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# THE LIGHT IN MUSEUM EXHIBITIONS AS AN EFFECTIVE TOOL FOR COMMUNICATING THE MEANING OF ANCIENT REMAINS

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## ABSTRACT

In this paper, based on research made by the Authors in the Mediterranean area, is highlighted how the use of light in museums can effectively contribute to a better knowledge of the past, giving citizens the opportunity to rediscover their identity and tourists to understand local history and archaeology. The research investigates about the aspects of lighting for archaeological sites or part of them. The charm of an archaeological site or a monument comes from the perception of its whole environmental context, both for functional lighting and artistic valorization. The emphasis is on what should be the most effective lighting system for the monumental sites, one respecting the ruins and the authenticity of the context, bringing at the same time out their architectural, historical and symbolic significance. Achieving this goal requires the involvement not only of purely historical and archaeological disciplines, but also a precise knowledge of technical devices, lighting system, environmental sustainability and related legislation. The cultural value of ancient contexts highlights that the light should be a valuable tool recovering historical memory of cultural heritage. This should be a new way to highlight significance of fragments in compliance of the surrounding, which has not the same characteristics, to signal a visual path, creating itineraries that involve the context. The light, which is emotion, suggestion, evocation, supports the experience of every single visitor. Innovative technological solutions should be designed observing the kind of landscape and morphological characteristics of the site.

## INTRODUCTION

My contribution is about an issue that has become really important in the enhancement of the archaeological sites: cultural aspects in lighting design.

The lighting should be the responsibility of who'll be interested to deal with an issue as the enhancement of archaeology, in the future.

Since recent decades we have witnessed a gradual opening and projection to the outside world, and now we are able to define the archaeological ruins as sites of memory [1]. The change involves two main actors: who is responsible for the preservation of the cultural heritage and the people who enjoy these places. But the change is determined also by increasing of the number of visitors. That's because today there is a greater interest than in the past, about the knowledge of the cultural heritage and the transmission of values to a non-specialist public.

Paul Valery said that the monuments, the ancient remains must sing. Historical memory is not able to communicate its value to all people by itself, it's necessary to know how to make it reappear the immaterial memory. Innovative instruments must be used to describe ancient ruins.

Therefore, we need a tool to help us construing our cultural heritage: the adoption of a common language can set a dialogue between the interested parties: cultural heritage and visitors, citizens and tourists, all community. The issue isn't just illuminate, "make light" to see something in a more or less way artistic, but the main issue is also that of communicating the ancient fragment. Actually, a piece of stone represents an evidence of our identity.

You know that the advent of artificial light is of the twentieth century. This discipline has been for years, exclusive interest and occupation of technicians and the companies that built the lighting devices: in Italy there is an Association Lighting designers, AIDI, that was founded in 1959. Until that date, the artificial light didn't regard the composite architectural design. The cultural aspect has been overlooked in 1990 years: in these years the focus has moved to transmission of meanings and the issue has been about how to convey historical data, artifacts, documents of past life through light. We've demonstrated that light has got specific roles. This investigation hasn't been limited to some passive considerations, but focuses on evaluating the current situation through the analysis of national and international case studies in Mediterranean



area and in Europe because in this area, nowadays, cultural tourism is also one of the fastest growing sectors. These are the most important aspects of a good practise of artificial lighting:

- Recovery of historical memory of the ruins
- Perception of the fragment
- Indication of the hierarchy of paths and creation of guidance and teaching routes
- Enhancement of the archaeological heritage, in compliance with the ruins and authenticity of their context
- More simple reading of archaeology
- Setting of areas for activities such as walk, contemplation, conversation

Definitely, the use of innovative technologies helps highlighting the value of the archaeological heritage and their containers to enable communicating the significance at the visitors. This analysis has been based on an interdisciplinary approach [2].

Professor Maria Clara Ruggieri has said: The story must not belong to us in an untouchable way, out of time, but as a living presence today. Light can be used as a "parameter of spatial definition", which modifies the perception of space through optical and perceptual phenomena. In this sense, light has the same characteristics of a real building material [3].

