoration or reconstruction and it should be treated accordingly.
- 1.6 Preservation means maintaining the fabric of a place in its existing state and retarding deterioration.
- 1.7 Restoration means returning the EXISTING fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.

1.8 Reconstruction means returning a place as nearly as possible to a known state and is distinguished by the introduction of materials (new or old) into the fabric. This is not to be confused with either recreation or conjectural reconstruction which are outside the scope of this Charter.

1.9 Adaption means modifying a place to suit proposed compatible uses.

1.10 Compatible use means a use which involves no change to the culturally significant fabric, changes which are substantially reversible, or changes which require a minimal impact.

## Conservation principles

### Article 2

The aim of conservation is to retain or recover the cultural significance of a place and must include provision for its security, its maintenance and its future.

### Article 3

Conservation is based on a respect for the existing fabric and should involve the least possible physical intervention. It should not distort the evidence provided by the fabric.

### Article 4

Conservation should make use of all the disciplines which can contribute to the study and safeguarding of a place. Techniques employed should be traditional but in some circumstances they may be modern ones for which a firm scientific basis exists and which have been supported by a body of experience.

### Article 5

Conservation of a place should take into consideration all aspects of its cultural significance without unwarranted emphasis on any one at the expense of others.

### Article 6

The conservation policy appropriate to a place must first be determined by an understanding of its cultural significance and its physical condition.

### Article 7

The conservation policy will determine which uses are compatible.



### **Article 8**

Conservation requires the maintenance of an appropriate visual setting, e.g. form, scale, colour, texture and materials. No new construction, demolition or modification which would adversely affect the settings which adversely affect appreciation or enjoyment of the place should be excluded.

### **Article 9**

A building or work should remain in its historical location. The moving of all or part of a building or work is unacceptable unless this is the sole means of ensuring its survival.

### **Article 10**

The removal of contents which form part of the cultural significance of the place is unacceptable unless it is the sole means of ensuring their security and preservation. Such contents must be returned should changed circumstances make this practicable.

## **Conservation processes**

### **PRESERVATION**

#### **Article 11**

Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

#### **Article 12**

Preservation is limited to the protection, maintenance and where necessary, the stabilisation of the existing fabric but without the distortion of its cultural significance.

### **RESTORATION**

#### **Article 13**

Restoration is appropriate only if there is sufficient evidence of an earlier state of the fabric and only if returning the fabric to that state recovers the cultural significance of the place.

#### **Article 14**

Restoration should reveal anew culturally significant aspects of the place. It is based on respect for all the physical, documentary and other evidence and stops at the point where conjecture begins.

### **Article 15**

Restoration is limited to the reassembling of displaced components or removal of accretions in accordance with Article 16.

### **Article 16**

The contributions of all periods to the place must be respected. If a place includes the fabric of different periods, revealing the fabric of one period at the expense of another can only be justified when what is removed is of slight cultural significance and the fabric which is to be revealed is of much greater cultural significance.

## **RECONSTRUCTION**

### **Article 17**

Reconstruction is appropriate where a place is incomplete through damage or alteration and where it is necessary for its survival, or where it recovers the cultural significance of the place as a whole.

### **Article 18**

Reconstruction is limited to the completion of a depleted entity and should not constitute the majority of the fabric of a place.

### **Article 19**

Reconstruction is limited to the reproduction of fabric, the form of which is known from physical and/or documentary evidence. It should be identifiable on close inspection as being new work.

## **ADAPTION**

### **Article 20**

Adaption is acceptable where the conservation of the place cannot otherwise be achieved, and where the adaption does not substantially detract from its cultural significance.

### **Article 21**

Adaption must be limited to that which is essential to a use for the place, determined in accordance with Articles 6 and 7.

### **Article 22**

Fabric of cultural significance unavoidably removed in the process of adaption must be kept safely to enable its future reinstatement.

## Conservation practice

### **Article 23**

Work on a place must be preceded by professionally prepared studies of the physical, documentary and other evidence, and the existing fabric recorded before any disturbance of the place.

### **Article 24**

Study of a place by any disturbance of the fabric or by archaeological excavation should be undertaken where necessary to provide data essential for decisions on the conservation of the place and/or to secure evidence about to be lost or made inaccessible through necessary conservation or other unavoidable action. Investigation of a place for any other reason which requires physical disturbance and which adds substantially to a scientific body of knowledge may be permitted, provided that it is consistent with the conservation policy for the place.

### **Article 25**

A written statement of conservation policy must be professionally prepared setting out the cultural significance, physical condition and proposed conservation process together with justification and supporting evidence, including photographs, drawings and all appropriate samples.

### **Article 26**

The organisation and individuals responsible for policy decisions must be named and specific responsibility taken for each such decision.

### **Article 27**

Appropriate professional direction and supervision must be maintained at all stages of the work and a log kept of new evidence and additional decisions recorded as in Article 25 above.

### **Article 28**

The records required by Articles 23, 25, 26 and 27 should be placed in a permanent archive and made publicly available.

### **Article 29**

The items referred to in Article 10 and Article 22 should be professionally catalogued and protected.(ICOMOS 2010)

