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Machaerus: A Fortified Royal Palace Overlooking the Dead Sea in Jordan

Introduction

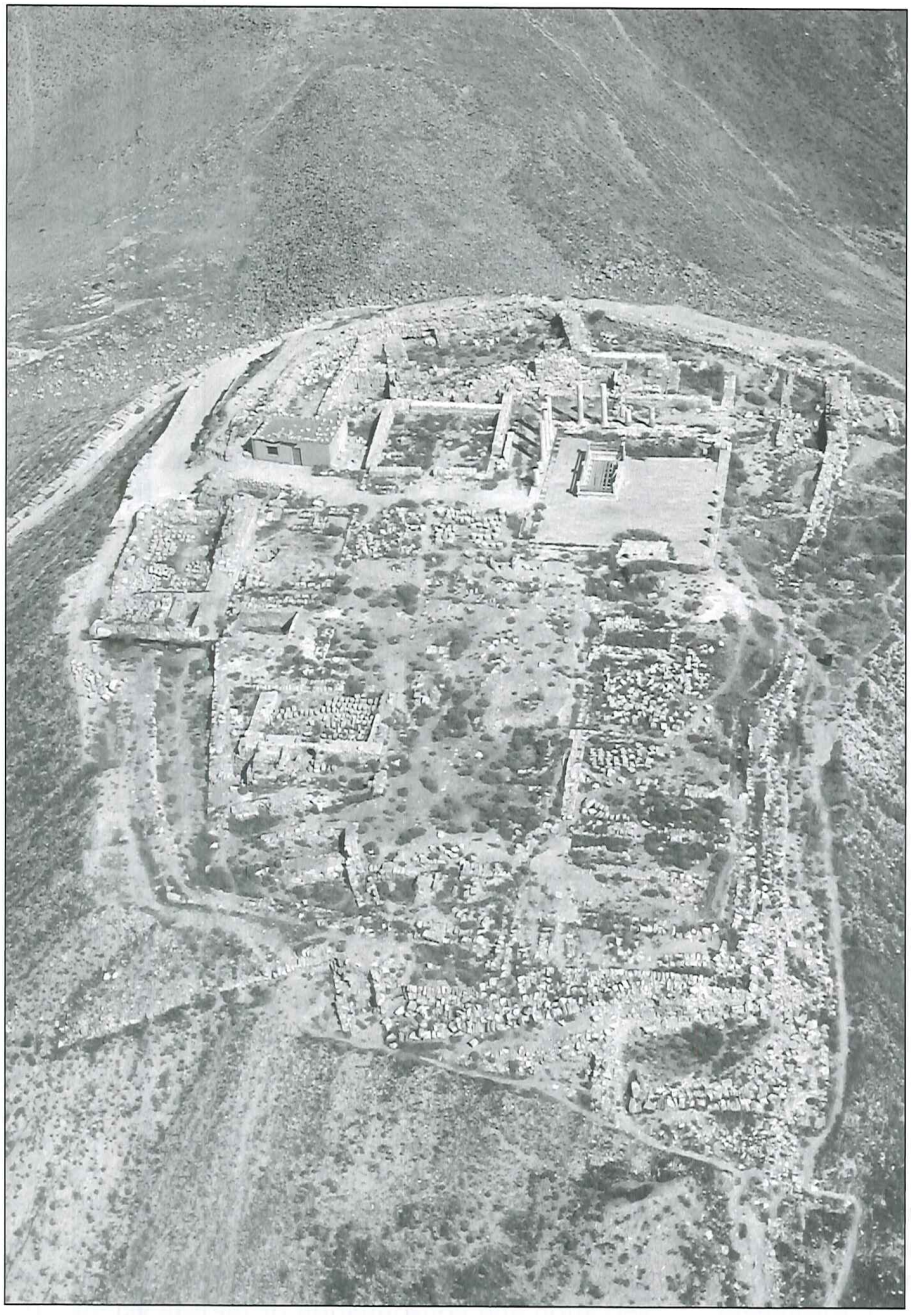
The architectural heritage of Machaerus fortress consists of three superimposed structures of the Hasmonean, Herodian and Early Roman eras. This paper presents a comprehensive comparative architectural analysis of the three historical periods of the fortress, based on 20th century archaeological investigations as well as on my own archaeo-architectural field surveys and excavations. Following a detailed three month field survey in 2009 at Qal'at al-Mashnaqa in Mukāwir, known from ancient sources as the acropolis of Machaerus (Machairos) city, a new archaeological excavation started at the fortified royal palace on the hill-top, which overlooks the Dead Sea in Jordan (FIG. 1). The joint mission of the Hungarian Academy of Arts and Jordanian Department of Antiquities (Excavation Permit No. 2010/13) conducted a sixty-one day archaeological investigation at the site between 1 April and 31 May 2010.

According to Flavius Josephus, the naturally defended fortress was first erected by the Hasmonean Alexander Janneus. This was destroyed by Gabinius in 57 BC (*BJ* I 8, 6). The second architectural period is the result of the building activity of King Herod the Great (*BJ* VII 6, 2). Elsewhere, there are six other fortresses of Herodian date that provide excellent architectural and archaeological *comparanda*: *viz.* Alexandreion, Doq, Cypros, Hyrcania, Masada and Herodion, the latter being the only non-Hasmonean legacy. As a result of a comprehensive archaeo-architectural analysis of these seven hill-top fortresses, which functioned as the eastern defences of the Jerusalem kingdom during this period, it can be stated that not only do they represent similar architectural conceptions of fortified royal palaces, but also that they were most likely designed and erected by the same constructors. Our excavations have yielded archaeological and architectural evidence to support this hypothesis.

After the Tetrarch Herod Antipas and King Agrippa I, Machaerus became the *dominium* of the Roman *Praefectus Judaeae* in 44 AD. Following the eruption of the Jewish Revolt in 66 AD, Lucilius Bassus besieged the fortress in 72 AD (*BJ* II 18, 6; VII 6), when the Zealots took refuge in the acropolis of the city. There are a number of features associated with this third period of the site's architectural heritage: in addition to the defensive wall erected around the acropolis, in the vicinity of Machaerus there are Roman camps (*campus*), encircling walls (*vallum*) and an unfinished attack ramp (*agger*). The closest analogies for these monuments are to be found at the fortress of Masada (*BJ* VII 8-9) on the west shore of the Dead Sea, where classic Roman siege-techniques can be properly examined. The aims and objectives of the excavations and surveys of the Hungarian research team, in collaboration with the Jordanian Department of Antiquities, include (1) the architectural and archaeological examination of the monument and its material culture, (2) the preservation, conservation and consolidation of the Machaerus fortress and (3) its attractive future presentation to the public.

