

DEVELOPING A COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN FOR
THE PALAZZO IMPERIALE AT OSTIA ANTICA, ITALY

By

TODD E. ADAMS

A thesis submitted to the

Graduate School-New Brunswick

Rutgers, The State University of New Jersey

in partial fulfillment of the requirements

for the degree of

Master of Arts

Graduate Program in Art History

written under the direction of

Dr. Archer St. Clair Harvey

and approved by

New Brunswick, New Jersey

May, 2013

ABSTRACT OF THE THESIS

Developing a Comprehensive Conservation and Management Plan for the Palazzo
Imperiale at Ostia Antica, Italy

By TODD E. ADAMS

Thesis Director:

Dr. Archer St. Clair Harvey

The purpose of this paper is to outline the steps necessary for the development of a comprehensive conservation and management plan for the building known as the Palazzo Imperiale at Ostia Antica in Italy, utilizing a combination of the APPEAR method developed by Warnotte et al, and the values-based approach put forth by Demas. The current condition of the Palazzo is in a deteriorating state, and intervention will be necessary soon if the proposed plan is to be cost effective. Assessing the condition of the structure, its decorative elements (mosaics), its place within the Ostia Archaeological Park, and its future sustainable management will all be considered as components to a successful intervention at this site.

Acknowledgments

I'd like to express my gratitude to the following individuals, without whose invaluable help this paper would not have been possible: Archer St. Clair Harvey, Katherine Woodhouse-Beyer, John Kenfield, Joanne Spurza, Angelo Pellegrino, Paola Germoni, Alfredo Marinucci, Chiara Belfiore, Roberto Crivellero, Valerio Commandatore, Fabio Guideti, and Dewey Moss.

Table of Contents

Abstract	ii
Acknowledgments	iii
List of Illustrations	v
Introduction	1
Chapter One: The Palazzo Imperiale at Ostia Antica	5
Chapter Two: Creating the Plan	19
Chapter Three: Conservation of the Palazzo Imperiale	42
Chapter Four: Management, Interpretation, and Presentation	69
Conclusion	76
Appendix I: Mosaics in the Palazzo Imperiale	78
Appendix II: Conservation of the Victorious Charioteers mosaic	80
Bibliography	83

List of Illustrations

Plan of the Palazzo Imperiale	8
Nineteenth-century engraving of the Mithraeum, room 75	9
The Mithraeum today	9
Vegetative Damage in room 75	12
Lacuna in wall in room 75	12
Vegetative damage in rooms 79 and 68	13
Salt efflorescence in room 76	13
Salt efflorescence in room 97	14
Salt efflorescence in room 92	14
Crumbling pier in room 76	15
Separation of courses in 1964 restoration work in room 93	15
Friable concrete capping in room 73	16
Lichen growth on alter of Mithraeum, room 75	16
Lichen growth on broken column in room 64	17
Moss growing on mosaic floor in room 63	17
Map of Riserva del Littore Romano	50
Multiple destructive forces on wall in room 78	51
The damaging action of soluble salts on porous materials	52
Exposed core in pier in room 82	55
Loss of brick and mortar at base of pier in room 85	56
Forces acting on ancient walls and their results	57
Deteriorating cement capping in room 73	59

Introduction

“Archaeology offers, among other things, a window to the distant past that enhances our understanding of human, social and technological development. For professionals, academics, and the public at large, archaeological sites provide valued information and experiences, which most of us hope to keep available to future generations as well...Conservation is not merely about saving the physical remains of the past; it is about telling something about ourselves to present and future generation—what is important to us, [and] what we value about our history...”

Randall Mason and Erica Avrami, 2000

“...when we expose a monument after years of burial we assume the responsibility of studying it and understanding it, but we also take on the responsibility of conserving all of it and making it accessible to all.”

Andrew Wallace-Hadrill, 2007

“The object of conservation is to prolong the life of cultural heritage and, if possible, to clarify the artistic and historical messages therein without loss of authenticity and meaning. Conservation is a cultural, artistic, technical, and craft activity based on humanistic and scientific studies and systematic research. Conservation must respect the cultural context.”

ICOMOS training guidelines, 1993

The proper conservation of archaeological sites entails more than simply pouring cement wall caps on the remains of bath complex walls, lifting a mosaic and hanging it on the wall of a museum, or clearing vegetation from an overgrown atrium house. Conservation, if it is to have any meaning beyond the quantifiable, beyond bricks and mortar and thresholds and arches and all the other physical components that define a site, must be an act of clarification, amplification, and transmission. Each site, each structure, each artifact is a voice from the past speaking to the present, but coming to us as if from an out-of-range radio station: much static and noise and precious little signal. The first step in conservation, and indeed in archaeology itself, is the attempt to construct a coherent meaning out of the remains before us, to clarify the signal and separate out the noise. Unlike a radio signal, however, the strength or weakness of the voice we are endeavoring to make out is not necessarily dependent on its distance from us, here not in kilometers but in years. Faced with the reality of accidents of preservation, we make the most of what we have before us, whether it is the wealth of remains from first century Pompeii, or the poverty of remains from seventeenth century Jamestown; Jamestown may be the more recent site, but its nearness to us has done little to provide clarity. Creating a sense of coherence is the first step, but the act of clarification is not a single step but rather an on-going process, just as the entire clarification-amplification-transmission process is actually cyclic in nature rather than linear, making conservation an organic system that is constantly evolving.

The next step in the cycle, amplification, is in reality two steps, both suggested by the varied meaning of the word itself. From the Latin *amplificare*, meaning to enlarge as well as to enlarge *upon*, when amplifying a site we are not only concerned with enlarging

the voice of the past, but also with enlarging upon the site by supplementing the physical remains with analysis, research, *comparanda*, collaboration with other experts in related fields, and educated guesswork. Amplification is what provides the flesh and soul to the bare bones of clarification, creating a living, breathing site in four dimensions rather than merely three.

A site that is unpublished, un-disseminated to the world might just as well have never been excavated or conserved at all. Without transmitting the clarified, amplified signal from the past and allowing it to speak to present and future generations, the site remains buried not in earth, but in ignorance. One of the key roles of the archaeologist is that of storyteller, with the responsibility to communicate to a wide audience the results and significance of her findings.¹ As Deetz says elsewhere, "...if we as archaeologists are to continue our work, it must be in the context of public understanding and support."² Without proper on-site transmission systems such as interpretive signage, visitor's centers, ease of accessibility, new types of interactive media, models and recreations, and other methods of communicating the meaning and function of the site to visitors, the site remains the province of experts to the exclusion of all others, who are left to wander around a bewildering array of broken walls, fallen columns, and locked gates closing off forbidden areas. Transmission then is the key to transforming cultural resources into cultural heritage, and repopulating the places of the past with inhabitants of the present.

The Palazzo Imperiale at Ostia Antica is a case in point. Originally excavated in the mid-nineteenth century, it stands at quite a remove from the main excavations at Ostia

¹ Deetz 1998, 94.

² Deetz 1993, 172.

in the midst of a landscape of hay fields and the Tiber River; there are no directions to its location, no signage or any other interpretive features, not even an indication of its name outside of the guidebooks. Any visitor to Ostia who happens to come across the Palazzo is quite left to his own devices to make sense of the warren of rooms to the north and south, to understand the two large open cortiles at the center of the complex, or to find out what the large protective shelter is in fact sheltering. The aim of this paper is to outline a workable blueprint for creating a comprehensive conservation plan for the Palazzo, to lay out the processes involved in conserving, managing and maintaining, and communicating to the public the reality of the Palazzo as it evolved over its active life from the first to the third centuries CE. The physical isolation of the Palazzo from the rest of Ostia has not worked to its favor, except that it is undamaged by excessive tourist visitation; but the destructive forces of vegetation, soluble salts in the soil and salty sea winds, rain, flooding, and the incompatible restoration materials and techniques used in the past have taken their toll on the fabric of the building and it presents itself to us now in compromised condition. But the remains of the Palazzo are still stable and not yet crumbling visibly before our eyes; walls are not leaning dangerously and propped up by supports, no areas are locked behind gates for being too fragile to bear the presence of visitors. It is because of the relative strength and stability of the site that now is the time to plan for an aggressive regime of conservation that will maintain and extend its present condition into the foreseeable future.

Chapter One: The Palazzo Imperiale at Ostia Antica

Ostia's so-called Palazzo Imperiale sits in what can only be described as "splendid isolation," far removed from the streets, temples, baths, food bars, and civic buildings that comprise the Ostian city center. To reach the Palazzo (which few tourists ever do), the visitor must hike roughly two hundred meters past the northwestern edge of the excavations, following a dirt road up a slope and around a curve until empty fields, used for growing hay for neighboring farmers, stretch out on either side. Ahead on the right, barely visible as one tops the rise, sitting in a hollow two to three meters below the level of the surrounding land, are the remains of the apartment-bath-commercial complex bearing the misnomer "Palazzo Imperiale." This isolation is a quirk of the site's modern-day existence: in antiquity it was surrounded on all sides by buildings of various types, now lying, still buried and untouched, beneath the hay fields above. The Palazzo sits alone, cut off from any context with the rest of the city, at the far western end of Regio I; cut off also from the Tiber River: its once-majestic riverfront entrance, flanked by marble columns, now faces blindly the steep slope of the Tiber embankment. This isolation has resulted in type of "out of sight, out of mind" attitude by the Soprintendenza: vegetation has aggressively overgrown the site, rendering many of the rooms and structures all but invisible beneath their lush canopy. Damage from root systems is rampant throughout; incrustation and efflorescence spread unchecked; erosion and decay of brick, stone, and mortar wear away foundations; burrowing by wildlife destroys mosaics; roofing structures erected to protect portions of the site are damaged by weather and lack of maintenance, becoming potential threats to the remains they were meant to safeguard.