- List of Figures

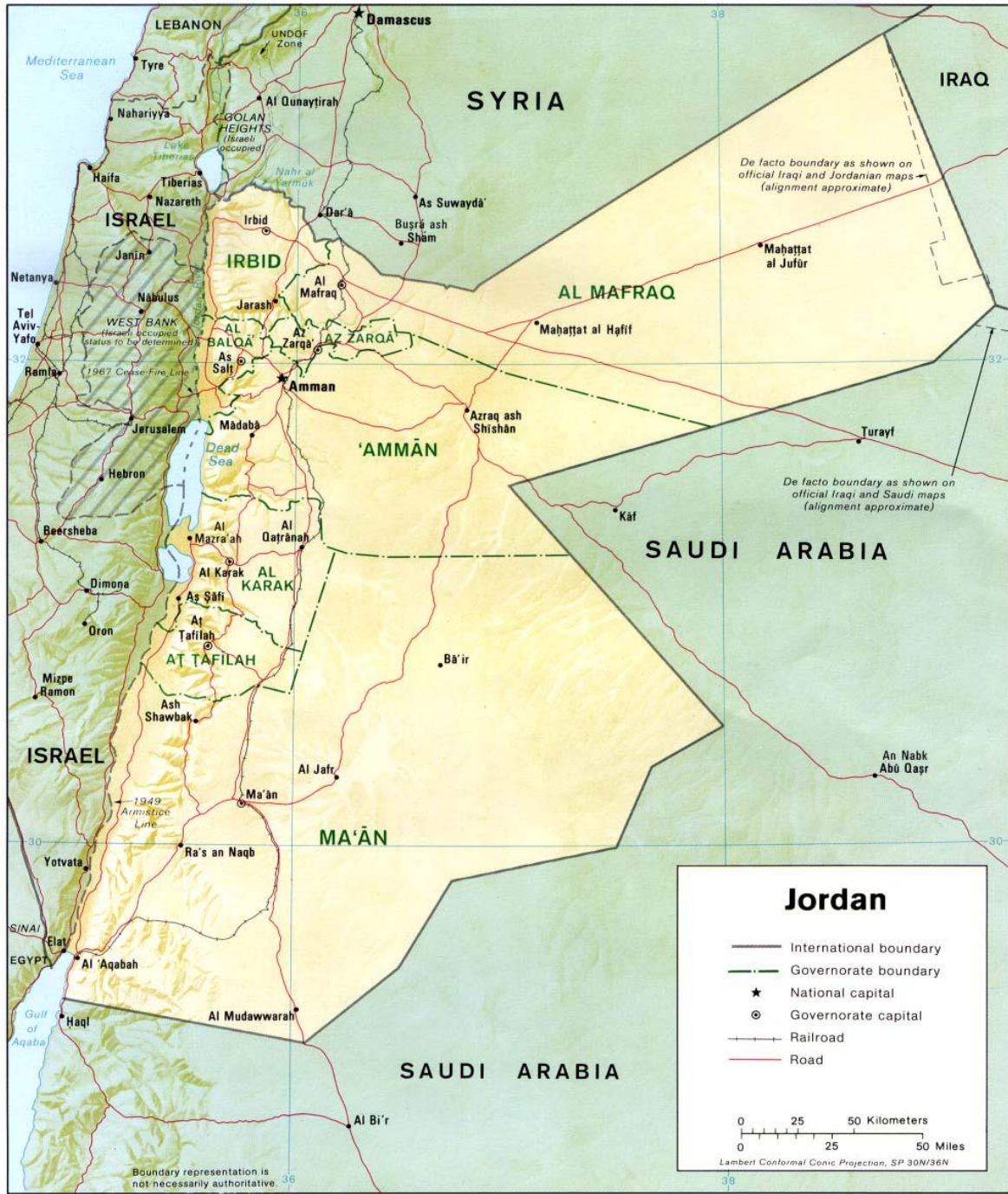


Figure 1: Map of Jordan

Royal Geographic Center, Archive Department, Amman, Jordan, 2009





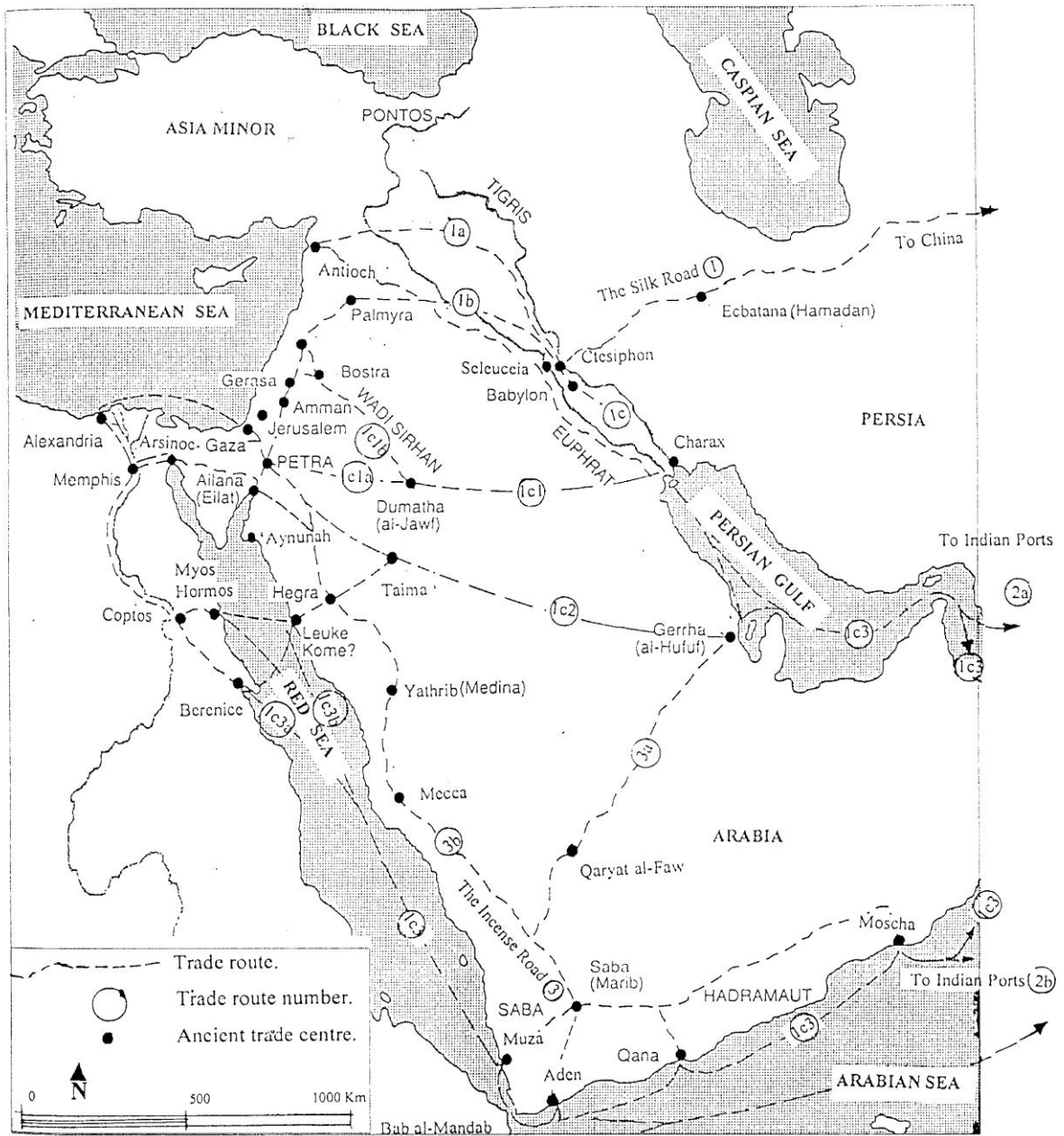


Figure 4: Map of the Nabataeans Trade Routes

After : Rababeh, S.: 2005

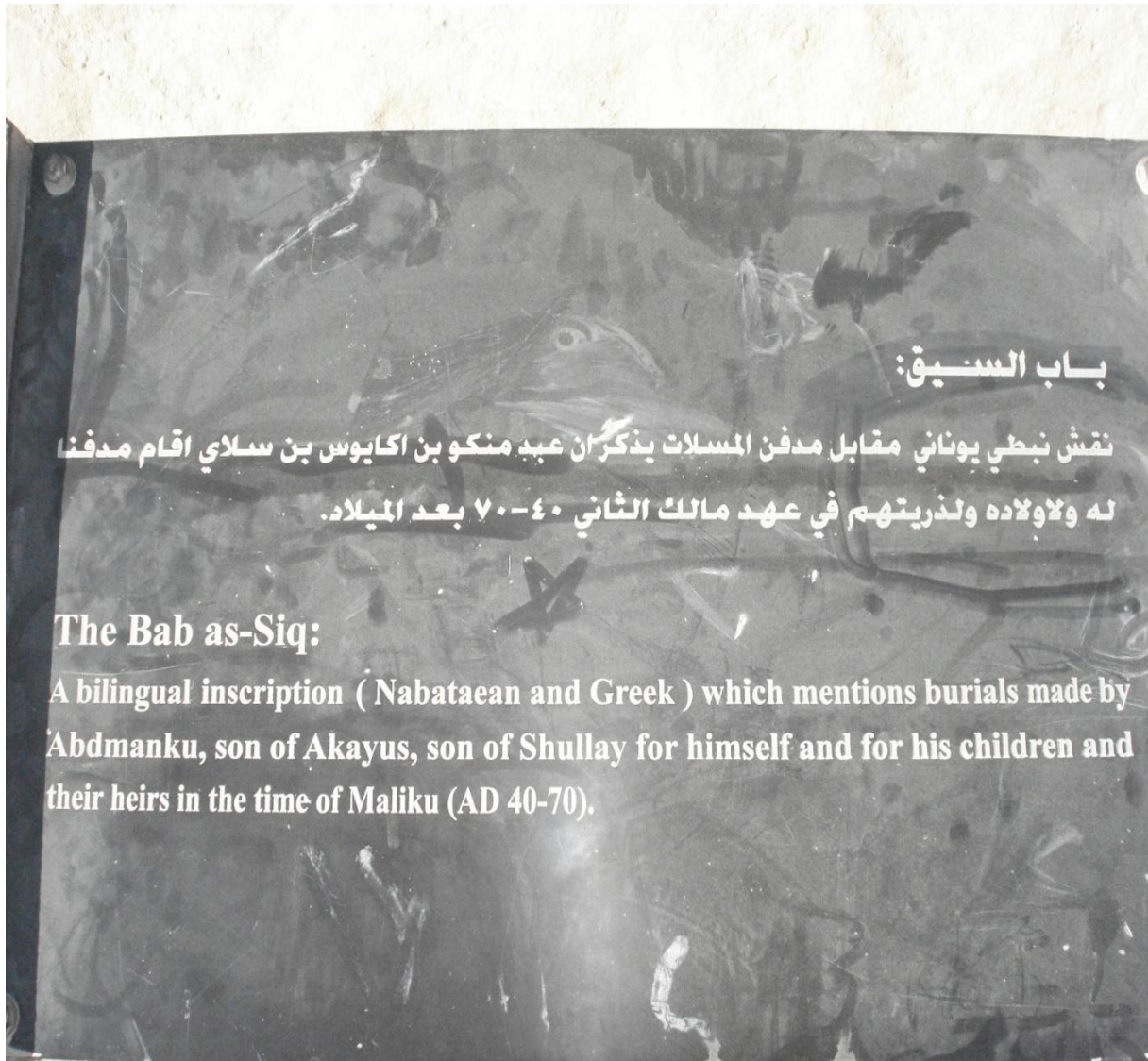


Figure 5: Sign from Petra

Al-Tell, Yazan: Bab as-Siq, Petra, Jordan, 2009





Figure 6: Sign from Petra

Al-Tell, Yazan: Bab as-Siq, Petra, Jordan, 2009



Figure 7: Visitor Center in Petra

Al-Tell, Yazan: Petra, Jordan, 2009



Figure 8: Hydraulic Pipe Remains

Al-Tell, Yazan: Al-Siq, Petra, Jordan 2009



Figure 9: Hydraulic Tunnel System in Petra

Al-Tell, Yazan: Al-Siq, Petra, Jordan 2009



Figure 10: Water Reservoir in Petra

Al-Tell, Yazan: Siq Al-Barid, Petra, Jordan, 2009



Figure 11: Decorated Pottery Plate from Petra