Surveys and Archaeological Investigations During the 20th Century

It was the German explorer, Ulrich Jasper Seetzen, who identified and discovered the ancient archaeological site for modern research on 17 January 1807, based on the detailed descriptions of Flavius Josephus. He gave a narrative report of the ancient site and included Machaerus on his sketch map of the Dead Sea region. Over the following 150 years,



1. Aerial photograph of the Fortress of Machaerus; view from south-east, ©APAAME_19980517_DLK-0186.tif (David Kennedy).

further descriptions and cartographic surveys were prepared, but archaeological excavations did not start until 1968. Prior to the Hungarian-Jordanian excavations, the following surveys and archaeological investigations were conducted at the site during the 20th century:

September-October 1953: The First Aerial Survey and Photo-Documentation

The *ca* 4000 frames of the Hunting Aerial Survey of Jordan taken in 1953 opened new chapters in the aerial archaeology of Jordan in general and the scientific documentation of the Machaerus palatial fortress in particular. Through the courtesy of the Royal Jordanian Geographic Centre in Amman, these were supplied as diapositive copies for scientific research to the Remote Sensing for Archaeology in the Middle East (RSAME) project directed by Prof. David Kennedy, University of Western Australia. Thanks to the kind support of the latter, we have received six unpublished aerial photographs of Machaerus and its immediate vicinity, and as a result have been able to document the untouched archaeological site, prior any excavations.

June 1968: Initial Archaeological Excavation and Field Survey

E. Jerry Vardaman's one-month mission was conducted with the institutional backing of the Southern Baptist Theological Seminary, financed by Mr and Mrs Cully Cobb. Although his findings have remained unpublished, I was fortunate enough to find three unpublished manuscripts in Jerusalem (Vardaman 1969a, 1969b) and the USA (Vardaman 1968) which summarised the scientific results of his limited but important Machaerus excavations. Vardaman was not only the first excavator of the fortress, but during the first archaeological field survey, he also identified the aqueduct-system and surrounding Roman military structures, *viz.* the camps, *vallum* and unfinished *agger* (Vardaman 1969a: 18). A prominent unpublished archaeological find was discovered at Fort Worth, Texas, namely, a well-preserved sard seal attributed to King Agrippa I. Its publication is currently in preparation, along with a reconstruction of Vardaman's excavations, in our forthcoming Machaerus academic monograph.

March 1973: A Detailed Archaeological Field Survey

August Strobel (German Evangelical Institute for the Archaeology of the Holy Land) published the results of his research in two remarkable articles (Strobel 1974a, 1974b) concentrating on the monumental military remains of the Roman siege in 72 AD, notwithstanding the fact that the fields of aerial and landscape archaeology were not as well developed as they are today. Strobel did not make any comparative architectural examinations of other fortresses besieged by the Romans in the first century. Only Masada is mentioned, without details. It is worth noting that even though he referred to the unpublished articles of Vardaman (1969b, cited in Strobel 1974b: 102 fns. 5-7, 124 fn. 25), he made no mention of Vardaman's architectural survey documentation of the Roman military monuments of Lucilius Bassus on Machaerus (Vardaman 1969a: 18). Having said that, Strobel's surveys and descriptions are still significant, being more detailed than Vardaman's. Some of his observations are excellent and while he could not conduct excavations on the archaeological site, he published proper photo documentation five years before the Franciscan excavations.

1978-1981: Four Seasons of Large-Scale Archaeological Excavation and Architectural Survey

Under the directorship of Virgilio Corbo, the Franciscan Biblical School (*Studium Biblicum Franciscanum* = SBF) in Jerusalem carried out four seasons of detailed excavation that were published in preliminary reports in *Liber Annuus* and *ADAJ* (Corbo 1978, 1979, 1980; Corbo and Loffreda 1981; Loffreda 1981; Piccirillo 1979, 2004). The Franciscan excavations are undoubtedly one of the most relevant and important sources of information about the architecture and archaeology of Machaerus. Following their work, a preliminary plan of the fortified palace (*acropolis*) was prepared (Corbo and Loffreda 1981: figs. 1-2). They also identified the remains of the suburb (*suburbium*) described by Josephus – which has yet to be excavated – on the eastern slope of the hill. As well as the stratigraphy, detailed pottery (Loffreda 1996) and numismatic (Piccirillo 1980) reports have both been published.

It is clear that the Franciscan excavations amidst the walls of the Hasmonean fortification concentrated on the clearance and survey of Herodian floor levels. Stanislao Loffreda went one step further: he identified and made a detailed functional description of the different rooms of the royal baths in the fortress (Loffreda 1981: 85-90). The scientific achievements of Corbo's Machaerus excavations are on a par with his excavations at Herodion, except that he was never able to prepare a final report on Machaerus.

1992-1993: Two Seasons of Supplementary Excavations and the Restoration Project

Six months after the death of Virgilio Corbo in December 1991, the Franciscan Biblical School in Jerusalem, the University of Florence and the *Cooperativa Archeologia* of Florence continued the excavations under the overall direction of Michele Piccirillo, taking the first steps towards conservation of the monument with the reconstruction plan of Luigi Marino (Bianchi and Fagella 1992, 1993a, 1993b). The restoration project was extended to the Byzantine ruins of Mukāwir village, as well as to the construction a modern path leading up to the fortress (Marino 1993, 1994; Marino and Martella 2000). Since Piccirillo and Eugenio Alliata had both been part of Corbo's team, as well as being responsible for the excavation of the Byzantine ruins at Mukāwir in the 1980s, we can consider this new SBF-affiliated project as a direct continuation

of Corbo's excavations by his former students a generation later. The most important results of the supplementary excavations were the uncovering of the Peristyle Courtyard, including its northern surrounding and the Herodian Cistern at its centre, and presentation of the architectural monuments to the public. Some preliminary reports with more detailed plans appeared on the supplementary excavations and reconstruction works (Bianchi and Fagella 1993b), but these received a mixed reaction from the Jordanian authorities and international community. It was felt by some that the ancient atmosphere was damaged by the huge modern pavement and that the architectural character of the reconstructed Peristyle Courtyard was simply wrong. The courtyard was not originally Ionic in style and the number of columns in antiquity was 8x8 instead of the reconstructed 8x10. Although the work imitated *anastylosis*, it is an unauthentic modern reconstruction which gradually suffered from vandalism.

May 1998: Helicopter Survey

Prior to the start of our project, David Kennedy's Aerial Photographic Archive of Archaeology in the Middle East (APAAME) project carried out an excellent documentation of the archaeological site. By comparing these aerial photographs with (1) the remote sensing data of the 1953 Hunting Aerial Survey, (2) photographs taken in 1990 after Corbo's but before Piccirillo's excavations and (3) current Google Earth satellite images, we are now in a position to make a detailed comparative aerial and landscape archaeological examination of Machaerus today.

Even after all these archaeological investigations at Machaerus, all that was available to researchers in terms of a ground-plan was a sketch which did not show building-stones (Loffreda 1996: pls 1-4). The results of the above-mentioned excavations either remained unpublished or appeared only as preliminary reports in different languages. To date, not a single monograph has been published on Machaerus.