Excavations at the Palazzo were undertaken by Pietro Ercole and Carlo Ludovico Visconti beginning in 1855 and were completed in 1871; what we see of the Palazzo today is due almost entirely to these excavations. The large-scale excavations carried out by Guido Calza under Mussolini (1938-1942) that exposed the city left the Palazzo untouched, most likely due to its far remove from the city center. The *caldarium* (See Figure 1, room 11) and its adjacent service corridor (room 10) were uncovered in excavations undertaken by the Soprintendenza Archeologica di Ostia in 1986-1987; several earlier structures at lower, earlier levels (rooms 106, 114, 115) were also revealed during these excavations. Since 2008, excavation work has been carried out by Dr. Joanne Spurza in rooms 7, 16, 17, 70, and 71 revealing numerous mosaic fragments, most notably in rooms 17 and 70, and an ancient project to raise the floor level in room 7. Working alongside Dr. Spurza has been a small, multi-national team drawn from Italy, the Netherlands, England, and the United States in frequent consultation with Paola Germoni, director of archives at Ostia, Chiara Belfiore, director of restorations, and Roberto Crivellaro of the grounds keeping department. The team has also worked under the direction of Valerio Commendatore, a mosaics restoration expert, to undertake emergency stabilization of the Victorious Charioteers mosaic in the *caldarium* (room 11), which is in danger of collapse as the hypocaust floor it rests upon deteriorates. Each year the scope of the excavation has been enlarged: from room 7 in year one, to rooms 7, 17, and 16 in years two and three, to rooms 70 and 71 in year four; a smaller number of rooms in the fourth year, but much larger excavations carried out in those two rooms.

What we see today of the Palazzo is a ruin of a ruin: the remains uncovered by the Visconti between 1855 and 1871 have degraded to such an extent that contemporary

engravings made of the site bear little relation to the present-day experience (Figures 2 and 3). But the Palazzo of the Visconti is in many ways still there; while the best of the mosaics were cut up and transported to the Vatican during the Visconti excavations, the building's footprint, walls, rooms, corridors, staircases, latrines, hot and cold rooms, shops, store rooms, courtyards, and shrines are still intact, and we can move through them, where vegetation allows, and still ferret out the various features of this large complex.

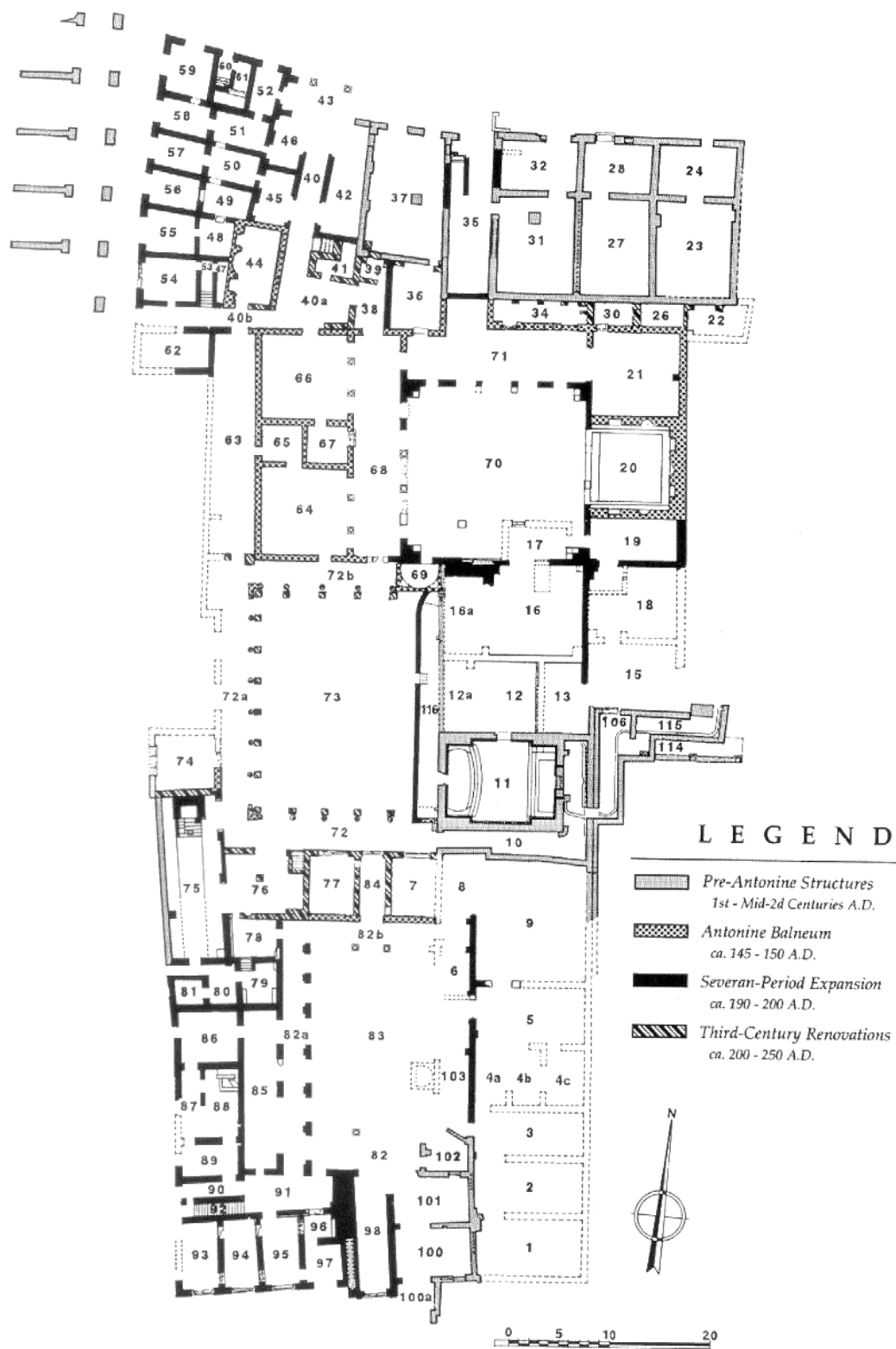


Figure 1: Ground plan of the Palazzo Imperiale. Image courtesy of www.ostia-antica.org.



Figure 2: The Mithraeum in the Palazzo Imperiale (room 75), from an 1860 print. Image courtesy of www.ostia-antica.org.



Figure 3: The Mithraeum today. Photo by author.

Tour of the Palazzo Imperiale

The Palazzo covers an area of approximately 1,240 square meters (124 x 72 m) housing more than one hundred rooms, aligned on a north-south axis facing the Tiber at the north end, and fronting the city itself on the south (Figure 1). The building can be divided into four distinct sections: a southern complex surrounding a central cortile; a large central bath; warehousing on the northeastern extremity; commercial space at the northwest. Today the main entrance to the complex is from the south (Room 98); to the east, rooms 1-5 and 9 remain unexcavated, evidenced only by wall lines beneath the surface. The western counterpart to the first three of the unexcavated rooms, 100-102, are of uncertain purpose and their relationship to rooms 1-3 has obviously not yet been established.

To the west of entrance 98 lies a commercial suite of five rooms (93-96); these *tabernae* date to the same period as the commercial space to the northwest, both part of the Severan expansion of the Palazzo from at the end of the second century AD. North of this commercial suite is an L-shaped arrangement of rooms, 86-92, which may have been residential space of several stories, as indicated by the staircase in room 92; a north/south corridor (85) separates this area from the southern cortile (82-83). To the north of this possible residential space is a *mithraeum* (74-75), and what seem to be ancillary rooms for this shrine (79-81, and perhaps 76, 78), although this is by no means certain. At least a portion of this area of the Palazzo was multi-story, as evidenced by the staircase in the northeast corner of room 76. To the east of the *mithraeum* is a suite of rooms, 76, 77, 7, whose function is unclear; a central basin and niche were discovered in room 77, with no indication of their possible use.

North of this suite of rooms lies the central bath complex of the Palazzo; the tripartite *palaestra*, rooms 72 and 73, and to the east a group of heated rooms, 11-16, including a large caldarium (11). The northern end of the complex includes a *frigidarium* (70) with niched *piscine* (20); a possible apodyterium (71); a reception suite (64-66); and a latrine (44). Spurza dates the heated portion of the *balneum* to the pre-Antonine period (the first to the mid-second century CE), and the expanded northern portion to the Antonine period, c. 145-150 CE; further expansion to the entire area took place in the later Severan period, c. 190-200 CE³ (see Figure 1).

The northeast section of the Palazzo houses a series of pre-Antonine (possibly Hadrianic) double *horrea* (23/24, 27/28, 31/32); rooms 36-39 probably date to the same period. Finally, the northwest section houses a trapezoidal cluster of rooms, 47-61, which Spurza identifies as *botteghe/retrobotteghe* (workrooms or shops with backrooms)⁴. The peculiar shape of this commercial suite was more than likely due to a desire to squeeze as many rooms as possible into the available space; the remains of staircases in rooms 53 and 61 indicate multiple floors. This portion, like the southwest area of the Palazzo, dates to the late-second century Severan expansion.

Current State of Preservation of the Palazzo Imperiale: A Visual Survey

That the Palazzo is an endangered site is plain to see after even a casual inspection of the remains. The most visible threat is the uncontrolled vegetation growing on and among the ruins. Intrusive roots and trunks have pulled walls apart, destroyed mortar, undermined foundations, and damaged mosaics; there is no part of the Palazzo

³ Spurza 1999, 133-138.

⁴ Spurza 1999, 136.

that is free from aggressive vegetative growth. Harder to see to the untrained eye is the destruction caused by soluble salts rising from the soil through the walls via capillary action, crystallizing within the porous brick and mortar and causing damage from within. Inadequate restoration techniques used in the past, along with the use of inappropriate repair materials such as concrete, accelerate decay by exerting undue stresses on the original construction materials and creating conditions that allow for the intrusion of water and vegetation into walls and floors.

Vegetative Damage



Figure 4: Vegetative damage to a pier in room 75. Photo by author.



Figure 5: Vegetative damage combined with animal burrowing creates a large lacuna in the southwest wall of room 75. Photo by author.



Figure 6: On left, large trunk pushes apart north and east walls in room 79. On right, invasive vegetation tears apart wall in room 68. Photos by author.