An archaeological context includes the soil, the site type, the layer the artifacts came from, what else was in that layer. The importance of where a fragment of an artifact is found is profound. A site, properly valued and conveyed to public, tells you about the people who lived there, what they ate, what they believed, how they organized their society. The whole of our human past, prehistoric and historic period too, is tied up in the archaeological remnants, and it is only by considering the entire package of an archaeological site that we can even begin to understand what our ancestors were about. In this context are collected a series of case studies as a critical reference that has been described with particular attention to the choice of lighting design. We are seeing a succession of cases studied in depth, to demonstrate the educational use of both natural and artificial light. This concerns the lighting installation in indoor and outdoor museum exhibitions as the case of some archaeological sites. In different contexts and environments the role of the light is quite different [4].

Before of all, we have reviewed the philosophy of perception, the Gestalt theory, to better explain the idea of light as a tool. Through the Gestalt principles (similarity, continuity, meaningfulness), it's possible to reconstruct a fragment, going back to the whole shape, having a clear perception of the structure. The light may give to archaeological fragments the effect of the whole: an overview in which the perception of the single piece leads to the vision of the entire image. The architecture is also made up of visual perception, texture and material volume, quality of light that rests gently or forcefully on exposed surfaces and gives them colour, texture and palpable quality.

*Light shows an environment: The Hall of the Bronze Auriga (Fig. 1)* - The hall in which it's exposed the Bronze Auriga, real star of museum exhibit, is the highlight of the entire construction of the new exhibition of the Archaeological Museum of Delphi, designed by Alexandros Tombazis & Associates (2004). We know that lighting a Museum is a complex undertaking. The specific demands and restrictions of museum space are often hard to meet. Conventional lighting can change the colour of the artifacts, while dim or indirect light can leave the visitors peering at objects lost in shadow. In this case the combination of natural (daylighting) and artificial lighting is one of the main strengths of the setting of the room for a proper visual comfort of the statue and for the human well-being. The natural light comes largely from the skylight (daylight lantern) on the ceiling, and to a lesser extent by three light slots, located along the walls of the room and properly screened by other colour panels. Daylighting is integrated, when required, by small bright spots that form a square, in the same location of the skylight but larger than this. The main principles that have guided the design of the Hall and its setting are:



- the settlement of the bronze Auriga according to the square space of the hall;
  - the size and location of the square skylight, placed on axis with respect to the statue and the area of the sculpture, created by a metal fence;
  - the integration of natural and artificial light.
- Finally, the layout of the room of the museological reconstruction of the chariot in the showcase, contextualizes the monument (the votive offering of Polizalos) which belonged to the same Auriga[4].

*Light highlights customs and tradition in an essential way: New exhibition of the Tomb of Kha (Fig. 2) - (presented in 2010).* A careful use of light has become very common: light is an effective tool for its thin consistency, for its lack of invasiveness, for its extraordinary effectiveness in creating a fascinating background and in communicating many different parameters of interpretation. Today, LED technology is finding wide use in lighting design for the enhancement of archaeological remnants because of its satisfactory colour rendering, its elevated performance in saving energy and in reducing pollution, in full compliance with the standards set for the conservation of ruins, as demonstrated by the new exhibit designed for the Tomb of Kha in the Egyptian Museum of Turin[5]. This represents one of the greatest masterpieces of the Egyptian Museum of Turin was discovered during an excavation in 1906: the 506 objects of the Tomb of Kha were found intact. This material is important enough to constitute a museum in itself. The lighting design was created and sponsored by Ilti Luce and employs an innovative, low consumption LED system that imbues the objects with a gemlike quality but at the same time respects the highest standards of conservation.

We know that lighting that generates heat can damage a museum's collection, especially ancient objects made of organic material. The lighting designed for the Tomb of Kha is an example of the depth transformation under way at the Egyptian Museum: visitors today, entering the first room, are in an environment that pays great attention to the contents as well as the container.

The showcases minimalist lighting that enhances the exhibits with delicate ease, the approach that emphasizes the artistic aspect as well as archeology, the finds are the starting point of the viewer and the point of arrival. At first the director of museum wasn't sure about the use of the led. they tested several approaches and then chose one of the newest LED cables to light the sarcophagus. At a recent press conference, the director told reporters how she was able to adjust the light fixtures without tools or equipment. All the spots are magnetic: no screws, no glue, no damage at all to the site. The whole system can be installed, modified, or removed in a minut. Definitely, results are low impact, low energy, lasting impression.