Nine months after the death of Michele Piccirillo in October 2008, a new archaeological mission-the seventh-started work at Machaerus in his beloved memory, directed by the author. In addition to excavation, survey and conservation at the site, the scientific objectives of this new project also include the preparation of an up-to-date academic monograph (and ultimately a final report) which includes a synthesis of international research at Machaerus. As well as presenting the archaeological and architectural results of the Hungarian-Jordanian mission, it is intended to summarise the history of several generations of monumental descriptions, survey and excavation at the site over more than 200 years, with the aim of publishing it in an academic format for the international research community and future generations.

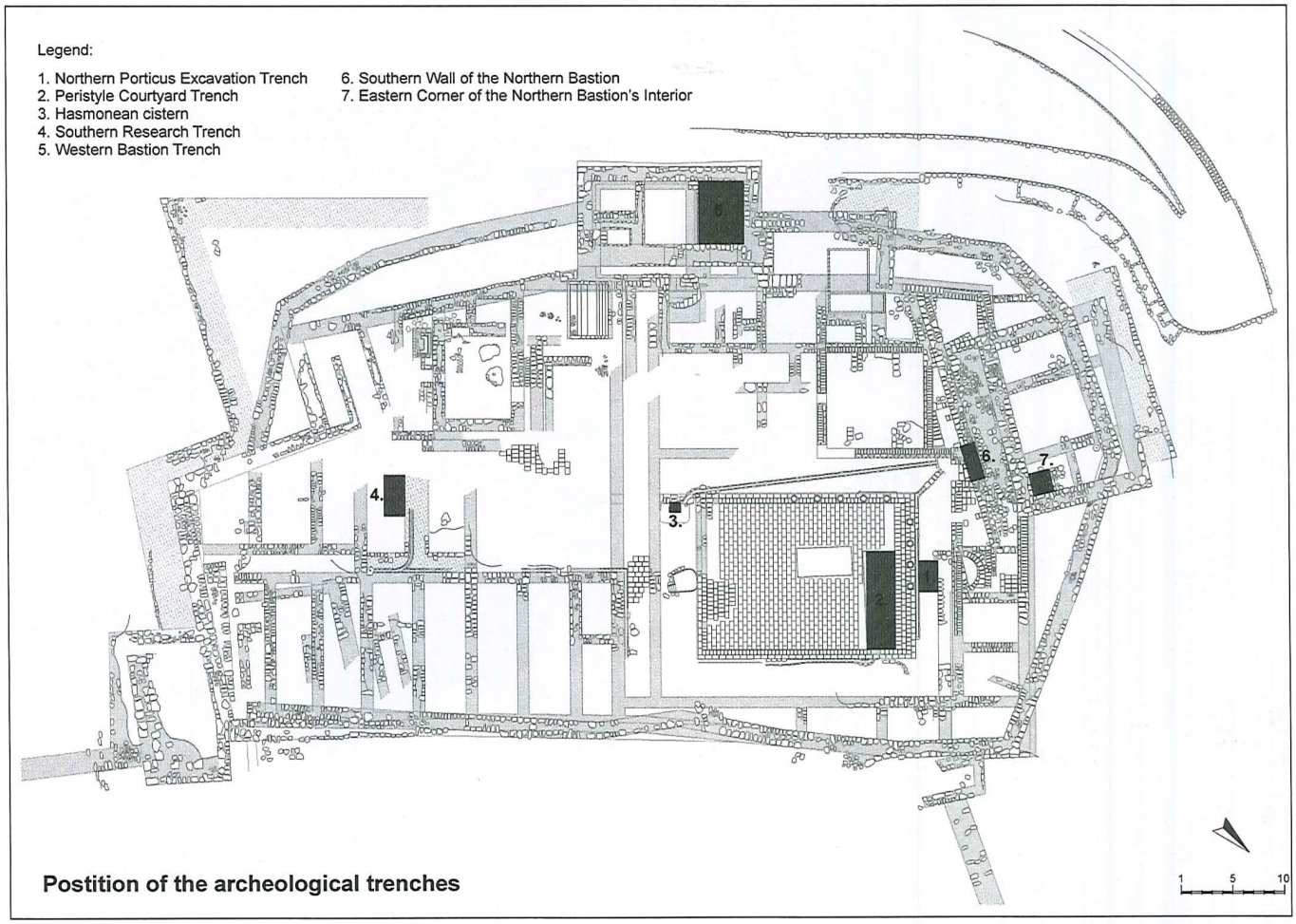
I was fortunate to meet the Friars Stanislao Loffreda (co-director with Virgilio Corbo of the 1978-1981 Machaerus excavations) and Eugenio Alliata (director of the SBF Museum) at the SBF in Jerusalem. Both researchers kindly expressed their support for the current Hungarian-Jordanian excavations at Machaerus and our intention of producing a bicentennial final report. We received similar support from Fr Carmelo Pappalardo during discussions at the Mount Nebo Friary. Unfortunately, as well as Virgilio Corbo (1918-1991) and Michele Piccirillo (1944-2008), E. Jerry Vardaman (1927-2000) and August Strobel (1930-2006) have also passed away in the intervening years.

The Hungarian-Jordanian Archaeological Mission

Excavation, Survey and Conservation

In addition to detailed surveys using modern techniques, including archaeology, landscape archaeology, architecture, geology, geophysics and Google Earth satellite imagery, our archaeological investigations have also made use of more traditional methods. To gain a better understanding of the architectural heritage and archaeological stratigraphy of the site, we opened seven excavation trenches: four in the Herodian palace, one in the western bastion of the Hasmonean fortification and two in the northern bastion (FIGS. 2-4). A preliminary report on this work, together with stratigraphic analyses of the excavation trenches, has been published in *ADAJ* (Vörös *et al.* 2010).

Neither stratigraphic nor professional architectural assessments of the monument's structures had been carried out before. Following detailed work, we feel reasonably confident in our assessment of the relationships between the different architectural periods and construction phases of the buildings of Machaerus and its surroundings. Our results have provided a number of fundamentally new perspectives. In addition to detailed architectural de-



2. 2010 ground-plan of the fortress of Machaerus, marked with our excavation trenches.

scriptions, we have been able to (1) establish the sequence of the Hasmonean, Herodian and Roman periods represented in the structure and ground-plan, (2) prepare a theoretical reconstruction of the archaeological monument in its former glory and (3) established the sequence of development of the Machaerus fortress in terms of architectural space. With the aid of 3D computer-modelling, the architectural development of the ancient and (unfortunately) modern constructions have been illustrated not only by means of ground-plans for each period (accompanied by theoretical architectural reconstructions), but also through documentation of the surviving archaeological structural remains.

The only previous geological survey of the site was conducted in October 2005 under the auspices of the joint SBF and University of Florence mission. However, geophysical survey – essential for archaeological research – was not carried out. Nevertheless, we have been able to use their geological results, e.g. geostructural data, lithostratigraphy, tectonics, geomechanics, use of natural stone and geological stability of the site (Coli and Coli 2006, 2009), in much the same way as we have benefited from the previous architectural and archaeological investigations. Truly, we are standing on the shoulders of previous generations of researchers.