Soluble Salt Damage



Figure 7: Salt efflorescence on eroded brickwork in room 76. Photo by author.



Figure 8: Salt efflorescence in room 97. Note that the modern (1964) brick above, to the right, and left of center is not affected (although the restoration plaque at top right has been). Photo by author.



Figure 9: Heavy salt efflorescence in room 92. Photo by author.

Inadequate Restoration Techniques



Figure 10: Crumbling pier with too-large concrete cap in room 76. Photo by author.



Figure 11: Separation of courses in 1964 restoration, room 93. Photo by author.



Figure 12: Inadequate concrete capping to wall in room 73, now extremely friable. Photo by author.

Incrustations



Figure 13: Lichen growth the altar in the Mithraeum, room 75. Photo by author.



Figure 14: Lichen growth on broken column in room 64. Photo by author.



Figure 15: Moss growing on mosaic floor in room 63. Photo by author.

Mosaics in the Palazzo Imperiale

The current state of the mosaics at the Palazzo Imperiale can only be described as deplorable. During the original Visconti excavations of 1855-1871, numerous polychrome mosaics were cut from their beddings and removed; the less desirable black-and-white mosaics left to deteriorate over time. The removal of the polychrome mosaics was less than skillful; great chunks of the mosaic from the frigidarium (room 70), now in the Vatican, were left behind on-site as the room chosen for its installation, the Sala dell'Immacolata Concezione, could not accommodate the entire floor. Currently, no known polychrome mosaics remain on site, but a moderate number of black-and-white mosaics remain *in situ* in the following rooms: 7, 11, 16, 17, 64, 66, 68, 70, 71, 73, and 75. Their conditions range from good (68), to fragmentary (7, 71), to highly imperiled (11, see below). A comprehensive investigation into the location and condition of conjectured mosaics will be carried out as part of the condition survey; a complete program of restoration and conservation will then be included in the master Plan.

Chapter Two: Creating the Plan

In 1987, the government of Italy submitted to UNESCO's World Heritage Committee an application to inscribe Ostia Antica, Portus, and Isola Sacra on the list of World Heritage Sites. The committee decided to defer the nomination until the Italian authorities had "...formally adopted the safeguarding measures which the development of the archaeological site entails."⁵ But Ostia was not resubmitted, nor does it feature on Italy's Tentative List of sites to be nominated for World Heritage List status. There seems to be no reason, or at least no reason offered, for the withdrawal of Ostia; Pompeii, Herculaneum, and Torre Annunziata were all submitted and inscribed on the list ten years later in 1997, so the reason for Ostia's deferral, the adoption of safeguarding measures, seems no longer to be a factor regarding archaeological sites in Italy. The criteria used by the Committee for inscribing these three sites, 1) testimony to cultural tradition, 2) significance in human history, and 3) traditional human settlement⁶ would all seem relevant to Ostia as well. Whatever the reason for Ostia's withdrawal from consideration as a World Heritage Site, it is clear that the ancient town retains significant heritage value, albeit of a different kind from its "sister cities" of Pompeii and Herculaneum.

One of the striking features of Pompeii is its abundance of private homes: the House of the Menander; the House of the Vettii; the House of Julius Polybius; and on and on. Ostia, on the other hand, is basically a working-class city, and its housing reflects this fact: the city is filled with numerous large *insulae*, tall apartment blocks built to house a large number of inhabitants; what Michael Grant calls a "revolution in housing" (Grant

⁵ UNESCO. "Documents." <http://whc.unesco.org/archive/1987/sc-87-conf005-4e.pdf> (Accessed March 12, 2013).

⁶ UNESCO. "Documents." <http://whc.unesco.org/archive/1997/whc-97-conf208-17e.pdf> (Accessed March 12, 2013).

1978, 244). But Ostia's *insulae* are not the cheap, poorly built firetraps of the Republic and early Empire; they are solidly built of brick and concrete and designed to comfortably house the growing "middle class" population of Ostia. The Garden Apartments, the House of Themistocles, the House of the Paintings, the House of Diana, the Building of Serapis, the Building of the Charioteers, and the House of the Bar are of few of these multi-story buildings; smaller, so-called *medianum* apartments (named for their central hall or *medianum*) dot the city in all five *regioni* of the city. The *insulae* of second and third century Ostia would not look out of place in modern Rome; the solution to comfortable urban living that today's Rome has settled upon can trace its inception back to the apartment blocks of its ancient port city.

But Ostia does not simply represent an example of built heritage, it represents in its current antique state a condition UNESCO calls an organically evolved landscape, one "...in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form."⁷ Ostia was abandoned sometime in the fifth century CE, ending its evolution, and nature took over, creating the "relict landscape" of a mixture of natural and man-made components that we see today. Any visitor to Ostia knows that its landscape features, for example the umbrella pines, the hay fields, the Tiber River, bestow a tranquility on the site that is lacking in places like Pompeii and Herculaneum, and blend together with the material remains of the city to create a new landscape around every bend in the road. Pompeii will always feel like an urban space; Ostia feels like a place in the country. If we were to approach Ostia not simply as an archaeological site,

⁷ UNESCO. "Cultural Landscape." <http://whc.unesco.org/en/culturallandscape/#1> (Accessed March 12, 2013).

but as a cultural landscape as well, in the same manner as the Paestum and Velia sites in the Vallo di Diano National Park in Campania, its case to be inscribed on the World Heritage Site list would be much stronger than it seems to be today.

UNESCO Operational Guidelines for Management Plans

While UNESCO has no set template for management plans put in place for sites on the World Heritage list, there is a set of operational guidelines that it considers essential to any successful management plan. These guidelines are 1) legislative, regulatory, and contractual measures for protection; 2) boundaries for effective protection; 3) buffer zones; 4) management systems; 5) sustainable use.⁸ These guidelines are intended for heritage sites as a whole, but are applicable to a smaller site like the Palazzo also as they address all the needs of protection and management, as well as providing a framework to encompass the three parts of the core conservation plan outlined below. For example, the boundaries of the Palazzo are not as yet clearly defined; the eastern portion of the building (rooms 1-5, 8, 9) are wholly unexcavated, and the southwestern walls have become de facto retaining walls owing to the embankment they are embedded within. Should this embankment be dug out to determine if the Palazzo extends in that direction? Should the eastern rooms be excavated as well? Making proper use of the UNESCO guidelines will ensure that the program of intervention for the Palazzo conforms to heritage site standards of conservation and management.

The core conservation plan for the Palazzo Imperiale will be composed of three discrete parts: a conservation blueprint, a management blueprint, and a marketing

⁸ Ringbeck 2008, 6.

blueprint. Any one of these three components will be sufficient for short-term solutions to specific on-site needs, but only the development and execution of all three plans will ensure the long-term success of an intervention project. Conservation without management will result in piecemeal, “as-needed” interventions, which in the long run are more expensive and harder to manage.⁹ Omitting an effective marketing blueprint can result in loss of revenue necessary for the implementation and maintenance of the management plan, as well as effectively denying accessibility to the site by the public, an important and too often overlooked stakeholder, by creating through omission the impression that the site is for professionals alone. Shackel () recounts his visit to the Harpers Ferry National Historical Park, and uncovering a long-discarded sign from a 1970s-era excavation which read: “Yes, we are archaeologists—Yes, we are doing archaeology—Please do not disturb us.”¹⁰ Happily, the attitude that public outreach and education by archaeologists is unnecessary, and that archaeology is beyond the comprehension of visitors is waning, if not already dead.¹¹ Indeed, creative and effective marketing ensures that the role of the archaeologist as storyteller can regain its former status.¹² There are stories inherent at every heritage site, but at Praetzellis puts it, “It is the *site*’s story in the sense that the story emerges from the site. But this is not to say that some specific story lurks within the soil and artifacts waiting to be freed by the archaeologist. On the contrary. The site contains many potential stories, but every one is a product of the archaeological imagination that pulls together historical and

⁹ Stubbs 1986, 81.

¹⁰ Shackel 2002, 157.

¹¹ Given the isolation of the Palazzo Imperiale from the main excavations at Ostia, we seldom had visitors to the site. But every now and then a few hearty (or simply lost) souls managed the lonely trek, and it was always a treat to be able to explain to them the work that we were doing, and to try to dispel the Indiana Jones notion of archaeology as “treasure hunting.”

¹² Young 2002, 240.

archaeological facts into an interpretation that is more than the sum of the parts of which it is made and more than its excavator can document in the usual way.”¹³ But while every good story has a beginning, middle, and an end, the effective conservation and management of a heritage site should create a story whose end is not only unwritten, but forestalled for as long as possible.

The development of conservation and management plans by archaeologists working in tandem with conservators, architects, structural engineers, surveyors and others represents a sea-change in the traditional mindset of the archaeologist, who so often in the past did not take into consideration the conservation of the structures uncovered, losing archaeological evidence due to uncontrolled erosion and decay.¹⁴ As Fagan puts it, “...archaeologists need to change their thinking profoundly. The irony is that they’re comfortable dealing with long spans of time in the past—and ignore the implications of their work for the long-term future.”¹⁵ The moment a structure or artifact is uncovered, the archaeologist should begin to think as a conservator, even while doing the work of an archaeologist; the conservator in turn must be involved at the moment any exposure takes place, in order to help understand and preserve the given stratigraphic moment.¹⁶ When archaeologists fail to plan for conservation, a completed archaeological site can take on the air of abandonment; tourists can perceive these “abandoned” or unattended sites as giving them free reign to recklessly explore, sitting or standing on fragile walls, or removing building materials or other objects.¹⁷ The Code of Professional Standards adopted by the Archaeological Institute of America (AIA) in 1994 explicitly

¹³ Praetzelis 1998, 1.

¹⁴ Palumbo 2000, 8.

¹⁵ Fagan 2006, 9.

¹⁶ Buccellati 2006, 74.