Al-Tell, Yazan, Department of Antiquities museum, Petra Jordan 2009



Figure 12: Nabataean Decorated Juglet

Al-Tell, Yazan, Department of Antiquities museum, Petra, Jordan 2009





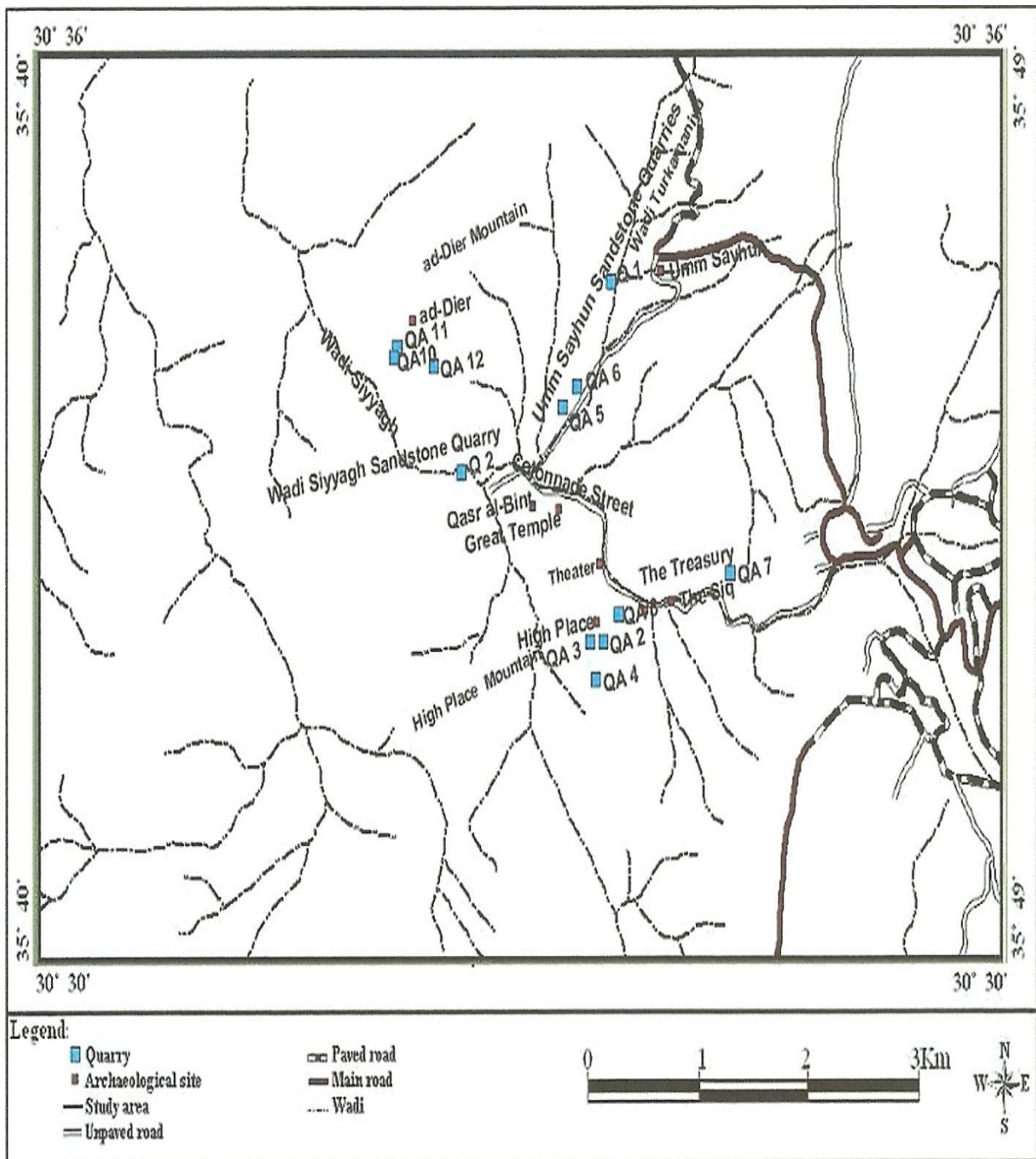


Figure 14: Quarries distribution at Petra Site

After Ortloff, C.R. 2007:



Figure 15: Steep and high Quarry Faces – typical of the Petra Quarries

After Abu-Jaber, N., *et.al.* (2007)



Figure 16: General view showing Umm Sayhoon Sandstone Quarry (Q1)

After: Abu-Jaber, N., *et Al.* 2007



Figure17: Traces for quarrying tools in Umm Sayhoon Sandstone Quarry (Q1).

After: Abu-Jaber, N., *et. Al.*2007



Figure 18: One of Petra ancient quarry landscapes; a spectacular 'high elevation' quarry face.

After: Abu-Jaber, N., *et. Al.* 2007

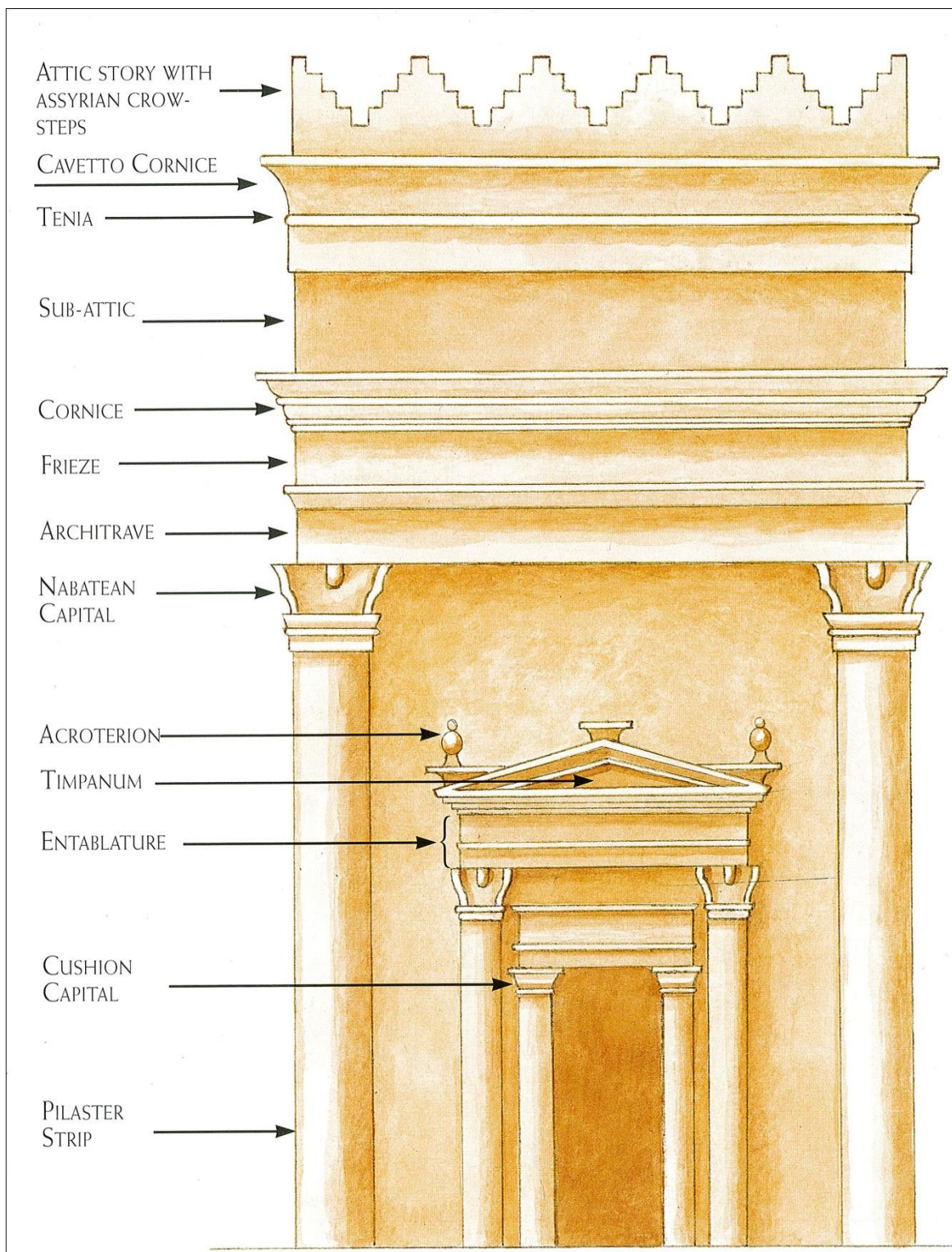


Figure 19: Nabataean Rock-Cut Façade

After Bourbon, F., (1999)