To gain a better understanding of the archaeological site, we carried out geophysical surveys using ground-penetrating radar and eddy-current detection with different antennas. Of the different radar-survey antennas, a 40 Mhz GPR antenna has the potential to reveal soil and rock structures to a depth of 40m, while a 400 Mhz GPR antenna (60 pulses per second) can reveal structures to a depth of 4 m under dry soil conditions. The eddy-current detector, operated by Dr Péter Eisler using signals of different strength, was used primarily on the uppermost archaeological layers, to a depth of 1m below the modern ground-surface. The survey was

3. Interior of the 15.5m deep Hasmonean cistern discovered in the Southern Portico excavation trench of the Peristyle Courtyard, with a section through *in situ* ancient debris accumulated in the bottom; view from eastern corner.

4. Western Bastion trench after excavation, with modern construction and pilgrims in the background. After excavation of our 6m deep archaeological trench, the highest wall-remains of the fortification tower stood 8.75m high, giving an unexpected vertical dimension to the surviving monument; view from south.

extended to the Herodian and newly discovered Hasmonean cisterns as well.

As a result of our geological and geophysical programme (Dr Alain Gachet, Radar Technologies International, France), we were able to demonstrate the effect of the 31 BC earthquake on the Hasmonean walls of Alexander Jannaeus and also discovered the anti-seismic nature of the Herodian cistern architecture. On the walls of the latter, the orientation of two fractures has accurately determined the direction of seismic waves, i.e. perpendicular and at 70 to north. It was assessed that these represent the earthquake of 113/114 AD. It is probable that this earthquake caused (archaeologically visible) damage to water storage facilities, with the result that the site was not permanently occupied during later periods.

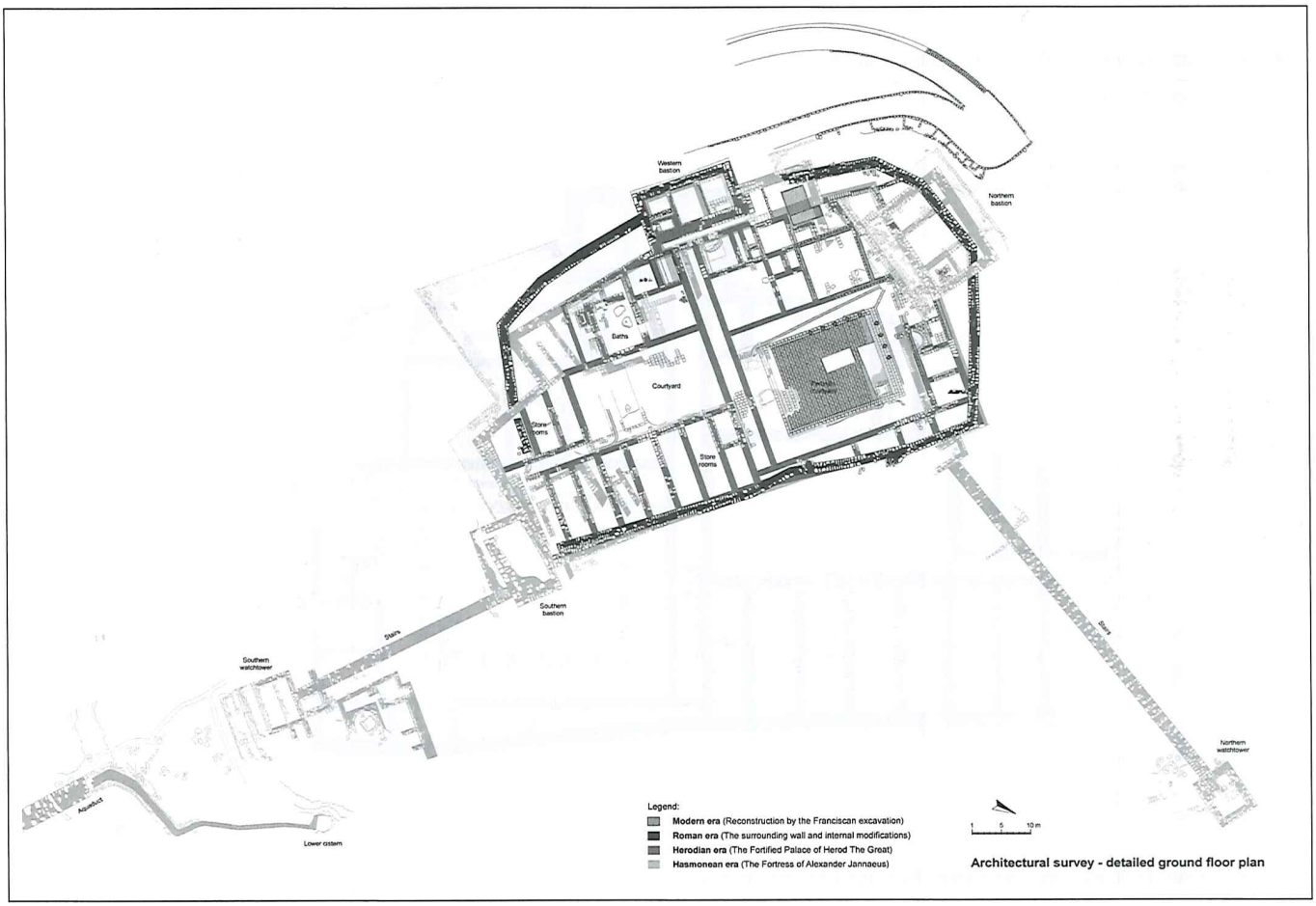
Architectural Development and Theoretical Reconstruction of the Herodian Fortified Royal Palace

Owing to the fact that the Herodian architecture (named after King Herod) is clearly identifiable, the earlier Hasmonean building activity (of Alexander Jannaeus) and later Roman (Zealot) additions to the ruins of the fortified palace (demolished by the Nabateans; *AJ* XVIII 5, 1) could be separated and recorded. In order to date the different archaeological strata of accumulated layers of debris and wall-foundations, we made good use of the pottery study of Stanislao Loffreda and the numismatic catalogue of Michele Piccirillo, as well as the pottery and coins we recovered ourselves. For identification of the different architectural periods and phases of the structure, the Herodian fortified palaces on the west bank of the Jordan river and Dead Sea (see above), and their publications provide excellent *comparanda* for the architectural and material heritage of Machaerus. We concluded that the archaeological site was occupied for *ca.* 150 years between the foundation of Alexander Jannaeus and the fall of the military group of the Zealot Eleazar in 72 AD.