¹⁷ Palumbo 2000, 6.

states that “All research projects should contain specific plans for conservation, preservation, and publication from the very outset, and funds should be secured for such purposes.”¹⁸ In Italy, the Associazione Nazionale Archeologi (National Association of Archaeologists—ANA) stresses throughout their code of conduct that one of the primary roles of the archaeologist is the protection and conservation of the archaeological heritage as a personal moral responsibility to society; “...una personale responsabilità morale verso il patrimonio archeologico e culturale...”¹⁹ Likewise the code of ethics of the Confederazione Italiana Archeologi (Italian Confederation of Archaeologists—CIA) requires that the society’s members be ever mindful of the protection and conservation of the Italian archaeological heritage.²⁰

It is a truism in archaeology that all excavation is destruction; remains long-buried have achieved a level of equilibrium with their surrounding matrix to such an extent that decay mechanisms have been effectively arrested, and their subsequent re-exposure to the atmospheric and environmental elements that promote their deterioration can be disastrous if the excavator does not work to minimize this “environmental shock.”²¹ Interventions begun at the moment of excavation have the highest probability of success, provided they are based on sound scientific principles and experience and undertaken with the appropriate skills and personnel.²² It is crucial to recognize that the moment a

¹⁸ Archaeological Institute of America. “Code of Professional Standards.” <http://www.archaeological.org/news/advocacy/132> (Accessed March 13, 2013).

¹⁹ Associazione Nazionale Archeologi. “Codice Deontologico.”, Art. 1.2, <http://www.archeologi.org/web/news.asp?id=315> (Accessed March 13, 2013).

²⁰ Confederazione italiana archeologi. “Codice Deontologico.” http://www.archeologi-italiani.it/index.php?option=com_content&view=article&id=46&Itemid=233&lang=en (Accessed March 13, 2013).

²¹ Stanley Price 1984, 5.

²² Some inappropriate intervention criteria are untrained staff, outdated methodologies, incompatible materials, and undocumented reconstructions. Reconstructions, usually meant to protect a site or return it to some notion of its “original” condition, or even to render it more understandable to the visitor, are often irreversible as well as being historically and archaeologically incorrect. (Palumbo 2000, 8-10)

structure or artifact is uncovered, the achieved equilibrium is destroyed and the processes of decay are reactivated and irreversible; the goal of the conservator is to approximate the level of equilibrium and slow down the inevitable slope of deterioration. The lack of a proper conservation plan puts the entire project on a “catching-up” footing, always several steps behind the forces acting on the exposed remains and never actually catching up at all.

In May of 2011, Francesco Giro, then Undersecretary for Cultural Heritage, announced plans to release twelve million euros to Ostia Antica for the completion of three conservation projects, one of which was an intervention at the Palazzo Imperiale for site stabilization and conservation.²³ As of this date, the funds have not materialized. At this time, there is no conservation plan in place for the Palazzo Imperiale; the current excavation project at the site, directed by Dr. Joanne Spurza, is spearheading the effort to put together, in collaboration with the Soprintendenza, a viable conservation plan to preserve and enhance the Palazzo and to better incorporate the site into the touristic experience at Ostia Antica. The 1986-87 Soprintendenza excavations at the site, under the direction of Alfredo Marinucci, erected the sheltering structure over the caldarium to protect it and the Victorious Charioteers mosaic atop the hypocaust, but no further action was taken to conserve the site, and no plan was proposed or generated as a result of those excavations.

²³ The remaining money was earmarked for work on the theater and Piazzale delle Corporazioni, and restoration on the western end of the Decumanus. *la Repubblica* “Dal teatro alla schola di Traiano via al restyling di Ostia Antica.” May 14, 2011. <http://ricerca.repubblica.it/repubblica/archivio/repubblica/2011/05/14/dal-teatro-alla-schola-di-traiano-via.html> (Accessed April 1, 2013).

Creating the Plan

There is almost as much work to be done prior to implementing the Plan²⁴ as there is once it has been put into effect; these early phases are crucial to its overall success, providing it with a sound foundation, allowing for flexibility in implementation, and ensuring that its scope is comprehensive enough to handle any and all contingencies once they (inevitably) arise. Conservation intervention in any site is a complex process involving numerous stakeholders who may not always share the same interests and agree on the same approaches; reconciling these various points of view without a sound structure in which each concerned party has its own place to voice its concerns can lead to an anarchic decision-making process.²⁵ Putting as much work into the front-end of the Plan as into the practical implementation of the conservation work itself will pay dividends at each stage as the solid administrative framework functions to keep the Plan on track and guide each successive phase of the project. Skimping at the outset will lead to functional breakdown at every turn, rendering the Plan at best unwieldy and at worst irrelevant.

*The Plan as a multi-phase construct*²⁶

Every plan, no matter how simple, will involve multiple phases. Planning a dinner party involves the guest list phase, the menu phase, the purchasing of foodstuffs phase, the cleaning and table-setting phase, the cooking phase, and so on. It is up to each planner to decide how narrow or broad each phase will be; the narrower each phase, the more

²⁴ For the sake of convenience, the term “Plan” (capitalized) will be employed as an umbrella term for the combination of the conservation, management, and marketing plans.

²⁵ Warnotte, et al 2008, 368.

²⁶ The plan as presented here is a synthesis of the values-based approach (Demas 2000, 27-54) and the APPEAR method (Warnotte et al 2008, 367-374).

precise it will be, but the number of phases will multiply. Broader phases result in what can appear to be a more compact plan, but make them too broad and the phase can prove unwieldy. The conservation plan for the Palazzo Imperiale will involve five phases, each one narrow enough to maintain its focus and keep manageable, but broad enough to represent a significant portion of the overall Plan.

Phases one through three: the planning process

The planning process lays the foundation for the entire Plan, providing a tool for making logical decisions, sorting through complex issues, setting priorities, explaining and justifying decisions, and ensuring that the results of decisions are sustainable. It will enable the stakeholders to formulate a shared vision for the site and render all decision-making transparent, essential for avoiding, or if necessary negotiating, any conflicts that may arise.²⁷ Each phase of the Plan is subdivided into three stages:

1. Planning: the planning stage will identify all the players necessary for the successful completion of the phase (each phase will no doubt involve a rolling cast of players, with overlapping and one-off participants). This is also the stage for setting up a structure for the decision-making process.
2. Action: the action stage sees the implementation of tasks required to make informed decisions regarding the ultimate goal of the phase.
3. Review: players will assess the results achieved in the first two stages in order to produce the most relevant decisions during each phase of the project.

²⁷ Demas 2000, 28.

Phase one: identification and description—collecting information

The first phase is defined by the collecting of information regarding the site, and identifying not only the stakeholders, but also a core planning team. Stakeholders can vary from site to site, but generally consist of government agencies, archaeologists who have worked on the site, the local community (including private tourist agencies), and the local site administration. In the case of the Palazzo Imperiale, we can identify the following stakeholders: 1) Soprintendenza Speciale per i Beni Archeologici di Roma; 2) Angelo Pellegrino, director of Ostia Antica; 3) Paola Germoni, director of archives at Ostia Antica; 4) Joanne Spurza, archaeologist and specialist on the Palazzo Imperiale; 5) Alfredo Marinucci, archaeologist, who conducted the 1986-1987 excavations at the Palazzo; 6) Chiara Belfiore, director of restorations at Ostia Antica. Input from the local community, as stakeholders in the economic benefits of tourism, will be solicited as well, but a project such as this one, focusing on one building out of the entire Ostia site, may be too small to merit the attention of the citizenry. It will be advisable to assess the economic impact of tourism to the park on local business; an assumption could be made that since the pedestrian route from the train station to the excavations bypasses the modern town entirely, day-tripper tourist euros might bypass the town as well. But as one of the benefits than accrue to any enhancement to the park is (it is hoped) an increase in tourism, local and Rome-based tourist agencies should be included as stakeholders in any intervention project.

The next step in phase one is the description and documentation of the site. The description process includes defining the boundaries of the Palazzo and identifying and naming its specific components. This is also the time to research and collate the known

history of excavation and interventions at the site, including the current state of research. The human resources of Alfredo Marinucci, who conducted the 1986-87 excavations at the Palazzo, Joanne Spurza, who has been studying and excavating at the site since the 1990's, and Paola Germoni, director of archives for the whole of Ostia will be able to tap into most, if not all, of the existing documentation on the Palazzo. Gathering this information into one place will inform the stakeholders of what is known about the Palazzo, and what needs to be understood; these results will inform the assessment portion of phase two.²⁸

Phase two: assessment and analysis—taking stock

The second phase of the planning process is larger in scope than phase one, and encompasses a broad range of subjective and objective information that will clarify the decision making process in phase three. Phase two can be broken down into three parts: assertion of the significance of the site; assessment of the physical condition of the site; analysis of the management constraints and opportunities of the site.

Assessing the significance of the Palazzo, that is, the value that motivates not only labeling it as part of cultural heritage but also the incentive to conserve it, is a subjective process that will vary from member to member of the planning team. Mason and Avrami offer seven categories of values in conservation for consideration in assessing significance: historic and artistic value; social and civic value; spiritual or religious value; symbolic or identity value; research value; natural value; economic value.²⁹ Not all of these values will accrue to every site, but together they provide a broad base and range of

²⁸ Demas 2000, 33

²⁹ Mason and Avrami 2000, 16-17.

qualities while providing a concise set of criteria for evaluation. Combined, these values will provide an answer to the question “Why and to whom is this site important?”³⁰ To supplement the assessment of value is the contextualization of the site locally and regionally: is this site unique or rare? Is it representative of a particular period? Is there high research potential?³¹ At the outset we can identify three values from the list of seven that apply to the Palazzo: historic/artistic value; research value; economic value. Other stakeholders will no doubt identify other values beyond these three, and most likely beyond the list of seven mentioned above. These combined valuations when applied to the Palazzo Imperiale will provide the project with a sound rationale for its preservation and management while forming the core of the shared vision.

The next step in phase two will be assessing the physical condition of the site, called the condition survey; an objective recording of the Palazzo’s current state that at the outset documents only effects, and not the causes of deterioration. Once the proper documentation has been completed, a diagnosis of the probable causes of deterioration will be created, identifying such threats as vegetation, erosion, flooding, animal burrowing, visitation, lack of maintenance, looting, inappropriate past interventions and vandalism. Nearly all of these problems accrue to the Palazzo Imperiale, with the exceptions of looting and vandalism; the site was fairly well picked clean of artifacts during the nineteenth-century Visconti excavations, and the site is too remote to be of interest to vandals.