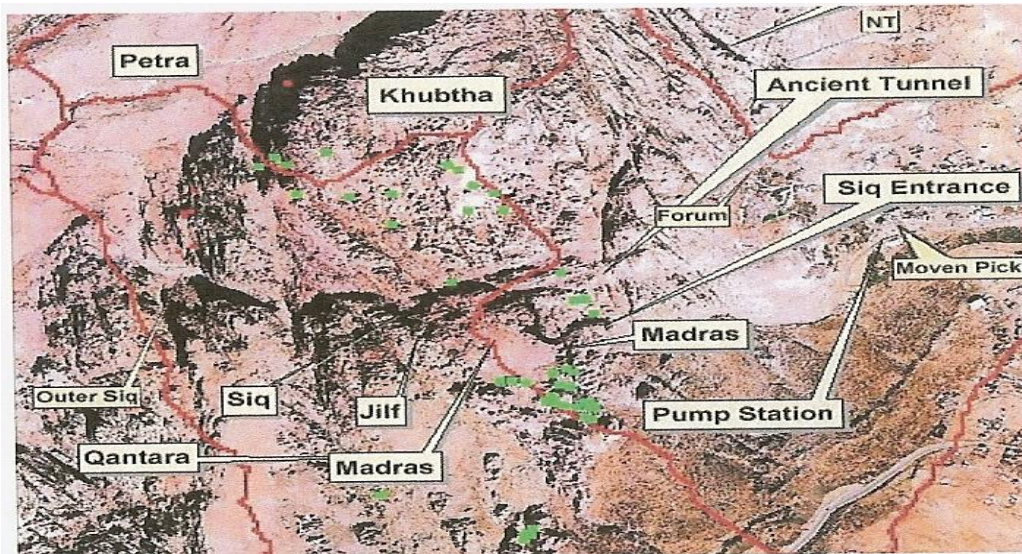


Figure 20: spot image taken in 1992, showing the Wadi Musa, Petra. The siq lies to the city side with an open area where the famous Al-Khazna (Treasury) faces it.

After Orloff, C.R.: 2007

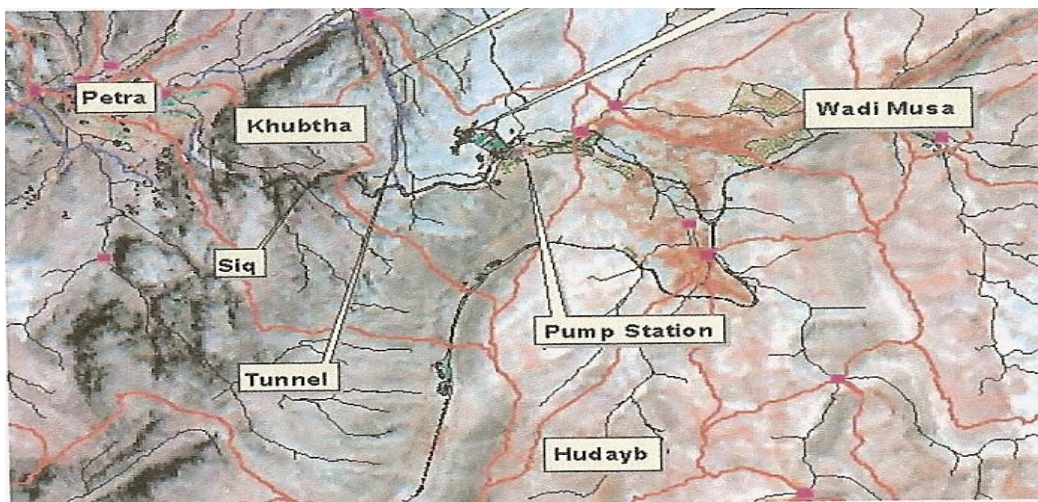


Fig 21: An ortho-photo of the al-Khubtha area showing the siq and al- Muthlim flows. The dams and cisterns surveyed by the Petra National Trust

After Akasheh: 2007

---

Ortho-photo: Refers to a photograph that has been corrected for the distortions that result from the angle of the camera. It correct the image so that it stretches out to fit the coordinates of the map



Figure 22: A general view for Petra site showing all the locations

After: Rababeh. S.: 2005



التغير النسبي Relative Change 06/05			2006			2005			الشهر
المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	
Total	Jordanian	Foreign	Total	Jordanian	Foreign	Total	Jordanian	Foreign	
52.8%	42.5%	55.6%	24,843	4,976	19,867	16,258	3,492	12,766	كانون ثاني
18.6%	-22.6%	26.0%	22,568	2,225	20,343	19,024	2,874	16,150	شباط
-4.4%	-7.2%	-3.5%	42,617	10,443	32,174	44,600	11,250	33,350	آذار
19.3%	17.8%	20.1%	68,613	23,593	45,020	57,528	20,028	37,500	نيسان
1.0%	-20.0%	6.2%	35,705	5,653	30,052	35,368	7,068	28,300	ايار
-12.0%	-9.6%	-12.5%	21,027	3,794	17,233	23,898	4,198	19,700	حزيران
-19.8%	5.5%	-30.2%	21,374	8,221	13,153	26,645	7,795	18,850	تموز
-28.8%	51.8%	-52.0%	22,713	10,835	11,878	31,881	7,139	24,742	أب
-50.6%	-46.8%	-51.7%	15,845	3,646	12,199	32,107	6,857	25,250	ايلول
-26.0%	315.9%	-38.5%	26,594	5,298	21,296	35,924	1,274	34,650	تشرين اول
-23.9%	11.4%	-28.6%	32,142	5,549	26,593	42,229	4,979	37,250	تشرين ثاني
-8.7%	-16.2%	-7.0%	25,325	4,116	21,209	27,724	4,914	22,810	كانون اول
-8.6%	7.9%	-12.9%	359,366	88,349	271,017	393,186	81,868	311,318	المجموع

Table 1: Monthly numbers for visitors to Petra 2005/2006 (source MoTA)

Month	التغير النسبي Relative Change 07/06			2007			2006			الشهر
	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	
	Total	Jordanian	Foreign	Total	Jordanian	Foreign	Total	Jordanian	Foreign	
January	3.9%	-21.6%	10.3%	25,804	3,900	21,904	24,843	4,976	19,867	كانون ثاني
February	27.7%	61.8%	23.9%	28,809	3,600	25,209	22,568	2,225	20,343	شباط
March	8.1%	-18.0%	16.5%	46,051	8,560	37,491	42,617	10,443	32,174	آذار
April	17.8%	36.9%	7.7%	80,794	32,294	48,500	68,613	23,593	45,020	نيسان
May	16.6%	11.6%	17.5%	41,626	6,307	35,319	35,705	5,653	30,052	ايار
June	38.5%	117.7%	21.1%	29,131	8,258	20,873	21,027	3,794	17,233	حزيران
July	72.1%	86.2%	63.3%	36,779	15,305	21,474	21,374	8,221	13,153	تموز
August	184.6%	61.0%	297.4%	64,647	17,444	47,203	22,713	10,835	11,878	آب
September	126.4%	53.6%	148.1%	35,869	5,599	30,270	15,845	3,646	12,199	ايلول
October	166.4%	62.5%	192.2%	70,844	8,611	62,233	26,594	5,298	21,296	تشرين اول
November	117.5%	49.6%	131.7%	69,914	8,304	61,610	32,142	5,549	26,593	تشرين ثاني
December	100.9%	9.3%	118.7%	50,877	4,497	46,380	25,325	4,116	21,209	كانون اول
<b>Total</b>	<b>61.7%</b>	<b>38.9%</b>	<b>69.2%</b>	<b>581,145</b>	<b>122,679</b>	<b>458,466</b>	<b>359,366</b>	<b>88,349</b>	<b>271,017</b>	<b>المجموع</b>