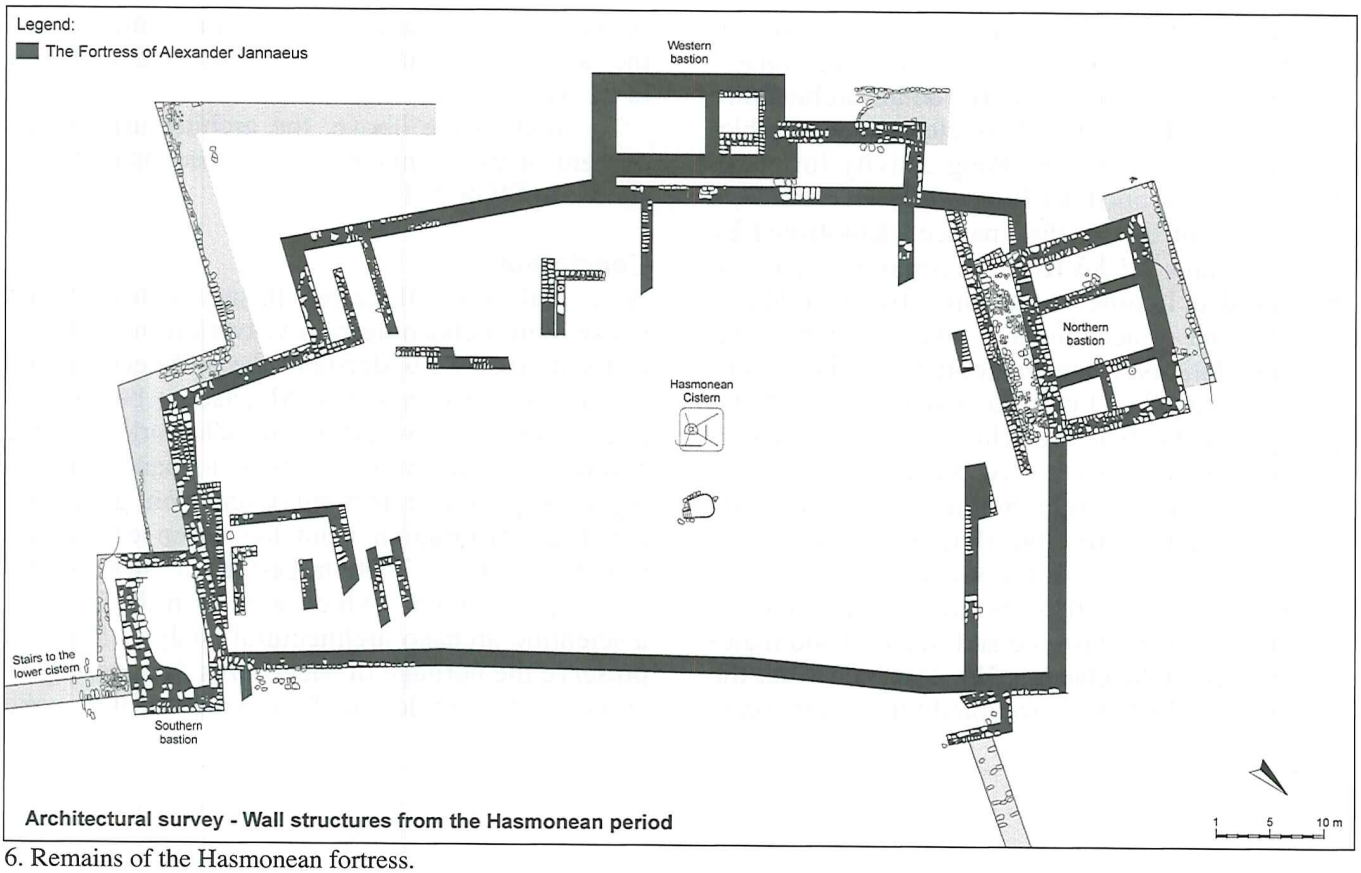
In light of the above, the architectural development of the monument can be reconstructed as shown in FIGS. 5-14.

Conclusion

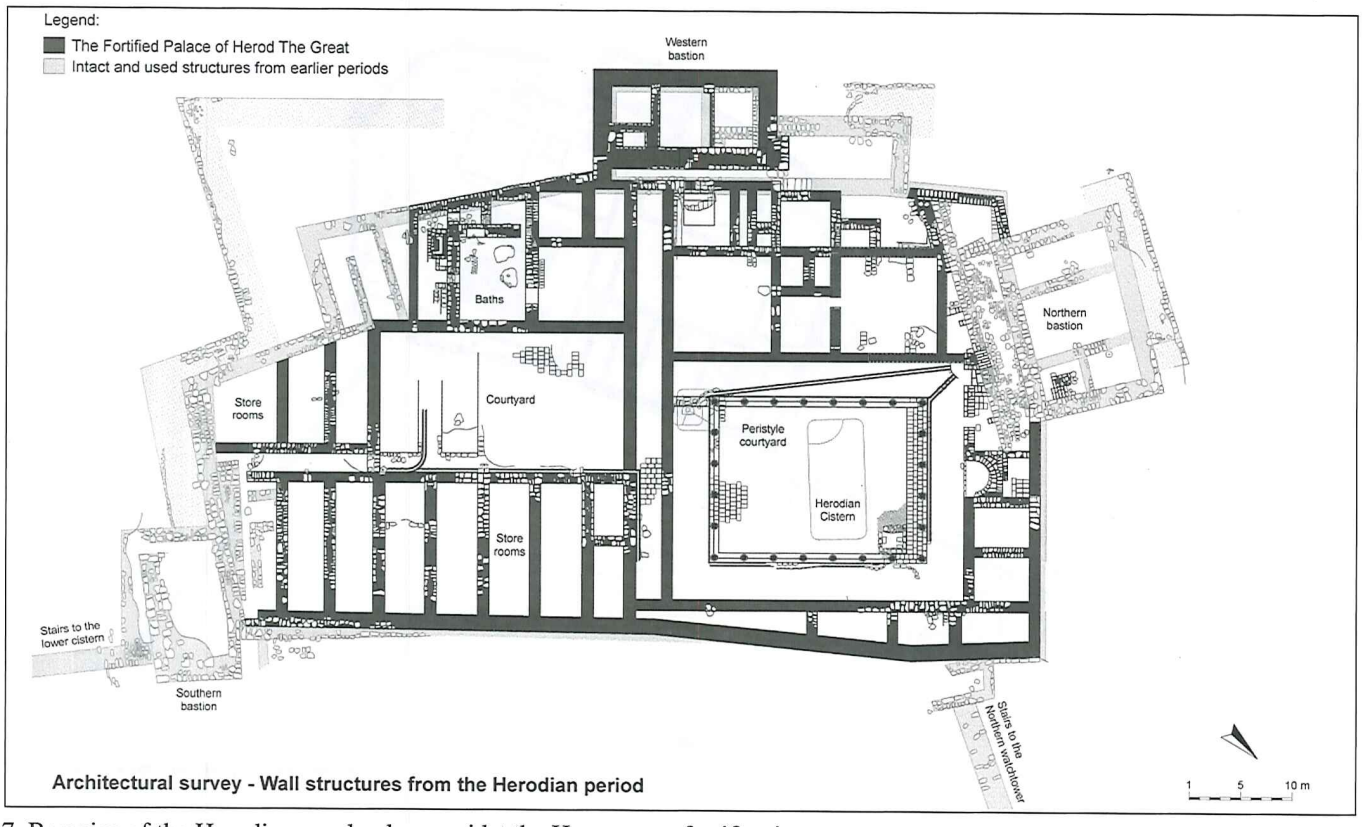
As a result of our three-month survey in 2009 and two-month archaeological excavation in 2010, we can state that we understand the architectural and archaeological heritage of Machaerus better than ever before. As a result of the fieldwork we have a substantial scientific database to hand (including a complete architectural description, geophysical data, information from the seven excavation trenches and *ca.* 7000 large-format professional digital photographs) which will form the basis of a scientific archaeo-architectural analysis that will preserve the heritage of Machaerus for future generations. On completion of our work, we will make