³⁰ Demas 2000, 34.

³¹ Demas 2000, 38.

A basic understanding of the mechanics involved in the various forces and cycles which are destroying the Palazzo is necessary to devising strategies to combat them; scientific research into new and better means of conservation methods is essential to formulating long-term responses to ongoing problems. After examining and analyzing each type of physical deterioration and environmental affect, research into these new methods occurs in three phases. First is the identification of the problem; next the problem is analyzed and theoretical solutions devised; the final step is the translation of theory into a practical technique and its subsequent testing by conservators.³²

The ongoing scientific research into improved conservation techniques often means that accepted methods already in use in the field may be supplanted by newer methods and sometimes materials. For this reason certain core principles must be adhered to whenever instituting any conservation project: reversibility, use of compatible materials, clear identification of new materials, and minimum intervention. Adhering to these basic guidelines will ensure that new and better methods may be more easily substituted for prior, less effective methods. It is also critical to note the preservation techniques often fail due to the incompatibility of old and new materials; differences in strengths, coefficients of expansion, porosities, and durability, as well as inexpert mixing and application of new materials, can worsen the deterioration of what was intended to be preserved.³³

At this point the project will issue a feasibility study that determines the viability of intervention at the site and analyzes all of the tangible and intangible issues relating to

³² Ward 1986, 32.

³³ Stubbs 1986, 82.

the intervention. The analysis will take into consideration how the project is perceived by the disparate stakeholders and detail their expectations for the project; outline appropriate intervention solutions that answer the needs of the site and satisfy all parties involved; establish the foreseeable impacts of the intervention; and define the boundaries or constraints on all those involved, i.e., specify the exact conditions for carrying out the project as they relate to each field of expertise. The feasibility study will be supplemented by full and accurate reports from each field of expertise relevant to the project: archaeologists, conservators, architects, structural engineers, etc.

The feasibility study and its supplements will be used to assess the positive and negative aspects of the planned intervention, and to define the fundamental options available to the project team for the creation of the intervention program. It is at this stage that the team members will compare their analyses in order to find common priorities and to outline the guiding principles for the project that will inform the remainder of the Plan.

The final component of phase two is assessing the constraints and opportunities that may affect the preservation and protection of the site; this is the SWOT analysis: identifying strengths, weaknesses, opportunities, and threats. Demas identifies ten points for consideration:

1. Legal and legislative concerns. Is there sufficient legal protection for the site? Are there any pending legal constraints such as land-use or zoning legislation?
2. Financial base: what will be the source of funding for the project?

3. Power base: who holds the decision-making power at the local, regional and national levels? How can this base best be leveraged to the advantage of the project?
4. Infrastructure, capital development and improvements: visitor amenities, roads, parking, etc. What is the current state of the infrastructure, and can it meet future needs?
5. Regional and local development context: are there any plans that may impact the site?
6. Visitor numbers, profiles and impact.
7. Structure of the organization: is the management organization adequate to meet current and future needs?
8. Staff resources and expertise: does the management organization have sufficient staff with the appropriate experience?
9. What is the state of the monitoring and maintenance systems?
10. Research assessment: what are the research needs of the site? Are there significant gaps in knowledge?³⁴

Phase two will close with the creation of a report describing the options chosen in each field of expertise for the creation of the project design; a description of criteria for the selection of people to work on the project design; and an estimate of the resources required to carry out the project as well as the future management of the site.

The tri-partite nature of phase two ensures that all relevant information, objective and subjective, will be documented and evaluated; all phase two materials must be

³⁴ Demas 2000, 41-42.

collated and made accessible to all stakeholders so that all parties are able to enter into the phase three decision-making process with a clear understanding of the needs and scope of the project. At the end of phase two, all stakeholders will have sufficient general and contextual information to allow an initial estimate of the importance of the site; an appraisal of any gaps in knowledge of the site; and some initial ideas for intervention.

Phase three: Response—making decisions and the project design

In phase three, the project team will establish policies regarding intervention, visitation and interpretation, research and excavation, and maintenance and monitoring, as well developing strategies for translating those policies into actions. It is essential that the policies define clear targets with measureable results in order to provide a quantifiable yardstick of progress on the site. Each objective must be accompanied by an estimation of resources required, a delegation of responsibilities and the composition of a time frame for its completion.³⁵ One of the functions of phase three is the setting of limits within each policy; for example, any expressed policy of intervention must establish clearly defined limits that govern all conservative interventions at the site. Setting forth a policy on excavation must set limits on the nature and extent of the excavation, as well as providing for the protection of unexcavated resources and the integration of conservation during and after the excavation; policies on visitation must outline any limits on the numbers of visitors and the areas accessible to them.³⁶

Thus the goal of phase three is the creation of the project design; that is, how the options chosen by the various team players will be transformed into a workable final

³⁵ Demas 2000, 46.

³⁶ Demas 2000, 45.

plan. It will be necessary for each field of expertise to refine their proposed solutions so that when combined they form a coherent and flexible plan rather than an unwieldy amalgam of over-weighted intervention projects disassociated from the whole. At the end of phase three, the project team will possess a detailed action plan for each field of expertise; a list of criteria for the selection of staff to work on the final project; as well as budgets, a description of the financial set-up of the project, and a workable and realistic timetable for the completion of the Plan.

The successful completion of the first three phases of the Plan will result in a strong theoretical and practical foundation for the remaining phases; these front-end preparations are crucial for establishing *the raison d'être* for the Plan as a whole and provide it with the ethical guidelines under which it will proceed.

Phases four and five: execution and operation

The next two phases of the Plan represent the practical, boots-on-ground portion of the intervention; phase four details the execution of the project design, and phase five the long-term management of the site. These two phases are the core of the intervention project, and the successful completion of the previous three phases will go a long way toward enabling the smooth functioning of both. But since all interventions take place in the real world, and not in the pages of a project design, there is of course no such thing as a worry-free, snag-free, imminent-disaster-free project; the planning process can only go so far when up against the reality of two thousand years of ruin, decay, and destruction. But phases one through three will give the project team a good sense of being “eyes-wide-open” to the condition of the site, the variables involved in the proposed

intervention, the capabilities of their fellow team members, and the scope of the intervention project as a whole. Forewarned is forearmed may be a cliché, but it nevertheless holds true as a principle in conservation.

Phase four: execution

Phase four can be summarized quickly and concisely in four points: 1) hire staff; 2) create a general execution plan to steer workers; 3) implement the general execution plan; 4) monitor the work regularly to assess quality of results against the set of objectives. The unpacking of this concise summary will be the topic of chapter three, “Conservation of the Palazzo Imperiale,” and will deal with the specific subject of conservation of the Palazzo. At the end of phase four, the results are a completed site intervention; a file of all the documents relating to all phases of the intervention; and action plans and evaluation procedures from each field of expertise for the development of a management plan.

Phase five: operations and management

As with phase four, phase five can be summarized quickly for unpacking in chapter five, Management, Interpretation and Presentation. The finished site is opened to the public; the interaction between the public and the site is monitored; interpretive installations are evaluated and any necessary adjustments made; the management plan is assessed at regular intervals to ensure it performs as required in facilitating the conservation of the site, scientific research at or regarding the site, and access to visitors.

The challenges facing the creation of a conservation plan for the Palazzo Imperiale are by no means extraordinary; what appear at the outset to be the most

complex issues, the restoration of the Victorious Charioteers mosaic and the replacement of the sheltering structure above it, fall well within the parameters of standard conservation projects. Perhaps the greatest challenge facing the conservation of the Palazzo is motivating visitors to Ostia to make the hike to its remote location; innovative and compelling interpretive facilities installed at the Palazzo, should they prove successful in attracting foot traffic to the site, could be used as a model for enhancing other sites within Ostia, making the Palazzo a conservation laboratory for the Soprintendenza.

Documentation

There is no more critical step in a conservation project than documentation; the proper recording of an intervention allows future archaeologists, scholars, and historians to know what was done to a site, why and when it was done, and by whom.³⁷ Good documentation provides a precise record of the intervention process and details the reasoning behind every step taken. The completed records, compiled before, during, and after the intervention project, will provide a baseline for monitoring further decay of the site, and can be accessed by those working on the next intervention. The availability of updated information allows for the identification of emergency situations and budgeting for necessary conservation interventions. A successful program of monitoring is key in assessing where risks to the site exist, what is causing these threats, if visible problems of decay are active, the speed of decay and how urgent is the need to intervene; these questions can be answered by comparing the present situation with records produced in

³⁷ Letellier et al 2007, xiii.

the past.³⁸ Active threats to the Palazzo include the aggressive intrusion of vegetation and soluble salts in the soil; the damage caused by these elements will no doubt confront every intervention at the Palazzo. The accurate documentation of present work is essential in assuring the continuing existence of the site; as always, the past informs the future.

The responsibility for recording information regarding the intervention falls on every member of the team; a proper conservation project is a multidisciplinary venture, and as such there is no distinction between information providers and information users.³⁹ The process of recording, documentation, and managing of the information gathered from disparate sources must be designed to accommodate a wide variety of data in format and content. The types of reports created during a typical condition survey may include measured drawings and photographs, thematic maps, condition reports, topographical reports, historical and archaeological surveys, and analyses of samples; later in the process the information system may need to include 3D modeling, PowerPoint presentations, videos, dedicated web sites, presentation boards, and so on. An effective system must be able to incorporate these various formats and maintain accessibility to all those involved in the project; effective conservation decision-making requires full access to pertinent documentation, updated continuously, at each stage of the process.⁴⁰

While we may think of the process of documentation as an objective process of information gathering, we should bear in mind that there is the subjective element of interpretation bound up into it as well; the decision as to what and how to document the

³⁸ Letellier et al 2007, 14.

³⁹ Letellier et al 2007, 17.