Table 2: Monthly numbers of visitors to Petra by Nationality 2006/2007 (source MoTA)

Month	التغير النسبي Relative Change 08/07			2008*			2007			الشهر
	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	
	Total	Jordanian	Foreign	Total	Jordanian	Foreign	Total	Jordanian	Foreign	
January	83.9%	-22.8%	102.9%	47,444	3,010	44,434	25,804	3,900	21,904	كانون ثاني
February	79.0%	-29.0%	94.4%	51,568	2,557	49,011	28,809	3,600	25,209	شباط
March	79.1%	-3.3%	97.9%	82,488	8,276	74,212	46,051	8,560	37,491	آذار
April	19.0%	-53.1%	67.0%	96,136	15,158	80,978	80,794	32,294	48,500	نيسان
May	97.8%	32.2%	109.5%	82,321	8,335	73,986	41,626	6,307	35,319	ايار
June	70.4%	-34.0%	111.8%	49,651	5,447	44,204	29,131	8,258	20,873	حزيران
July	23.5%	-25.4%	58.4%	45,416	11,411	34,005	36,779	15,305	21,474	تموز
August	-14.0%	-24.8%	-10.1%	55,577	13,120	42,457	64,647	17,444	47,203	آب
September	54.6%	-61.6%	76.1%	55,450	2,150	53,300	35,869	5,599	30,270	ايلول
October	40.6%	-0.4%	46.3%	99,616	8,580	91,036	70,844	8,611	62,233	تشرين اول
November	28.0%	-39.5%	37.1%	89,474	5,020	84,454	69,914	8,304	61,610	تشرين ثاني
December	14.2%	60.8%	9.7%	58,126	7,229	50,897	50,877	4,497	46,380	كانون اول
Total	39.9%	-26.4%	57.7%	813,267	90,293	722,974	581,145	122,679	458,466	المجموع

Table 3: Monthly numbers of visitors to Petra 2007/2008 (source MoTA)

Month	التغير النسبي Relative Change 09/08			2009			2008			الشهر
	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	
	Total	Jordanian	Foreign	Total	Jordanian	Foreign	Total	Jordanian	Foreign	
January	-18.3%	32.2%	-21.6%	40,322	3,978	36,344	49,383	3,010	46,373	كانون ثاني
February	-31.7%	10.5%	-33.8%	36,057	2,825	33,232	52,786	2,557	50,229	شباط
March	-19.7%	-6.9%	-21.0%	70,390	7,709	62,681	87,652	8,276	79,376	آذار
April	1.8%	37.3%	-4.5%	102,489	20,819	81,670	100,703	15,158	85,545	نيسان
May	-20.5%	33.5%	-26.2%	68,977	11,131	57,846	86,745	8,335	78,410	ايار
June	-11.1%	13.0%	-14.4%	41,346	6,319	35,027	46,503	5,591	40,912	حزيران
July	-4.9%	29.9%	-15.8%	45,680	14,828	30,852	48,056	11,411	36,645	تموز
August	-16.8%	-6.5%	-19.6%	49,988	12,267	37,721	60,047	13,120	46,927	آب
September	2.2%	327.9%	-10.1%	60,622	9,200	51,422	59,330	2,150	57,180	ايلول
October	-2.1%	-22.8%	-0.3%	105,866	6,621	99,245	108,112	8,580	99,532	تشرين اول
November	-2.8%	30.1%	-4.7%	86,933	6,380	80,553	89,474	4,905	84,569	تشرين ثاني
December	-5.3%	-51.5%	0.9%	58,268	3,505	54,763	61,527	7,229	54,298	كانون اول
<b>Total</b>	<b>-9.8%</b>	<b>16.9%</b>	<b>-13.0%</b>	<b>766,938</b>	<b>105,582</b>	<b>661,356</b>	<b>850,318</b>	<b>90,322</b>	<b>759,996</b>	<b>المجموع</b>

Source : Ministry of Tourism & Antiquities

المصدر : وزارة السياحة و الآثار

Table 4: Monthly numbers of visitors to Petra 2008/2009 (source MoTA)

Month	التغير النسبي Relative Change 10/09			2010			2009			الشهر
	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	المجموع	أردني	أجنبي	
	Total	Jordanian	Foreign	Total	Jordanian	Foreign	Total	Jordanian	Foreign	
January	42.3%	27.5%	43.9%	57,368	5,072	52,296	40,322	3,978	36,344	كانون ثاني
February	64.3%	44.0%	66.1%	59,258	4,069	55,189	36,057	2,825	33,232	شباط
March	46.2%	6.3%	51.1%	102,918	8,193	94,725	70,390	7,709	62,681	آذار
April	23.9%	-15.7%	34.0%	126,970	17,555	109,415	102,489	20,819	81,670	نيسان
May	42.4%	-35.0%	57.3%	98,201	7,230	90,971	68,977	11,131	57,846	ايار
June	17.7%	5.4%	19.9%	48,664	6,663	42,001	41,346	6,319	35,027	حزيران
<b>Total</b>	<b>37.2%</b>	<b>-7.6%</b>	<b>44.9%</b>	<b>493,379</b>	<b>48,782</b>	<b>444,597</b>	<b>359,581</b>	<b>52,781</b>	<b>306,800</b>	<b>المجموع</b>

Source : Ministry of Tourism & Antiquities

المصدر : وزارة السياحة والآثار

Table 5: Monthly numbers of visitors to Petra 2009/2010 (source MoTA)

# Bibliography

## BOOKS

- Abed, A. M., (2000):“Geology of Jordan, Its Environment and Water”, Al-Nahda Al Islamia library. Amman. (In Arabic).
- Adam, J., (1994):“Roman Building. Materials and Techniques”. Translated by A. Mathews. London: B.T Batsford (French ed. 1984).
- Alderson, W. T., Low P. S., (1976):“Interpretation of Historic Sites”. Nashville, TN: American Association for State and Local History.
- Albert, M., *et al.*, (2007): Training Strategies for World Heritage Management, Deutsche UNESCO-Kommission, Druckzone GmbH & Co. KG, Cottbus.
- Aldrich, C. (2003). Simulations and the Future of Learning: An Innovative (and Perhaps Revolutionary) Approach to e-Learning. San Francisco, CA: Pfeiffer
- Al-Ansary, A.R., (1982):“Qaryat Al-Fau. A Portrait of Pre-Islamic Civilization in Saudi Arabia”. Croom Helm (London)
- Al-Muheisen, Z., (2009):" The Water Engineering and Irrigation System of the Nabataeans" . Printed by the National press, Amman, Jordan.
- Arnold, D., (1991):“Building in Egypt: Pharaonic Stone Masonry”, Oxford: Oxford University Press.
- Auge, C. & Denzer J., (1993):“Petra, Lost City of the Ancient World”. New York ed. P. Cardinal, Discoveries, Abrams
- Ball, W., (2000):“Rome In The East, The Transformation Of An Empire”. London, New York: Routledge.
- Beck, L., Cable, T., (2002):“Interpretation For The 21<sup>st</sup> Century”: Fifteen Guiding Principles for Interpreting Nature and Culture (2<sup>nd</sup> ed.), Champaign, IL: Sagamore Publishing.

- Belloni, S., (1995):“Petra: The Pink City of The Desert”, Terni: Italy.
- Bellwald, U., Huneidi, M., (2003):“The Petra Siq: Nabataean Hydrology Uncovered”. Petra National Trust, Printed by: National Press, Amman, Jordan.
- Bourbon, F., (1999)(A): “Petra: Art, History and Itineraries in the Nabataean Capital”. Rome: Grafedit Publishers.
- Bourbon, F., (1999)(B): “Petra: Jordan’s Extraordinary Ancient City”, Barnes and Noble Books, New York.
- Bowersock, G., (1983):“Roman Arabia”. Cambridge (MA): Harvard University Press.
- Bowersock, G., (2003) “The Nabataeans in Historical Context”, in Markoe 2003
- Brochu L., Merriman T., (2002):“Personal Interpretation Connecting Your Audience to Heritage Resources”, InterpPress, Singapore.
- Browning, I., (1982):“Petra”. London: Chatto & Windus Publishers.
- Callebaut, D. Killebrew, A., Silberman, N. (2004): “Interpreting the Past: Presenting Archaeological Sites to the Public”, Brussels, Belgium.
- Causle, F., (2003): “Art and History of Jordan”, Casa Editrice Bonechi, Florence, Italy.
- Cohen, M., I. Drabkin, (1966):“A Sourcebook in Greek Science”. Cambridge (MA): Harvard University Press.
- Crawford, C., (2002):“The Art of Interactive Design: a Euphonious and Illuminating Guide to Building Successful Software”. San Francisco, CA: Nostarch Press.
- Crouch, D., (1993):“Water Management in Ancient Greek Cities”. Oxford: Oxford University Press.
- Diodorus Siculus (1958): trans. C. Oldfather et al. LCL. Cambridge, Mass: Harvard University Press.