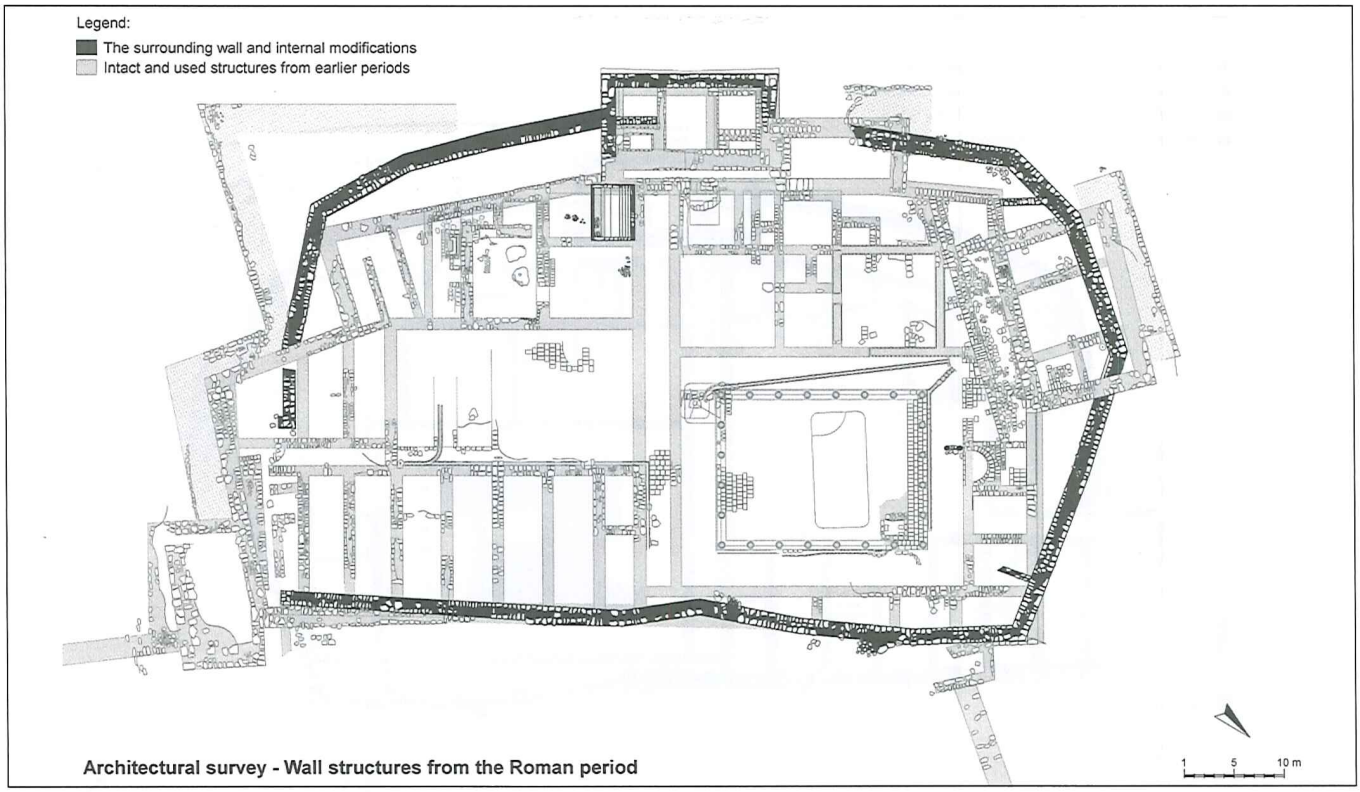
5. 2010 architectural survey: layout of the monument showing remains of all periods.



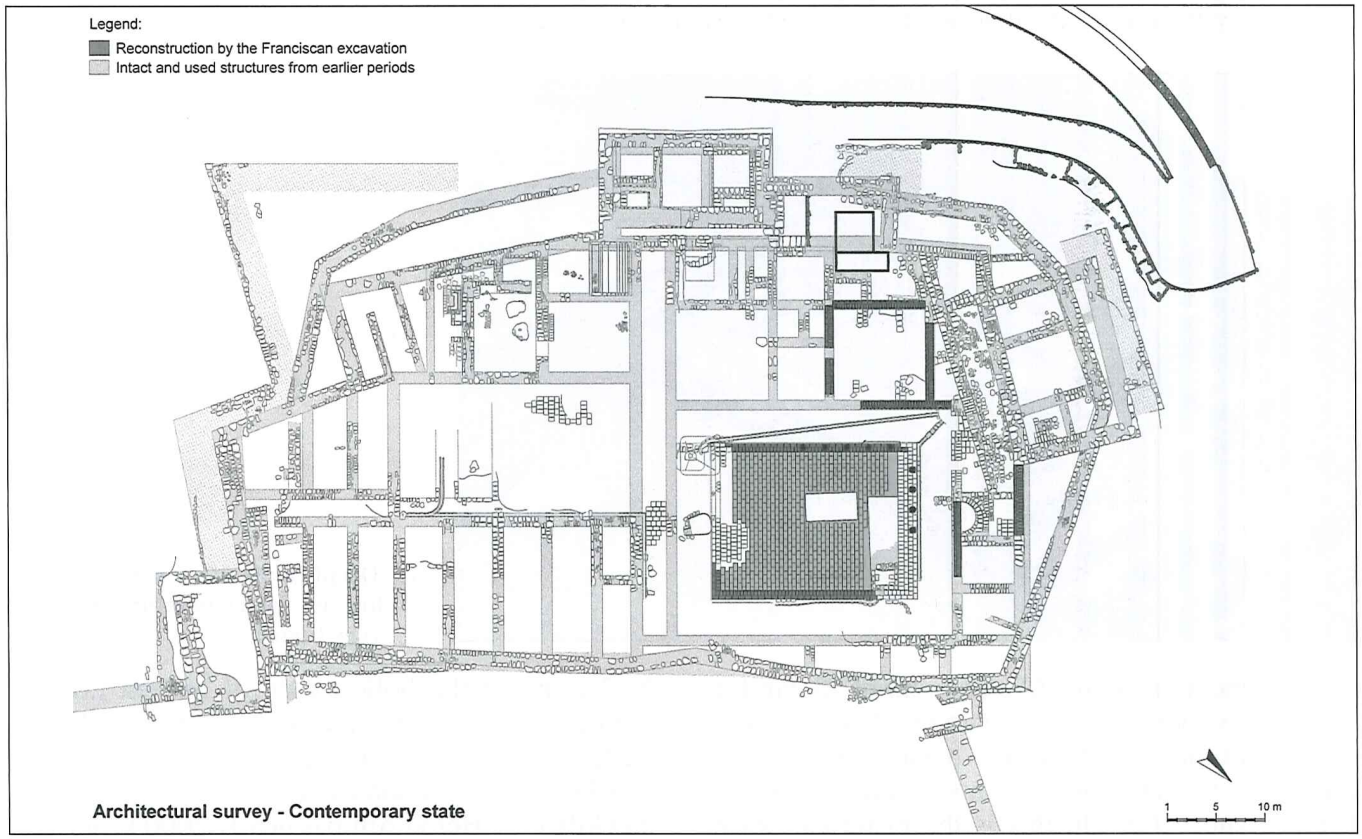
6. Remains of the Hasmonean fortress.