⁴⁰ Letellier et al 2007, 27

site is already an interpretation of the findings.⁴¹ The first step in proper documentation takes place in phase one of the conservation Plan, collecting information. The project team must determine the current state of existing site information: what graphic records are known to exist? Are the records gathered together in one place and accessible? What is known about the reliability of these records? Understanding the past history of the site allows the team to better interpret the current state of the site, how it differs now from what was documented earlier, the age of past interventions, how they were carried out and what their composition is, what threats are endemic to the site, and how the site was interpreted by those in the past. Once again, the past serves to inform the future.

The physical documentation of the site proceeds in three levels: reconnaissance recording, preliminary recording, and detailed recording. As suggested by their names, each level of recording increases in detail and accuracy, as well as in time necessary for completion. These levels can be outlined as follows:

1. Reconnaissance recording: overview photographic survey and sketched plans in sufficient detail to understand the characteristics of the site; should permit quick identification of features and problems.
2. Preliminary recording: more accurate than reconnaissance recording, includes measured graphic records and provided more complete information about the site; defines any areas for further investigation. Level of accuracy = $\pm 10\text{cm}$ for plans, elevation and cross-sections; $\pm 2\text{cm}$ for structural and other elements. For the past four excavations seasons at the Palazzo, a basic surveying level has been used to record elevations; the recent purchase of a

⁴¹ Kinzel 2008, 91.

new total station will enable the project to record a wider and more accurate range of measurements.

3. Detailed recording: most accurate level of recording possible; may take place before, during, or after the intervention to accurately record the site's physical characteristics. Level of accuracy = $\pm 2\text{-}5\text{mm}$ for building elements; $\pm 10\text{-}25\text{mm}$ for building plans, elevations, and cross sections.⁴²

When documenting the conservation site, at whatever level, each record is identified by the name of the site or building, a unique reference number for the feature being recorded, the date of the record compilation, the name of the recorder, and cross references to related site/feature records and reports, along with any graphic or photographic documentation. It is also desirable to create a "unique location address" for the overall site; the project manager can use GPS to create an address using the geographic coordinates of the site as an identifier.⁴³ In the case of the Palazzo Imperiale, the GPS coordinates are 41.75376 12.28162; the use of decimal degrees in the address eliminates the need for any words or symbols in the identifier. A GPS identifier has not as yet been adopted by the Palazzo project but given its usefulness and specificity there is no compelling reason not to make use of it.

Apart from specialists working within their respective fields of expertise, the skill set necessary for the worker on the ground are relatively modest, and once proficiency is gained in the more basic skills, acquiring those more advanced should be a relatively smooth process. Familiarity with basic programs such as imaging software, CAD,

⁴² Letellier et al 2007, 37-38.

⁴³ Letellier 2007, 51.

databases, and communications software should be an entry-level standard. Mid-level programs include image rectification, scaling, and creating mosaics of CAD overlays, distance meters, and GPS; at the highest level are applications such as GIS, totalstation, and 3D laser scanning. At least some team members should be able to troubleshoot software problems in the lab and in the field, and it is essential that there be a webmaster able to work in both HTML (hypertext markup language) and XML (extensive markup language) in order for the project to share its results on the web.⁴⁴ More experienced conservation team members will want to help those less experienced in developing not only technological proficiency, but also in learning to develop standards, guidelines, and procedures in archaeological and conservation work.

The digitizing of all site documentation enables the managing of large quantities of text and images in a flexible manner that allows for the integration of disparate formats and ease of cross referencing, but digital information must be updated periodically, which requires an financial commitment to maintaining the documentation in an accessible format. Advances in hardware and software can render documentation unusable should its storage format no longer be accessible. Records placed on eight-inch floppy disks, magnetic tape, and other obsolete storage media that have not been migrated to newer media are probably lost forever; it is always a matter of when, not if, such media are superseded. In order to maintain access to project records, documentation must be migrated to new storage standards in a regular fashion.

⁴⁴ Letellier et al 2007, 39.

Chapter Three: Conservation of the Palazzo Imperiale

A conservation plan at the Palazzo Imperiale must of necessity address the multiple threats to the stability, integrity and survival of the site. Invasive vegetation, soluble salts, ground water, flooding, inappropriate past interventions, lack of monitoring and maintenance, and visitor damage are each contributing to the further deterioration of the structure and rendering its conservation more expensive and more difficult. It is difficult to single out which of these threats is the most serious; vegetative intrusion is the most obvious and most noticeable threat to the structure, but more invisible threats are weakening and in some cases dissolving the site as well. Animals have dug burrows through the Victorious Charioteers mosaic in the caldarium; colonies of microscopic plant and animal life encrust surfaces; freeze-thaw and wetting/drying cycles destroy masonry from the inside out, and on and on and on. The threats are aggressive, and countermeasures must be aggressive as well if they are to achieve any level of success.

Creative Preservation

Viewing the Palazzo Imperiale today, we see what are of course ruins, which Stubbs concisely defines as “structures in advanced state of deterioration.”⁴⁵ At its most basic level, archaeological activity is aimed at establishing the “scientific image” of the site, a reduction of its reality to tangible facts based on material proof; but the reality is that an archaeological site is a hybrid of its actual material remains, the natural environment in which it exists, its history, its significance and its ambiance.⁴⁶ There are different approaches that can be taken to the preservation of the Palazzo; one philosophy

⁴⁵ Stubbs 1986, 79.

⁴⁶ Morin 1999, 194.

would advocate simply arresting the process of decay at the present time, structurally consolidating and weatherproofing the structure in its “as found” state.⁴⁷ This is, of course, the core aim of archaeology. “But the question may be raised, is it enough to save the site? Now that the patient’s life is assured and he can even walk and eat, wouldn’t we also want him to speak and smile?”⁴⁸ What Morin is advancing is an idea of authenticity not merely in design, materials, workmanship, and setting, but an authenticity of spirit arising not from a past reality but from a site’s present state. This is what he terms “creative preservation,” an approach that respects and understands the scientific archaeological knowledge, but also aims at “communicating with the past and with the public in a direct way...avoiding banal packaging in the form of easily digestible cultural products.”⁴⁹ Authenticity of a site in both material form and spirit (as opposed to reconstructions or restorations) makes a difference in how it is perceived by not only the public but by those working there, because it connects two greatly different times by participating in both.⁵⁰ The reality of the Palazzo today is vastly different from its past reality, not merely because of its ruinous state. Today the site sits by itself by the Tiber, separated from and invisible to the urban center of ancient Ostia. In its original context, it was surrounded by warehouses, shops, *insulae*, baths and every other type of building that existed in the city; it was one crowded in among many. That reality is gone forever, and a successful intervention will acknowledge in its interpretation and presentation both past and present realities. The truth is that there will never be an objective presentation of

⁴⁷ Stubbs 1986, 80.

⁴⁸ Morin 1999, 194.

⁴⁹ Morin 1999, 195.

⁵⁰ Lipe 2002, 21.

a site; presentation will always be based on interpretive choices and the need to tell a story, or stories.⁵¹

Condition Survey

There are four basic aims of the condition survey of a site: 1) to understand the condition of a structure at a given point in time; 2) to monitor the structure's condition over a period of time by review and analysis of past and present survey data; 3) to review the success of past interventions; 4) to determine the most cost-effective methods of conservation over the medium- and long-term.⁵² To be effective, the condition survey must be as comprehensive an assessment of condition and the scope of the necessary intervention as possible in order to reduce unknown or unanticipated future failures and expenditures; minimum intervention is generally the best policy where possible, but that policy must be tempered with sound practical experience and not guided solely by idealistic principle.⁵³

The most thorough condition survey is a multidisciplinary exercise that begins with what Ashurst calls "structural archaeology:" an informed, non-intrusive visual examination of a structure that allows its building history to be deduced; the ideal survey involves an architect, surveyor, engineer, archaeologist, historian, and materials scientist.⁵⁴ Features to be looked for in structural archaeology are inserted openings; shadow lines indicative of the removal or decay of a feature; surface cavities such as

⁵¹ Sivan 1997, 53.

⁵² Abrey 2007, 46.

⁵³ Abrey 2007, 52.

⁵⁴ Ashurst and Burns 2007, 89.

putlog holes or lost fixings; changes in wall thickness, construction type, and materials.⁵⁵

Several of these features are present at the Palazzo Imperiale: putlog holes, for example, in the east wall of room 89; they will be integrated into the condition survey. The results of the condition survey are a comprehensive assessment of the current state of the entire site, noting only the effects of deterioration, and not the causes. Once the condition survey is completed, a diagnosis of the causes can be assembled.

The multidisciplinary project team

Historically, the archaeologist has been the sole authority on-site; he might occasionally bring in an art historian to comment on a wall painting or mosaic, or a pottery expert for some typology, but the idea of a multidisciplinary approach to the research, excavating, and understanding of a site or structure was a foreign one.

Conservation, when considered at all, was an end-of-excavation backfilling; a hurried job considered no more than grunt work. In Pompeii and Herculaneum, for instance, so far off the radar was conservation that archaeologists have for years⁵⁶ complained about the shortcomings of the Italian authorities and their neglect of the remains, even though it was those same archaeologists who had come along and uncovered them, exposing the remains to decay in the first place.⁵⁷ But the Herculaneum Conservation Project at that site encourages a multidisciplinary approach to excavation and conservation, improving the decision-making process by collaboration in the definition of priorities.⁵⁸

⁵⁵ Ashurst and Burns 2007, 89.

⁵⁶ At least since Johann Wincklemann in 1762.

⁵⁷ Ashurst and Burns 2007, 89.

⁵⁸ Pesaresi and Castaldi 2007, 219.