- Eagles, P., McCool, S. & Haynes, C., (2002):“Sustainable Tourism in Protected Areas: Guidelines for Planning and Management” IUCN, Gland, Switzerland.
- Evenari, M. and Koller, D. 1956, Ancient Masters of the Desert. Sci. Amer. 194(4).
- Fennell, David A., (1999): “Ecotourism and Ecotourists”. Ecotourism: an Introduction. New York & London: Routledge.
- Frederico, D.H., Hennessy J.B (1989):“Archaeology of Jordan” (Field reports), Belgium.
- Glueck, N., (1959):“Rivers in the Desert”. New York (NY): Straus and Cudahy Publishers.
- Glueck, N., (1965):“Deities and Dolphins: The Story of the Nabataeans”. New York: Farrar, Straus and Giroux.
- Grater, R.K.,(1976) “The Interpreter Handbook : Methods, Skills and Technique”, S-W Parks and Monuments Association, USA.
- Groom, N., (1981):“Frankincense and Myrrh”: A Study on the Arabian Trade. Harlow: Longman Group Limited and Beirut: Libraries’ du Liban.
- Guzzo, M. & E.E. Schneider, (2002): “Petra”. Chicago (IL): University of Chicago Press.
- Hall, C.M., (2000): “Tourism Planning: Policies, Processes and Relationships”, Prentice Hall, Harlow.
- Ham, S., (1992):“Environmental Interpretation”: A Practical Guide for People with Big Ideas and Small Budgets. Golden, CO: North American Press.
- Healey, J., (2001): “The Religion of The Nabataeans”: A Conspectus. Leiden, Boston, Köln: Brill.
- Jameson, J.H., Jr. (1997):“Presenting Archaeology to The Public”: Digging for Truths, Altamira press, London.



- Josephus, (1960):“Complete Works”(The Antiquities of the Jews, the Wars of the Jews). Grand Rapids (MI): Kregal Publications.
- Knauf, E (1986) “Die Herkunft der Nabatäer“ in Lindner (ed) 1986.
- Knudson, D., Cable, T., Beck, L. (1999): “Interpretation of Cultural and Natural Resources”, Venture Publishing, inc. USA.
- Lawlor, J., (1974):“The Nabataeans in Historical Perspective”. Grand Rapids, Michigan: Baker Book House.
- Lewis, M.J.T., (2001):“Surveying Instruments of Greece and Rome”. Cambridge: Cambridge University Press.
- Lewis, W.(2005) “Interpreting for Park Visitors”, USA
- Levy, U., (1999):“The Lost Civilization of Petra”. Cambridge (MA): Floris Books.
- Machlis, G. E. (Ed.). (1986). Interpretive Views: Opinions on Evaluating Interpretation in the National Park Service. Washington, D.C.: National Parks and Conservation Association.
- Markoe, G., (2003) "Petra Rediscovered: The Lost City of the Nabataean Kingdom". Published by H.N. Abrams.
- Mirriman, T., Brochu, L., (2006): “The History of Heritage Interpretation in the United States”, NAI organization.
- Morris, H., J. Wiggert, (1961):“Applied Hydraulics in Engineering”. New York (NY): The Ronald Press.
- Mowforth, M. & Munt, I., (2003):“Tourism and Sustainability”, second edition, London: Routledge.
- Negev, A., (1986). “Nabataean Archaeology Today”. New York and London: New York University Press.
- Negev, A., (2003) “The Negev and the Nabataeans”, in Markoe 2003.

- Orton, C.P., Tyres P., Venice A., (1993): "Pottery in Archaeology", Cambridge University Press.
- Parr, P. (2003): "The Origins and Emergence of the Nabataeans", in Markoe 2003
- Patrich, J. (1990): "The Formation of Nabataean Art, Prohibition of a Graven Image Among The Nabataean's", London, Brill.
- Pearson, M., Sullivan, S., (1995): "Looking After Heritage Planning for Managers, Landowners and Administration", Melbourne University Press.
- Petrie, W.M. F., (1906): "Researches in Sinai". London, John Murray.
- Rababeh, S.M., (2005): "How Petra Was Built": An Analysis of The Construction Techniques of The Nabataean Free Standing Buildings and Rock-Cut Monument in Petra-Jordan, BAR International Series 1460. The Basing Stoke Press.
- Regnier, K., Gross, M., Zimmerman, R. (1992): "The Interpreter Guide Book": Techniques for Programs and Presentations, University of Wisconsin – SP Foundation Press.
- Risk, P. (1994). "The Search for Excellence in Interpretive Training". Legacy, 5(6).
- Rostovtzeff, M. (1941): "The Social and Economic History of The Hellenistic World". Oxford University Press.
- Schmitt-Korte, K. (1991) "Die Nabatäer im Spiegel der Münzen", in Lindner and Zeitler 1991
- Shaer, M., Aslan, Z. (2000): "Nabataean Building Techniques with Special References to the Architecture of Tomb 825 (Tomb of Fourteen Graves): The Restoration of the Rock Cut Tomb Façades. German-Jordan Project for Establishment of a Conservation Center in Petra Promoted by the Federal Ministry for Economic Cooperation and Development (BMZ).

- Smith, R.R. (1988) "Hellenistic Royal Portraits". Oxford: Clarendon Press. 11
- Starcky, J. (1955): "The Nabataeans: A Historical Sketch" BA 18, No. 4.
- Strabo, (2000): "The Geography of Strabo";, H.L. James, vol. II
- Tamwoy, S.M. (2007): "Heritage Interpretation Plan" Sandon Point North, A Report to Donfox Planning for Stockland.
- Tarn, W., (1966): "Hellenistic Civilization". Revised by the author and G. Griffith.
- Taylor, J., (2001): "Petra and The Lost Kingdom of The Nabataeans". London, I.B. Tauris
- Teller, M., (2006): "The Rough Guide to Jordan, Rough Guides", New York, USA.
- The United States National Park Service's "Master Plan for The Protection and Use of The Petra National Park" (1968).
- Tilden, F., (1977): "Interpreting Our Heritage". Third edition. Chapel Hill, NC: University of North Carolina Press, USA.
- Towner, J., (1985) "The Grand Tour: a key phase in the history of tourism. Annals of tourism research, vol. 12.
- Urry, J., (1990) "The Tourist Gaze: Leisure and Travel in Contemporary Societies", London, sage publications
- UNESCO's Petra National Park Management Plan (1994).
- US/ICOMOS's "The Study and Management Analysis and Recommendations for The Petra World Heritage Site".
- Vitruvius, (1999): "Ten Books on Architecture", Book VIII, in the Loeb Classical Library, ed. F. Grainger. Cambridge (MA): Harvard University Press.

- Walsh, M., (1980):“Drag Characteristics of V-groove and Transverse Curvature Riblets, in Viscous Flow Drag Reduction”, ed. G. Hough. (AIAA Progress in Astronautics and Astronautics 72.) New York (NY): American Institute of Aeronautics and Astronautics..
- Wealkens, M., et al. (1990): “The Quarrying Techniques of The Greek World”, in art historical and scientific perspectives on Ancient sculpture, 47-73 M. True and J. Podany. California: Getty Museum.
- Weaver, H., (1982): “Origins of Interpretation”. In G.W. Sharpe, interpreting the environment (2<sup>nd</sup> ed.) New York, NY: John Wiley and sons, Inc.
- Winnet F.V., Reed, W.L., (1970): “Ancient Records from North Arabia”, Toronto: University of Toronto Press
- Wolfe, L., M. (1946):“Son of The Wilderness”: The life of John Muir, New York: Alfred Knopfe.