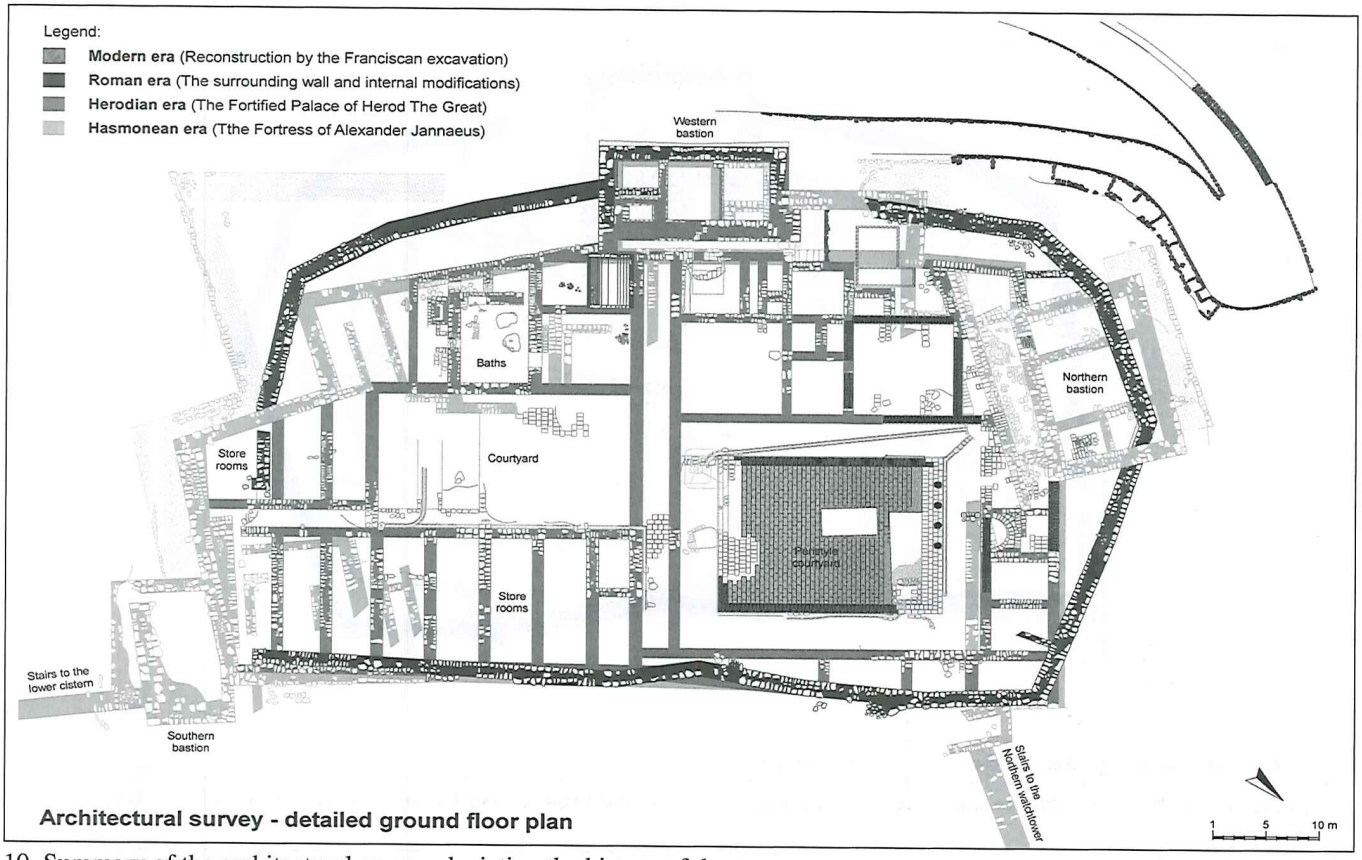
7. Remains of the Herodian royal palace amidst the Hasmonean fortifications.



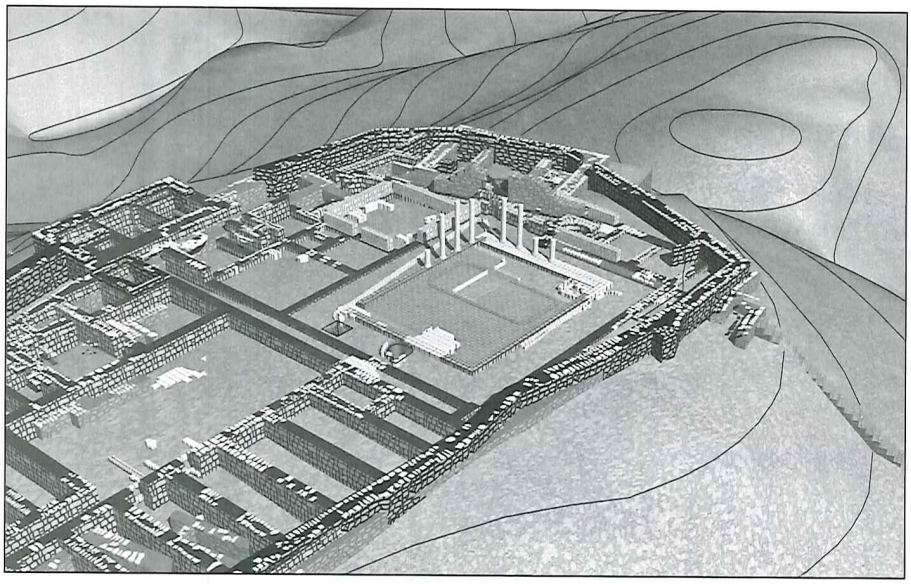
8. Remains of the building activity undertaken by the Zealots during the First Jewish Revolt, erected in the ruins of the Herodian fortified palace.