Case Study: The Herculaneum Conservation Project

The Herculaneum Conservation Project was established in 2001 as a joint collaboration between the Packard Humanities Institute and the Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei, with support from the British School at Rome. Between the 1970's and the 1990's, the on-going maintenance at Herculaneum by the Soprintendenza had nearly come to a halt owing to changes in public administration, both locally and nationally, with funding generally allocated for large, one-off projects and less available for regular maintenance.⁵⁹ Between 2001 and 2004, the Project assembled a team of mainly Italian consultants to carry out a series of studies, surveys, and trials, focusing on one urban block, the Insula Orientalis I, as a case study to develop conservation criteria and methodologies. The Project adopted the approach of "learning by doing," so that the specific problems of the site would spur the decision-making process, seeking to avoid making predetermined decisions out of context.⁶⁰

The next job of the Project was to carry out needed emergency conservation efforts over the site as a whole; following that "...the Herculaneum Conservation Project team are working to structure the site-wide campaign better, focusing not only on high risk situations, but also on creating a system of continuous care that brings together emergency works, on-going maintenance, and medium- and long-term works on infrastructure, structures and decorative features."⁶¹

⁵⁹ The Herculaneum Conservation Project. "Objectives: Sustainability." <http://www.herculaneum.org/hcp-home/eng/sostenibilita.html> (Accessed January 4, 2013).

⁶⁰ The Herculaneum Conservation Project. "Site Activities: Insula Orientalis I," <http://www.herculaneum.org/hcp-home/eng/orientalis.html> (Accesses January 4, 2013).

⁶¹ The Herculaneum Conservation Project. "Site Activities," <http://www.herculaneum.org/hcp-home/eng/attivitassito.html> (Accessed January 5, 2013).

A multidisciplinary approach means that on-site issues are dealt with by a core team: the archaeologist in conjunction with a conservation architect and a conservator-restorer; when necessary, additional specialists, such as structural engineers, geologists, chemists, and hydrology experts may be called in as well. The team format overcomes the tendency of restorers to focus solely on surfaces; of the archaeologist to discriminate against features of less historical importance; and of architects and engineers to narrow in on structures, roofing, and reintegration.⁶²

As a rule, the archaeologist possesses the most intimate knowledge of a site, and can identify specific features for conservation that are essential for reading a structure properly, such as blocked windows or joist and scaffolding holes. But a conservator-restorer, working closely on a surface, can be aware of construction details that might otherwise be overlooked; the challenges raised by an architect in replacing a timber lintel can help the archaeologist improve his analysis of Roman construction techniques.⁶³ An incident at Herculaneum illustrates this point. One of the structural engineers asked for a small test trench to be dug to check the depth of the foundation of the House of the Telephus Relief, prior to the construction of a protective roof. The new trench revealed the existence of another level that had been deliberately infilled by the Romans in the mid-first century CE; thus a structural evaluation provided new and important archaeological information.⁶⁴

⁶² Pesaresi and Castaldi 2007, 219.

⁶³ Camardo 2007, 209.

⁶⁴ Camardo 2007, 210.

Threats to the Palazzo Imperiale: Vegetation

Anyone who has visited the Palazzo Imperiale knows that out-of-control vegetation growth is a major concern at the site. Many areas of the building have been made almost inaccessible in the past by dense foliage growing near and in many places on the walls. Invasive roots are rendering the mortar in the walls friable, weakening the bonds between mortar and brick and leading to brick loss and eventual lacunae of various sizes. In some places vegetative growth has separated the protective cement cap from the wall below, allowing ingress to the core of the wall for rainwater, creating further deterioration of the wall from the inside out. Tree trunks as large as twenty centimeters thick grow at the base of walls, undermining the foundations and crushing brick as they press relentlessly against the exterior of the wall.

The control of the vegetation can only be managed in two ways: physical removal by pruning back, and treatment with herbicides. The current regime by the groundskeepers at Ostia employ both methods; growth is pruned back to the walls, but the roots are left intact as their unsupervised removal can lead to even greater deterioration of both wall and mortar. The policy at Ostia is that archaeologists make all final decisions regarding vegetation, and especially root removal. Groundskeepers at Ostia submit oral reports on any vegetative damage they may come across, but expressly do not intervene themselves. A major vegetative control plan for the entirety of Ostia was created in 2010, but as yet no funding has been allocated. This is a step forward, since between the 1940s and the 1990s, there was no vegetation control plan at Ostia at all.⁶⁵ This hands-off policy by the groundskeepers is a sound one since, in some extreme cases,

⁶⁵ Personal communication to author from groundskeeper Roberto Crivellaro, 2012.

it is the roots themselves that are holding the masonry in place, and a careful methodology must be instituted for their removal and the reconsolidation of the defective matrix. The favored herbicide at Ostia is glyphosate,⁶⁶ which is applied to leaves and is absorbed into the plant's sap stream killing the leaves, shoots and roots of the plant. Glyphosate has been generally considered to be non-toxic to humans and animals, but recent studies suggest that this may not be the case.⁶⁷ An initial treatment with residual herbicides such as terbuthylazine and oxadiazion, which stay active in the soil for longer periods and inhibit seed germination, with a follow-up of a glyphosate, would prove to be more effective.⁶⁸ Care with the use of glyphosate-based herbicides must be especially diligent at the Palazzo given the proximity of the Tiber River to the site. The large-scale use of herbicides stronger than glyphosate is restricted by the Soprintendenza due to environmental concerns as the site is part of the Riserva del Littorale Romano (Preserve of the Roman Coast), a nature preserve. The *riserva* was created in 1996 by the Ministero dell'Ambiente, and encompasses an area of 15,900 hectares; the preserve is not a contiguous whole, but rather a patchwork of protected areas along the Mediterranean coast, and reaching as far as 10km inland (see Figure 16). The park was established to protect not only plant- and wildlife, but also for "...the protection and enhancement of historic, archaeological, monumental and cultural heritage..." and "...the protection of landscape values..."⁶⁹ The preserve employs a two-tier system, as indicated on the Figure 16 map in light green (minor protection) and dark green (major protection).

⁶⁶ The active ingredient in Monsanto's Roundup brand.

⁶⁷ Scientific American. "Weed-whacking Herbicide Proves Deadly to Human Cells." <http://www.scientificamerican.com/article.cfm?id=weed-whacking-herbicide-p> (Accessed January 12, 2013).

⁶⁸ Pisa et al, 2008, 278.

⁶⁹ Lega Italiana Protezione Uccelli. "Riserva del Litorale Romano: il decreto," www.lipuostia.it/riserva/decreto.htm (Accessed March 15, 2013).

Areas of major protection are defined by the decree as those with great naturalistic, landscape, and cultural heritage characteristics; areas of low protection are generally agricultural lands and those places with higher human populations.⁷⁰ As seen on the map, both Ostia and Portus are located in an area of major protection, which provides all of the safeguards accorded to those sites in the light green areas, such as protected wildlife, plant life, restrictions on billboard placement, and most importantly the prohibiting of damage to archaeological sites, but also enjoy the further benefit of a prohibition on any further urbanization within the designated zone.⁷¹



Figure 16: Map of Riserva del Litorale Romano. Ostia is number 16, and Portus number 12. Image courtesy of www.lipuostia.it.

What is not desirable in any vegetation control scheme at the Palazzo is the wholesale annihilation of all plant life in the area. The removal of vegetation in proximity to and contact with the remains is a priority due to its present and ongoing threat to the integrity of the structure; the uncontrolled poisoning of the area will have a negative

⁷⁰ Lega Italiana Protection Uccelli. “Riserva del Litorale Romano: il decreto,” www.lipuostia.it/riserva/decreto.htm (Accessed March 15, 2013).

⁷¹ Lega Italiana Protection Uccelli. “Riserva del Litorale Romano: it decreto,” www.lipuostia.it/riserva/decreto.htm (Accessed March 15, 2013).

impact on animal habitation (animal intrusion should be contained and minimized without the unnecessary killing of the animals themselves) and on the nearby hayfields which are harvested for sale to local farmers. Containing the spread of toxic herbicides should be a priority, and facilitating the contamination of the local farm animal population should not be the legacy of the project.

Threats to the Palazzo Imperiale: Salts and Water

The encroachment of vegetation on archaeological remains is visible and obvious, but an equally pernicious threat works out of sight, and by the time its damaging effects become visible, it is almost too late to arrest. The soluble salts present in all soils cause damage that other processes can capitalize on to work their own brand of mischief; the micro-fissures they create provide entry for roots, water, and invasive organisms, as well as weakening both bricks and mortar (see Figure 17).



Figure 17: Multiple destructive forces working on the south wall of room 78. Photo by author.

The decay of porous (hydrophilic) materials is caused by mechanical, physical, chemical, and biological processes; often these processes work in combination, making the identification of the cause of decay difficult—many times a multidisciplinary study is

necessary to pinpoint the cause(s) of the deterioration.⁷² The hydrophilic nature of the building materials at the Palazzo provides pathways from the outer environment to their interior; capillary action draws water, along with dissolved salts, into the pores of the stone, mortar, bricks, and mosaics until these materials become stone-with salts, mortar-with-salts, bricks-with-salts, and mosaics-with salts.⁷³ Often the water and salts will penetrate through to the core of the material, where they cause the most damage. Salts crystallize in the large pores of the material, fed by the water held in capillary pores. When crystals form near the surface of wall, it leaves behind a residue known as efflorescence. Should, however, the salts crystallize in the interior, the result is the much more damaging subefflorescence.⁷⁴ This process of dissolution, crystallization, re-dissolution and re-crystallization results in micro-fissures throughout the material and speeds the processes of deterioration (Figure 17).

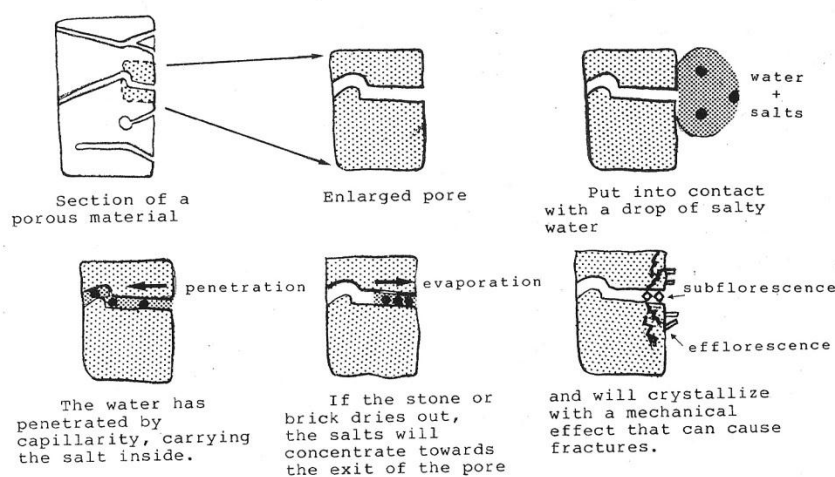


Figure 18: The damaging action of soluble salts on porous materials. Image courtesy of *Conservation on Archaeological Sites: with Particular Reference to the Mediterranean Area*, ICCROM, 1984.