*Light highlights the most significant evidence of the historical layers: Crypt of Plaça del Rei (Fig. 3) -* Starting from an archaeological fragment, through the use of light is possible to recall times, historical layers, locations and functions sedimented in the collective imagination. If it is true that we should know and practice all kinds of possibilities offered by contemporary lighting market with a precise knowledge of their performance and results, we are aware that not only it is important to *make light*, but it is also very important to *communicate history*. In the Crypt of Plaça del Rei in Barcelona, architect Josep Llinas doesn't manipulate the archaeological remains, which remain intangible. He mediates their understanding through games of brightness, contrasts and colour variations. In particular, the areas of pedestrian movement lie in the shadow, while warm or cold colours illuminate the archaeological artifacts, highlighting the most significant finds of the ancient *Barcino*. Few materials have been used: steel, for the structure resting on the ancient stones and for dark parapets; wooden slats for the floor; black plaster for the roof.

*Light for communicating historical superimpositions and functions: The archaeological crypt of Notre Dame (Fig. 4) -* The archaeological crypt of Notre Dame is one of the largest underground museums in Europe, with its 118 meters in length. Gray stones indicate the presence of ruins under the square (lining-out). Open to the public since 1980, it displays the foundations of



buildings built between Antiquity and the 19th century. Remains were discovered during the archeological digs, which were begun in 1965 and the structure ensures that they are protected[6].

This case represents another good example of good practice in which the light is used to show different historical periods, rests of buildings, Roman baths and functions, (lighting designed by Martini Light, in 2005). The visit inside the crypt is like a real journey through the time, where visitors explore the symbolic monuments of Lutetia. Three-dimensional models and direct light sources help showing the layers, the buildings, the decorations, traditions and also functions (red light for hypocausts in the calidarium and blue light for the frigidarium). The aim of the lighting design is so communicative and evocative.

Halogen lamps were used with dichroic reflector for reducing the heat load on the ancient stones. In these illuminating device, there is the possibility of inserting colour filters and breakwater light lenses, for changing spectacular effects. Light can also be manipulated by visitors through interactive consoles.

*The Ciutadella de Roses* (Fig. 5) - The Ciutadella de Roses in Catalonia is a monument that since 1961 has been part of Cultural Heritage of National Interest. The interventions in the Ciutadella include a series of activities for increasing the knowledge of history, ensuring the preservation and enjoyment of the archaeological sites. Therefore, it was important to explore new methodological guidelines in terms of organization and strategy, considering the development of new scientific projects proper to the aims of the interventions on the archaeological site. The setting and lighting design were realized by the company Aspecte, directed by Engineer Martyria Figueras. He has investigated the complexity and diversity of Roses, by launching an ambitious project, with the aim to allow residents and visitors a comprehensive perspective of the site[7].

In the Ciutadella Museum, opened in 2004, have been defined different areas with the aim to tell the history and different layers, presenting ruins and artifacts belonging to ancient civilizations:

- a) Archaeological Area - preserved remains since 4th century BC until 20th century.
- b) Public Area - Here the visitor can take advantage of wi-fi.
- c) Exhibition Hall
- d) Museum of History
- e) Scenic Area - The town offers a unique view that can become the ideal scene of concerts.

Figueras has tried to encourage interaction between visitors and the place, trying to minimize the risks with reliable interventions. The creation of raised routes has made the passage of visitors to the archaeological area easier, limiting direct access to the ruins and preserving them. Walking inside the fortress is a continuous discovery because it offers the possibility of enjoying magnificent views, both inside and outside of the fence.

Figueras has explained how the luminous sign can highlight the single fragment restoring cultural weight. Artificial lighting must necessarily seek a constructive relationship with the ruins, while facilitating their reading with an innovative use of a modern material. The lighting design gives the opportunity to reveal the history of the city of Roses following a route that focuses on six sections: the origins, the area of Greek settlements, the area of Roman settlements, the Monastery, the medieval town and the modern city. LED lighting fixtures were used, special shape, placed at strategic points, so as not to disturb visitors with contrasts of light and make the environments recognizable. The LED light, being cold light, doesn't cause harmful emissions for the ruins and allows to recognize the remains of settlements, to create atmosphere through different colours, producing emotional impressions on the visitors who are fascinated and enchanted. Materials able of capturing the attention of the visitor were used, and at the same time able of describing their periods, functions or activities in the past, without any damage. This goal was achieved through strategies in which the characteristics of different materials, different colours and other elements of communication were evaluated. Martyria Figueras says that "The landscape of Roses includes various landscapes in a unique landscape".