9. Remains of the modern building activity of the Piccirillo-Marino project.

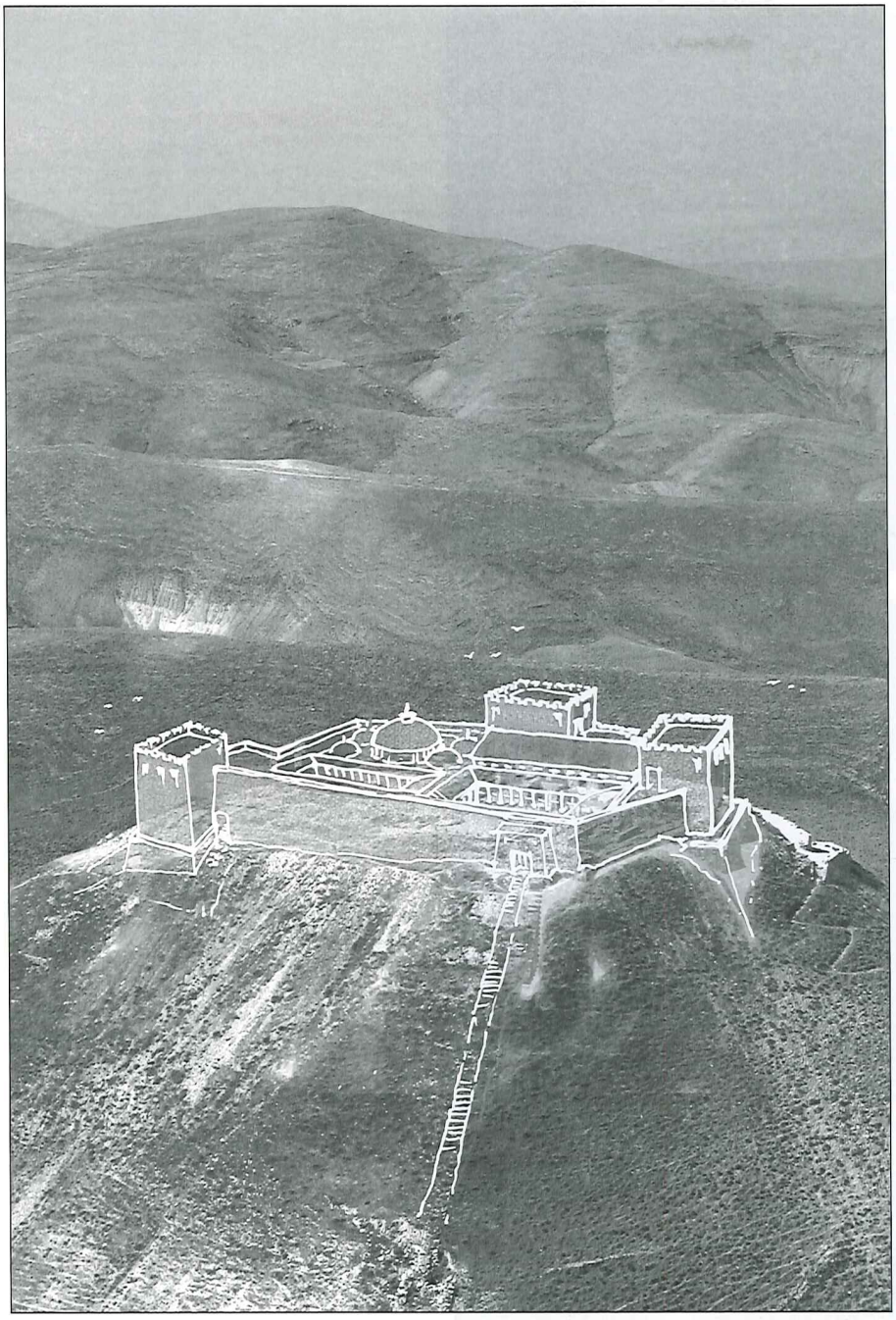


10. Summary of the architectural survey, depicting the history of the monument.



11. Detail of the 3D computer-modelling of the architectural remains; view from east.

recommendations to the Government of Jordan for the preservation and conservation of the ancient monument that will provide a positive experience for future visitors and pilgrims to this important Biblical site. After all, this is the historical place where, according to Flavius Josephus (*AJ* XVIII 5, 2), one of the holiest men of his era (known variously as Yokhanan the Baptiser, Saint John the Baptist [forerunner and precursor of Jesus Christ] and Prophet Yahya ibn Zakariyya) was imprisoned and killed by Herod Antipas nearly 2000 years ago. A final report will be published by the author on the



12. Theoretical architectural reconstruction of the Herodian fortified palace: drawing superimposed over aerial photograph, based on 3D computer-modelling; view from north-east.

history, archaeology and architecture of the fortified royal palace, overlooking the Dead Sea in Jordan, under the simple title 'Machaerus'.

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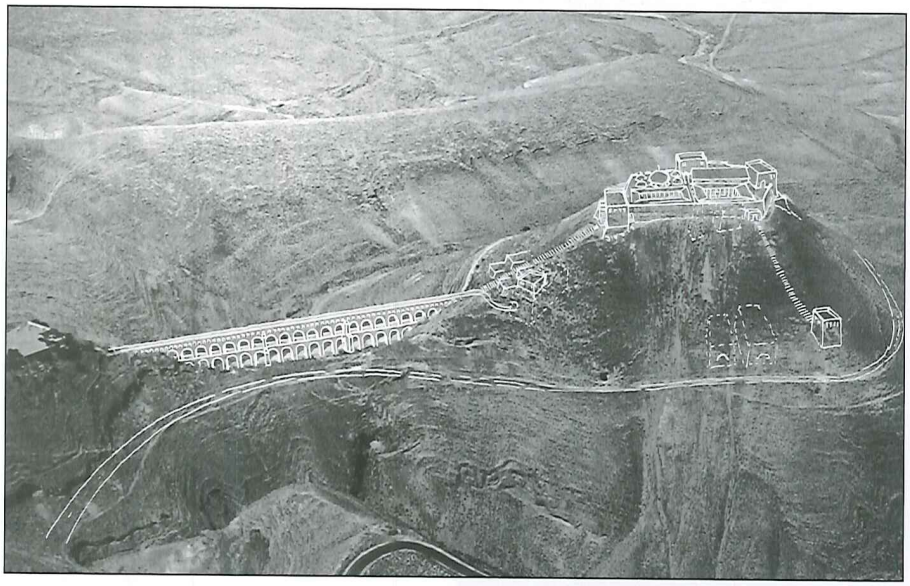

13. Theoretical architectural reconstruction of the Herodian palatial fortress and the aqueduct- and cistern-system: drawing superimposed over aerial photograph, based on 3D computer-modelling; view from east.

14. Theoretical architectural reconstruction of the Herodian fortified palace: drawing superimposed over aerial photograph, based on 3D computer-modelling; view from south-west.

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