### Doctoral Thesis

- Al-Talhi, D., “Mada’in Saleh, a Nabataean Town in North West Arabia: Analysis and Interpretation of The Excavation 1986-1990, a Dissertation from the Department of Archaeology, University of Southampton, December 2000.
- Barrie, E. (2001). Meaningful Interpretive Experiences from the Participants’ Perspective. Doctoral dissertation, Indiana University, Bloomington.
- Bedal, L., (2000): “The Petra Pool Complex”: A Hellenistic Paradeisos in The Nabataean Capital, results from the Petra lower market survey and excavation 1998. Diss. U. of Pennsylvania, 2000. Web.2001. a Dissertation in Anthropology.
- Chadwick, J. C., (1998):“A Survey of Characteristics and Patterns of Behavior in Visitors to a Museum Web Site” (Doctoral Dissertation, University of New Mexico, 1998).

- Clarke, C. (2000): "A Method for Natural Heritage Area Interpretive Planning Applied to The Trent University Nature Areas", Ontario. A PhD Thesis Submitted in Trent University, Canadian Heritage Development Studies M.A. Program, Ontario, Canada.
  
- Tuttle, C. (2008): The Nabataean Coroplastics Arts, A synthetic Approach for studying Terracotta Figurines. Plaques, Vessels and other clay objects. A dissertation submitted in partial fulfillment of the requirements in the Joukowsky institute for Archaeology and the Ancient world at Brown University.
  
- Negev, A., (1963): "The Nabataean Painted Pottery of Oboda and The Chronology of The Nabataean Painted Pottery" (Unpublished PhD Thesis), Jerusalem.

### Articles From Journals

- Abu-Jaber, N., Alsaad, Z., Al-Qudah, M., Smadi, N., Al-Zoubi, A. (2007): "Quarry Scapes Report: Landscape, Provenance and Conservation of Stone Source from Selected Archaeological Sites in Jordan". Conservation of Ancient Stone Quarry Landscapes in the Eastern Mediterranean.
  
- Akasheh, T., (2002). " Ancient and Modern Watershed Management in Petra" Near east Archaeology, Vol. 65, No. 4, Petra: A Royal City unearthed.
  
- Akasheh, T., (2003): "Nabataean and Modern Watershed Management around the Siq and Wadi Musa in Petra", in Hashemite University Report, the Hashemite University, Zarqa, Jordan. Zarqa: Hashemite University Press.
  
- Amr, K., (1987): "The Pottery from Petra, a Neutron Activation Analysis Study". BAR Intention Series, Oxford.
  
- Barrow, G., (1994): "Interpretive Planning: More To It Than Meets The Eye". Environmental Interpretation, 9.
  
-

- Bedal, L., (1998):“Neutron Activation Analysis of Pottery in Petra Great Temple”, volume 1: Brown University Excavation, 1993-1997, ed. M. Joukowski, p 346-367, Providence, RI.
- Bedal, L.(2002): “Water Consumption and Display in The Nabataean Capital, Near East Archaeology, Vol. 65, No. 4, Petra: A Royal City Unearthed.
- Bedal, L., (2004):“The Petra Pool-Complex: a Hellenistic Paradeisos In The Nabataean Capital”. Piscataway (NJ): Gorgias Press.
- Booth, K.L., Simmons, D.G. (2000): “Tourism and The Establishment of National Parks in New Zealand” In: Tourism and national parks: issues and implications. Eds: R.W. Butler and S.W. Boyd. John Wiley & Sons, Chichester.
- Bramwell, B., Lane, B., (1993):“Sustainable Tourism: An Evolving Global Approach”, Journal of Sustainable Tourism, 1(1).
- Buranski, M., (1995): “Building Techniques in Palmyra” SHAJ V.
- Dalley, S. and Goguel, A.(1997) “The Sela’ Sculpture: A New Babylonian Rock Relief in Southern Jordan” ADAJ 41.
- El-Roudan, O; al-Ardah, F. & Bedour, T. (2000). “Tourism Economics in Jordan”: Essential Facilities and Marketing, Royal Scientific Society, Amman.
- ESCWA (2001). “Challenges and Opportunities of WTO on Services in Selected ESCWA Member Countries”: Tourism, a Report by the Economic and Social Commission for Western Asia, United Nations, New York.
- Edith, Evans (1986): The water supply systems of the Nabataeans and Romans Humayma, Bulletin of the American Schools of Oriental Research
- Forlst, B.E., Littlejohn, M., Baxter, R., Machlis, G.E., Gramann, J.H. (2003): “Visitor Use and Evaluation of Interpretive Media”: A report on visitors to the National Park System. The National Park Service Visitor Services Project. Moscow, ID: University of Idaho Cooperative Park Studies Unit.

- Foote, Rebecca (1999) Frescos and carved Ivory from the Abbasid family homestead of Humima, *Journal of Roman Archaeology*, Vol.12
- Gerber, Y., (2000):“The Nabataean Coarse Ware Pottery”: a sequence from the end of the second century B.C. to the beginning of the second century A.D. *SHAJ-VI*.
- Gerber, Y. Brogli, R.F., (1995): “Late Roman Pottery from Az-Zantur”, *Petra SHAJ V*
- Graf, D. (1990): “The Origin of the Nabataeans”. *ARAM* , part 2.
- Graf, D. F., Bedal, L.A. Schmid, S. G., Sidebotham, S. E., “The Hellenistic Petra Project”: Excavations in the Civic Center, Preliminary Report of the First Season, 2004, *ADAJ* 49, 2005.
- Graf, D. F., Schmid, S. G., Ronza, E., “The Hellenistic Petra Project: Excavations in the Qasr Al-Bent Temenos Area. Preliminary Report of the Second Season, 2005, *ADAJ* 51, 2007.
- Harding, G.L., (1958): “Recent Discoveries in Jordan”, *Palestine Exploration Quarterly* 90
- Hammond, P.C., (1962): “A Classification of Nabataean Fine Ware”, *American Journal of Archaeology*, Vol. 66
- Hammond, P., (1973):“The Nabataeans; Their History, Culture and Archaeology”. *Studies in Mediterranean Archaeology*, 37, Gothenburg: Gothenburg Publishers.
- Hammond, P.C. (1987) “Three Workshops at Petra (Jordan)” .*PEQ* 1987.
- Heinen, H., (1984): “The Syrian, Egyptian Wars and The New Kingdoms of Asia Minor”, in the *Cambridge Ancient History*, Vol. VII, part II, the Hellenistic world: 412-46.Ed. F.W. Walbank et al. Cambridge: University of Cambridge Press.
- ICOMOS charter for the protection and management of the Archaeological Heritage (1990)

- Iliff, J.H. (1934):“Nabataean Pottery from the Negeb”, QDAP 3.
- JICA (2004): Comprehensive Basic Survey on Priority Areas of JICA assistant, a report by: Japanese International Cooperation Agency.
- Joukowski, M.S., (1999):“The Great Temple”, in Brown University Excavations 1993–1999, vol. 1. Providence (RI): Brown University Publications
- Joukowski, M.S., (2001). “The Great Temple of Petra”, in Archaeology in Jordan, 2001 Season, eds. S. Savage, K. Zamora & D.R. Keller. American Journal of Archaeology 106
- Joukowski, M.S., (2003): “Petra”: The Great Temple Excavation, 2002 Field Campaign. Providence (RI): Brown University Report.
- Kennedy, D.L., (2000) "The Roman Army in Jordan", London Council for British Research in the Levant, The British Academy.
- Keyes, B. E., Hammitt W. E. (1984) “Visitor Reactions To Interpretive Signs on a Destination-Oriented Forest Trail” Journal of Interpretation No. 9.
- Khairy, N, (1990):“The 1981 Petra Excavations“ in: Abhandlungen des Deutschen Palaestina Vereins. Band 13, vol. I, Kommission Bei Otto Harrassowitz, Wiesbaden.
- Kuo, L., (2002): “The Effectiveness of Environmental Interpretation at Resources-Sensitive Tourism Destination”. International Journal of Tourism Research, 4
- Kraeling, C.H.,(1938):“Gerasa - City of the Decapolis”, ASOR, New Haven, S. Fine, Sacred Realm, Oxford, 1996.
- Lindner, M., Gunsam, E., (2002):“A Fortified Suburb of Ancient Petra: Shammaasa”. ADAJ 46
- Mason, P., (1997): “Tourism Codes of Conduct in the Arctic and Sub-Arctic Region”, Journal of Sustainable Tourism, 5 (2)
- McCool, S. & Lime, D., (2001):“Tourism Carrying Capacity: Tempting Fantasy or Useful Reality”, Journal of Sustainable Tourism, 9(5):