*Light is used to create emotional impressions, even drama: Roman London Amphitheatre*(Fig. 6) - The roman amphitheatre of London was built after 70 AD. The display structure is about six meters under the square of the Guildhall Yard Art Gallery and it's still visible the original wall with the entrance from which gladiators, slaves and animals came in the arena. The intervention strategy has demonstrated the possibility, in the presence of an advanced culture, (about archaeological, architectural and museum issues), to conserve and properly show the original artifacts (even a few original wooden parts), despite their fragmentary nature. The intervention, realized by the firm Branson Coates Architecture in London (in 2004), is based on perspective effects and a particular use of lighting, which created a remarkable charm in the visitor, recalling the dramatic and tragic atmosphere of gladiatorial games. The aim of the project is to know the aspects of the Roman habits and traditions, enabling a material and immaterial building of the environment, through the use of wireframe projections on the restored wall, with particular care about conservative aspects and the preservation of original artifacts[8]. The shapes of gladiators, the stairs of the arena and the background of a cheering crowd, recreate the magnitude of the amphitheatre. Lights and sounds don't distract the visitor, who is involved by the show emotionally. The intervention is an essential reference to show how here projections are metaphors of a innovative restoration, a restoration of high technology.

*Light can emphasize the landscape, also with spectacular effects: Sicily, Selinunte* - The Archaeological Park of Selinunte was established in 1993, and today it's the largest and most impressive in Europe. The ruins of the colossal Temples show that since its foundation Selinunte has been considered "the cradle of the Doric-style". This privileged destination for poets and travelers, has always seemed like a huge expanse of ruins. We realize it by viewing pictures and description of the 18th century (such as those of Hackert and Houel). Temple E (Fig. 7), in particular, is the greater attraction of the archaeological park. Since 2008 an experimental intervention of lighting has highlighted this monument. This project was commissioned by the Province of Trapani. The lighting design was marked by the idea to convey to visitors the magnificence of the original structure, trying to recall his former beauty. Flush mounting lamps were located around the Temple: LED projectors distribute the light evenly to the entablature: the effect is without any doubt spectacular because there are changes in colour due to the dynamic light. High levels of illumination are achieved without any risk to the structural integrity of the stones of the monument, there is no ultraviolet or infrared radiation (with reduced pollution and energy savings). If this kind of intervention has benefits in terms of technological features, it represents a case of bad practice in terms of the didactic-communicative purpose: the choice of colours doesn't have any conceptual connection with the archaeological site, with the history, but it's a pure spectacular entertainment[9]. You cannot perceive the spiritual and symbolic meaning of the Temple. The final result is a real distraction from the monument itself and the landscape, Finally, the intervention leads to a misperception of the cultural content of the monument(Fig. 8).

In addition, we consider these aspects:

- 1) Drastic frontal lighting on each column reduces the contrasts necessary to the perception of fluting and of the others part of the monument like the inside, as well.
- 2) The uniform illumination on all fronts prevents perception of the sense of three-dimensionality of the Temple.
- 3) The lack of lighting inside, prevents the perception of the deep sense of the Temple. Spectacular effects go beyond the idea of communicating the proper historical and symbolic value.
- 4) In terms of visual impact both day and night the installations are visible on the ground.

The final result is a real distraction from the monument itself, as well as from the background, which is the landscape, Finally, the intervention leads to a misperception of the cultural content



of the monument. In fact, the dynamic light could have to identify the three phases of construction of the Temple, but his goal has not been achieved.

## CONCLUSIONS

This contribution shows that the archaeological contexts are an important opportunity to provide culture and education, but often educational function of interventions is poorly developed compared to expectations. It's undeniable that superimpositions of structures produced in different phases, the processes of destruction caused by time and by human activities, even the archaeological excavations and many other factors has led a quite difficult reading of the historic fabric, especially by non-specialists [10]. Cultural backgrounds influence people's perception of natural and artificial light and the task of architects should be to try to make reliable interventions, seeking strategies more useful to the understanding of the site for a wide range of public, saving both our common cultural heritage and public money (often wasted for wrong interventions).

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## FIGURES

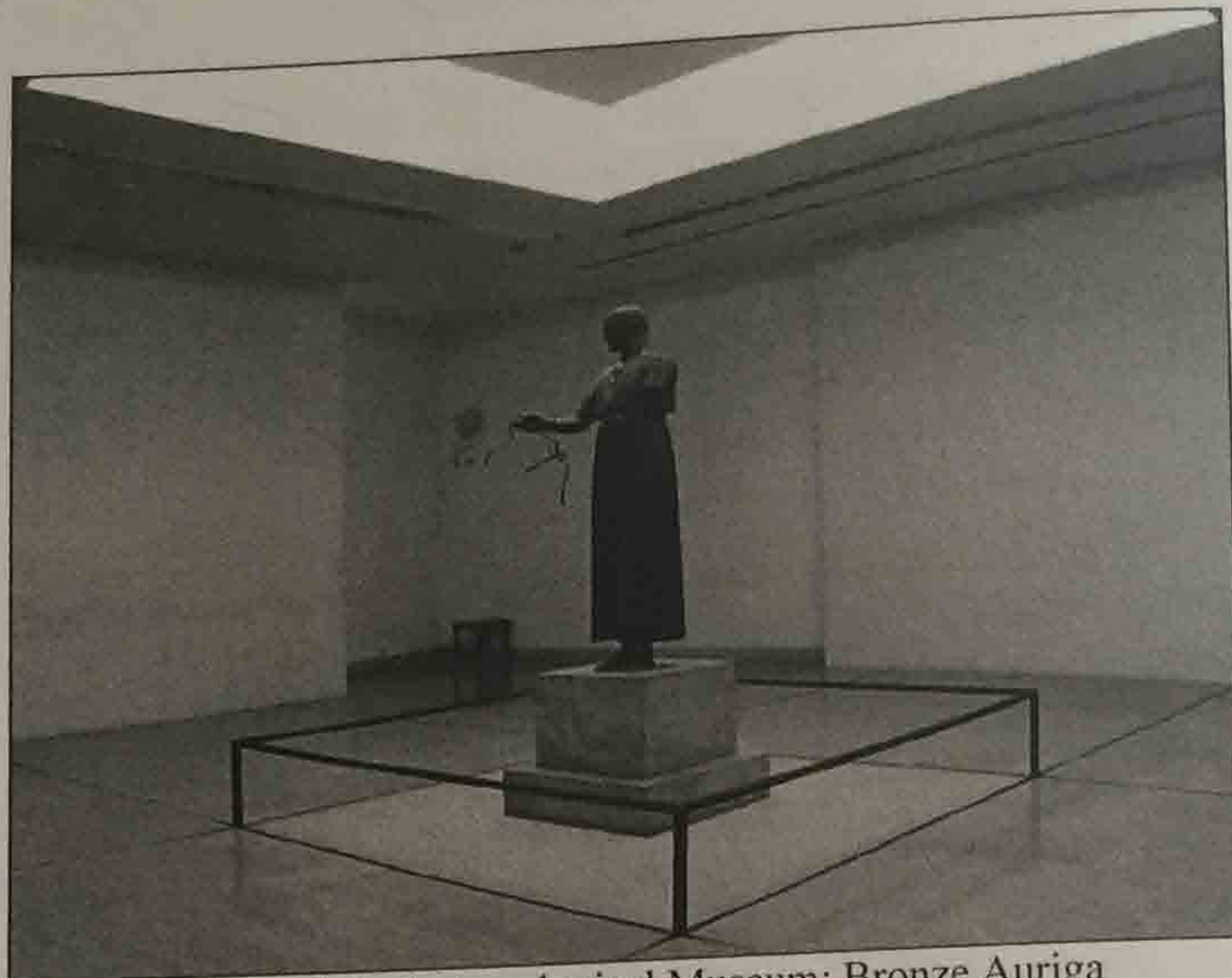


Fig. 1 -Delphi Archaeological Museum: Bronze Auriga



Fig. 2 - Turin Archaeological Museum: Tomb of Kha



Fig. 3 - Barcellona: archaeological crypt of Plaça del Rei



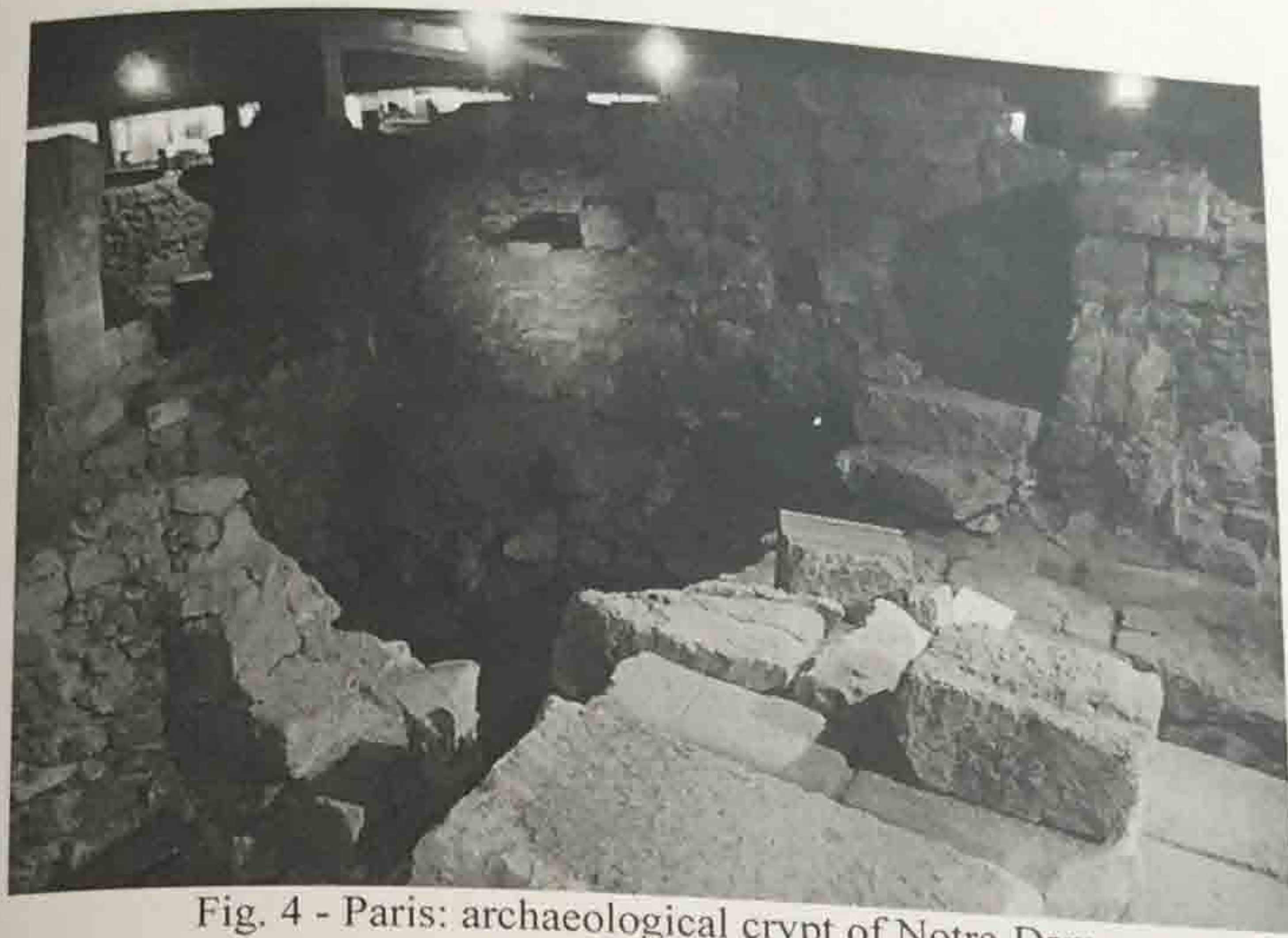


Fig. 4 - Paris: archaeological crypt of Notre-Dame

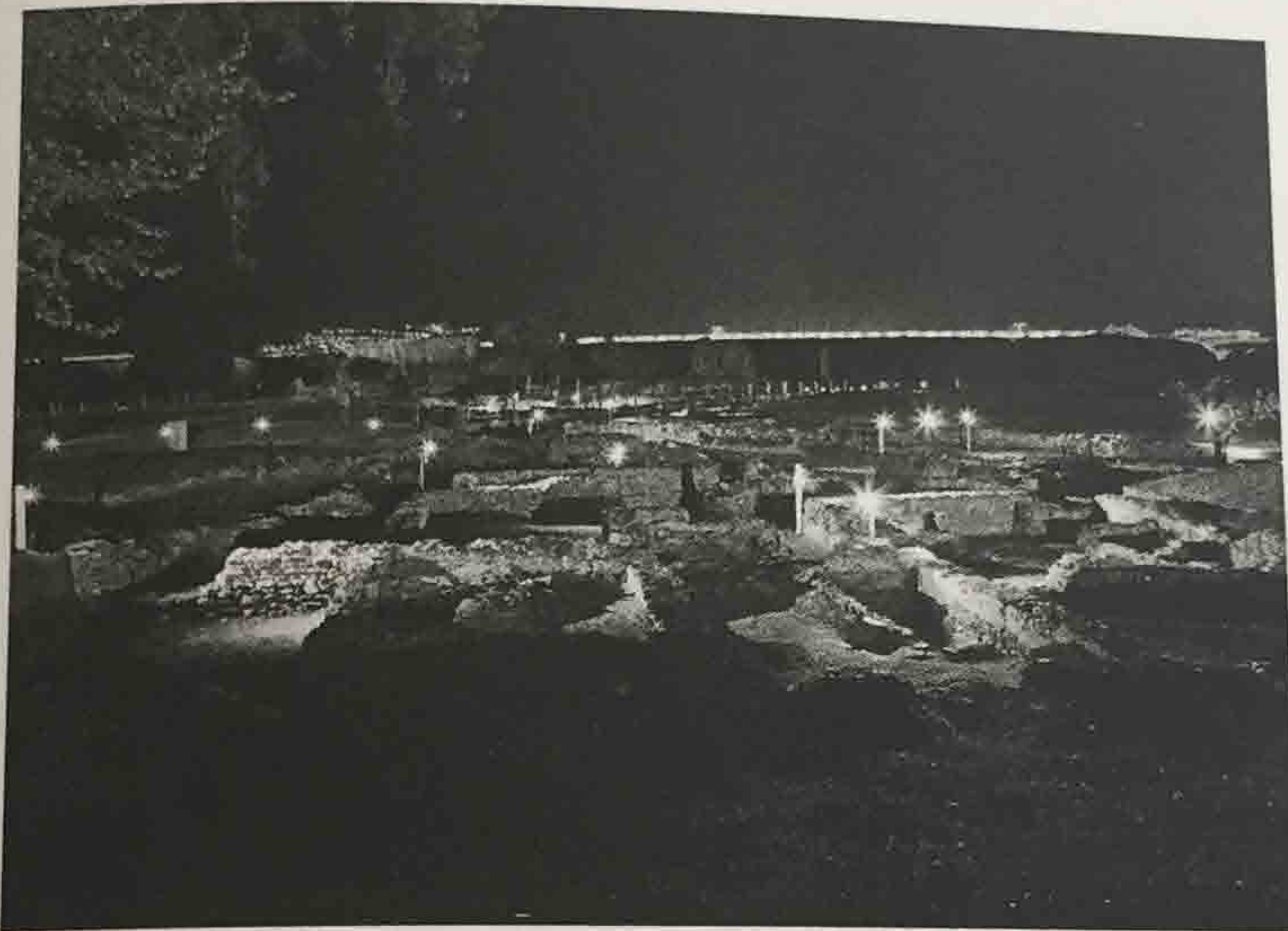


Fig. 5 - Roses, Ciutadella: Roman Settlement



Fig. 6 - London: Light in the London's Roman Amphitheatre