- Milik, J., (1982) "Origins des Nabataeans" SHAJ 1.
- Mills, E. (1922) "Watched by Wild Animals" Doubleday, Page and Company.
- Moscardo, G., (2000): "Understanding Wildlife Tourism Market Segments: An Australian Marine Study, Human Dimensions of Wildlife", 5(2)
- Musti, D., (1984) "Syria and The East", In The Cambridge Ancient History, Vol. VII, Part II, The Hellenistic World: 175-221. Ed. F. Walbank *et al.* Cambridge: Cambridge University Press.
- Ortloff, C.R., D. Crouch, (1998): "Hydraulic Analysis of a Self-Cleaning Drainage Outlet at the Hellenistic City of Priene". Journal of Archaeological Science 25
- Ortloff, C.R. & D. Crouch, (2001): "The Urban Water Supply and Distribution System of the Ionian City of Ephesus in the Roman Imperial Period". Journal of Archaeological Science 28.
- Ortloff, C.R., "The Water Supply and Distribution System of the Nabataean City of Petra (Jordan)", 300 B.C-300 A.D., Cambridge Archaeological Journal, ( web access 12.Nov.2007).
- O'Toole, F., (1992): "The Emperor's Map Makes us Tourists in Our Own Land", Interpretation Journal, Vol. 51.
- Parr, P.J. (1970). "A Sequence of Pottery from Petra. Near Eastern Archaeology in the Twentieth Century": Essays in Honor of Nelson Glueck. J. A. Sanders.
- Parr, P.J, (1978): "Pottery, People and Politics in Archaeology in The Levant": Essays for Kathleen Kenyon, E.D. Moorey, P. Parr, and P.J., Warminster: Aris and Philips.
- Pflüger, F. (1995): "Archaeo-Geology in Petra", ADAJ 39:.
- Schmid, S.G (1995): "Nabataean Fine Ware from Petra". SHAJ V

- Schmid, S. G.,(1997):“The Impact of Pottery Production on The Sedentarization of the Nabataeans”, in: J. R. Brandt, L. Karlsson (eds.), From Huts to Houses. Transformations of Ancient Societies. Proceedings of an International Seminar organized by the Norwegian and Swedish Institutes in Rome, 21–24 September 1997
- Schmid, S.G (1997):“Nabataean Fine Ware Pottery and the Destruction of Petra in the Late First and Early Second Century AD”. SHAJ VI.
- Schmid, S. G.(2001):“The «Hellenization» of The Nabataeans: A New Approach, in: Studies in The History and Archaeology of Jordan”, 7
- Schmid, S. G., (2001):“The Nabataeans: Travellers Between Life Style”, In Levantine Archaeology I, The archaeology of Jordan 367- 426. Ed. B. MacDonald, R. Adams, and P. Bienkowski. Sheffield: Sheffield Academic University Press Mice Press.
- Schmid, S. G., Nabataean Pottery, in: G. Markoe (ed.), Petra Rediscovered: Lost City of Nabataeans (Cincinnati 2003)
- Shaer, M., Aslan, Z., (1997): “Architectural Investigation on the Building Techniques of The Nabataeans With Reference to Tomb 825”. ADAJ 41
- Shalaginova, I., (2008): Heritage Presentation: How Can It Enhance Heritage Management? M.A. Thesis submitted to Brandenburgische Technische Universität Cottbus/World Heritage Studies Program.
- Shdifat, O., *et al.*, (2006): Tourism in Jordan (LIFE Third Countries Development of Methods and Tools for The Establishment of Good Environmental Performance in The Tourist Accommodation Sector in Jordan- Implementation of Pilot Studies. Green-TAS., Hashimite University, Zarqa- Jordan.
- Stucky, R. A., Kolb, B., Gerber, Y., Schmid, S. G., Bellwald, U., Jacquat, Ch., Swiss-Liechtenstein Excavations at Ez-Zantur in Petra 1994. The Sixth Campaign, ADAJ 39, 1995

- Veverka, J.A., (2000) “Paper Developed for The National Trust for Scotland Interpretation Seminar” John Veverka and Associates.
- Villeneuve, F., (1990): “The Pottery From the Oil Factory of Khirbet Edhharieh” (2<sup>nd</sup> Century): A Contribution to The Study of The Material Culture of The Nabataeans, ARAM 2: 1 and 2
- Ward-Perkins, J., (1992): “Marble in Antiquity”. Collected Papers of J.B. Ward-Perkins. Archaeological Monographs of the British School of Rome no. 6 Ed. H, Dodge and B. Ward-Perkins. London: British School at Rome.
- Wright, G.R.H., (1969): “Petra: The Arched Gate, 1959-1960, Some Additional Drawings” PEQ 102.
- Zayadine F., (1982): “Recent Excavations of Petra”, ADAJ 26.

### Personal Interviews

- Savage, S. (2010): “JADIS”- Personal Contact.

### Web sites

- Adams, R.B., “Archaeology in Jordan: A Brief History. Web access August 2009  
<http://russellbadams.brinkster.net/publications/Adams2008.pdf>
- Badia Project: “Sustainable Tourism Development”  
<http://www.badiaproject.org.uk/pdfs/8%20-%20Sustainable%20Development.pdf>  
web access August 2009.
- Chalupova, M. (2002): Cultural Heritage in Local and Regional Social and Economic Stability (State of Art- Slovakia).  
[http://www.arcchip.cz/w02/w02\\_chalupova.pdf](http://www.arcchip.cz/w02/w02_chalupova.pdf) web access Jan.2010.
- <http://www.cranebag.ie/presentingHeritage.html> (Web access Feb. 2011)
- Interpretation Policy (2005): Heritage Council of New South Wales, “Heritage Information Series” Heritage Interpretation Policy” New South Wales Government” Department of Planning. Web access February 2008  
<http://www.heritage.nsw.gov.au/docs/interpretationpolicy.pdf>

- ICOMOS (2008): “Proposed Joint Workshop of ICOMOS Cultural Tourism and Heritage Interpretation Committees During the ICOMOS General Assembly, 2008 Quebec. [www.ICOMOS.org](http://www.ICOMOS.org) web access march 2009.
- ICOM, International Council of Museums official website, [www.ICOM.org](http://www.ICOM.org) web access, January 2010.
- Jordan Tourism <http://www.tourism.jo/inside/Mission.asp> web. 2009
- McClure, C.R., Eppes, F., Sprehe, J.T., Eschenfelder, K. (2000). Performance Measures for Federal Agency Websites: Final Report. Downloaded from <http://fedbbs.access.gpo.gov/library/download/MEASURES/measures.pdf> web access September 28, 2009.
- Petra National Trust, Management Project from 1969-2000, with other projects <http://www.petranationaltrust.org/UI/ShowContent.aspx?ContentId=46> web access January 2010.
- Wardam, B, (2007): Petra and Nabataean water management system, Jordan Watch, Tuesday, July 10, 2007. <http://www.jordanwatch.net/archive/2007/7/264822.html> Web access April.2009.
- Walker, K.B,(2007): The Role of Interpretation Sustainable Tourism: a Qualitative Approach to Understanding Passenger Experiences on Expedition Cruises. PhD Thesis, James Cook University. <http://eprints.jcu.edu.au/2098/> web access 20.02.2010.
- Interpretation and Education, National Park Service's official web site, United States of America Government, [www.nps.gov](http://www.nps.gov) , web access November.2009
- [www.interpret.com](http://www.interpret.com) web access April.2009
- [www.ahi.org.uk](http://www.ahi.org.uk) web access November.2009
- [www.snh.org.uk/ww0/Interpretation/default.html](http://www.snh.org.uk/ww0/Interpretation/default.html)web access February 2010
- [www.heritagedestination.com](http://www.heritagedestination.com) web access February.2010
- [www.heritageinterpretation.co.uk](http://www.heritageinterpretation.co.uk)web access February.2010

- <http://www.sha.org/publications/documents/13-Reviews.pdf> web access February 2010
- <http://proteus.brown.edu/zimmerman/1733> web access January 2010
- <http://www.k-state.edu/media/mediaguide/bios/cablebio.htm> web access February 2011
- <http://rtm.sdsu.edu/bios/beck.php> (San Diego State University, School of Hospitality and Tourism Management) web access February 2011