⁷² Torraca 2009, 82.

⁷³ DeGuichen1984, 26.

⁷⁴ Torraca 2009, 85.

Ice crystals form within large pores in the same manner as salt. If the number of large pores is greater than that of capillary pores, the supply of water will be exhausted and the crystals will stop growing before they fill the pore. Should a large number of capillary pores exist, however, the water reserve will be much greater and the growing crystals will fill the pores causing stress damage to the material.⁷⁵

The use of pozzolanic mortar in Roman building renders them particularly susceptible to damage due to the invasion of water through capillary action. The porosity of this mortar is quite high—from 30 to 40 percent—allowing for deep penetration into the materials.⁷⁶ The walls of the Palazzo are typical Roman walls: a composite structure composed of two outer brick layers and an inner fill layer; the fill is generally a mixture of pozzolanic lime mortar, tuff, marble, and brick—what is called *opus caementium*. Core samples of this *opus caementium* taken from the walls of the Domus Tiberiana on the Palatine were subjected to six wetting-drying cycles of one month each to test for dimensional variations. The results showed a change in the length of the cores of 3-4%, indicating a change of 3-4mm per meter; when related to high structural walls, the possible dimensional changes can be “quite impressive.”⁷⁷ Exposed remains undergo numerous cycles of wetting and drying allowing for on-going dimensional change that exert stresses on them that may go unnoticed until a wall reaches critical condition. While most of the walls at the Palazzo are no higher than 2m, some are substantially taller, as in the room 20 *piscina*, and the suite of rooms adjacent to the Mithraeum, rooms 79 to 81. Walls in these areas can reach as high as 4m, and dimensional changes in the 3-4% range

⁷⁵ Torraca 2009, 84.

⁷⁶ Giavarini and Santarelli 2001, 214.

⁷⁷ Giavarinni and Santarelli 2001, 218.

means these walls are vulnerable to the dimensional changes and high stresses associated with freeze/thaw and wetting/drying cycles.

Threats to the Palazzo Imperiale: Voids in wall core

The deleterious effects of water intrusion on masonry walls cannot be overstressed; a thorough analysis of each wall at the Palazzo is necessary to detect, document and remedy both the exterior and interior damage caused by this ubiquitous threat. The number of walls at the site with exposed cores means that extensive damage has already resulted from the outside in and from the inside out (Figure 19). Voids caused by water erosion within the core will only grow given time, leading to the ultimate failure of the wall; when the binder in the core mortar is dissolved, its ability to resist cycles of wetting-drying, freezing-thawing, and salt crystallization is reduced. As water migrates downward through the wall, it washes out the mortar at the base, causing the wall to lean and become distorted (Figure 20).⁷⁸

⁷⁸ Ashurst and Burns 2007, 312.



Figure 19: Exposed core in pier in room 82. Photo by author.

Voids in the wall core can be detected in several ways. Soundings with a hammer can locate those nearest the surface of the wall; material at the suspect area can be removed exposing the void. To locate deeper voids introduce water into the wall using a hose; this will flush out loose dust and debris, and the water escaping from both faces of the wall will indicate the tracks and voids within the walls. These exit point will now become grout injection points for new, reconsolidating mortar.⁷⁹ The composition and behavior of the new mortar must be similar to that of the original; mortars used to substitute for missing material and to consolidate internal preparatory layers must not create areas of less porosity or greater hardness. Emergency measures to fill voids must support and “accompany” the ancient surfaces, without differing in strength or compactness or offering varying resistance to the migration of salts.⁸⁰

⁷⁹ Ashurst and Burns 2007, 119.

⁸⁰ Pesaresi and Castaldi 2007, 230.



Figure 20: Base of pier in room 85, with substantial loss of brick and mortar at base. Photo by author.

Grout is composed of hydraulic or non-hydraulic limes combined with a pozzolan such as ground fuel ash or ceramic powder, along with a suspension aid such as bentonite. Grouting should be done from the bottom up in a wall and allowed to spread horizontally.⁸¹

The formulating of new mortar for use on ancient walls is not a simple matter, but it is relatively straightforward. The constituents of replacement mortar are: 1) lime putty, made from quicklime and stored in an airtight container or under water for at least six months; 2) a hard, sharp aggregate such as clean and graded sand; 3) a rough and porous aggregate such as broken, graded limestone or brick. The pore structure of this aggregate aids in the carbonization of the mortar and increases its resistance to salt crystallization and freeze-thaw cycles; 4) a pozzolan, either wood-ash or powdered ceramic ground fine. Once the new mortar has been applied, steps must be taken to prevent it from drying too quickly, or it will most likely fail. The original backing mortar should be wetted

⁸¹ Ashurst and Burns 2007, 120.

thoroughly to prevent the suction of moisture from the new. Areas of new mortar should be screened with plastic sheeting to retain humidity, and sprayed to keep damp for seven to ten days.

Threats to the Palazzo Imperiale: Transfer of forces

There is a “critical zone” extending 450-500mm above ground level around the perimeter of an exposed wall where the combined effects of direct rain, seepage, drifting of water down the face, raindrop bounce, wind, and frapping of vegetation all act together to destroy the mortar; this is the zone most critical to the stability of the wall (Figure 21).⁸² If the deterioration of the mortar is allowed to proceed unchecked the wall will begin to lean; a curling action can also occur as the mortar is dissolved from the external faces of the bedding joints.⁸³ Any structure takes all of its weight on its footings; should there be a change in the distribution of foundation forces at ground level, the “toe” pressure of the wall will be the first affected. The loss of mortar in the critical zone

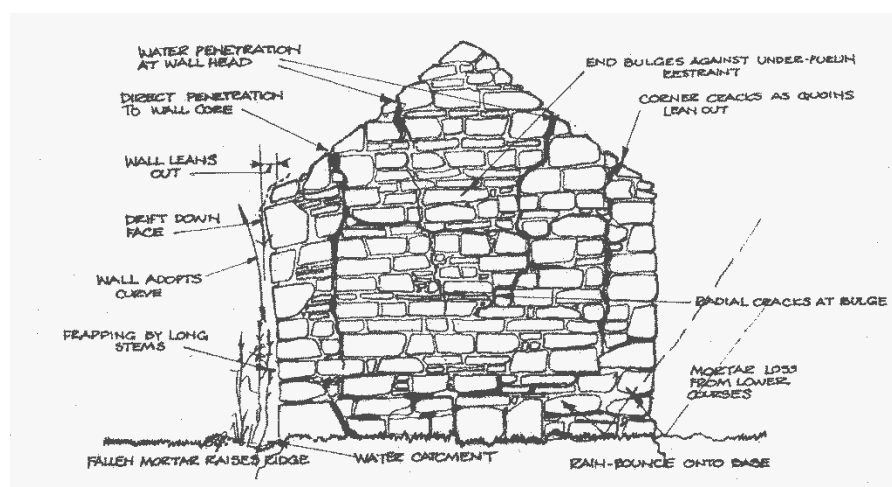


Figure 21: Forces acting on an ancient wall, and their results. Sketch by John Ashurst, *Conservation of Ruins*.

⁸² How 2007, 13.

⁸³ How 2007, 13.

will result in the structural forces of the wall attempting to redistribute the load to compensate by increasing the toe compression, which can cause the forward lean. Excavations, which are frequently taken at the base of walls, can increase this toe compression by weakening the strength of the surrounding soil, causing an acceleration in the deterioration of the wall's stability.⁸⁴

Threats to the Palazzo Imperiale: Inappropriate Interventions

A major concern for conservationists today is the impact of inappropriate interventions from the past; one of the most common of these types of interventions in the use of modern cement in restoration projects. The incompatibility of the ancient and modern materials causes further deterioration to the structure due to its excessive hardness, high soluble salts content, and lower porosity of the modern materials when compared to the ancient materials. Cement is used extensively as wall capping throughout Ostia, and the Palazzo is no exception. During restoration work carried out on the Palazzo in 1964, modern cement was used for wall capping throughout the site; given the variable quality of cement mixtures from batch to batch and worker to worker, there is some discrepancy in the current condition of wall caps, some fairly good, some actively deteriorating (see Figures 21, 12).

⁸⁴ How 2007, 29-30.



Figure 22: Deteriorating cement wall cap from room 73.

Unfortunately, the use of cement as mortar replacement in these interventions is irreversible as any attempt to remove it will cause further damage to the original brick and mortar. At Herculaneum, wall capping is composed of a sacrificial layer of lime mortar made of local lime putty, volcanic sand, and the addition of polypropylene fibers; the fibers increase the strength of the new mortar and slow down the setting process, which can become accelerated in the dry climate. The fibers also identify the mortar as modern.⁸⁵

Conservation of excavated mosaics

Buried mosaics suffer from a wide array of forces that seek to destroy the cohesive elements binding the tesserae together and break down the constituent elements of both the binding material and the tesserae themselves. Ground settlement can cause fractures throughout all bedding layers, especially to those mosaics placed on top of hypocausts; these unfilled voids below the mosaic are prone to collapse, as evidenced in the Victorious Charioteers mosaic in the room 11 *caldarium* of the Palazzo. Soil heaves,

⁸⁵ Pesaresi and Castaldi, 2007, 230.

caused by the upward surge of the water table; frost action (freeze-thaw cycles); soil erosion; and the swelling of subsoils caused by tree removal can all exert excessive stresses on the mosaic matrix. Even stress relief, as in the removal of soil during excavation, can have a negative impact on the cohesion of a mosaic.⁸⁶ The calcium carbonate in the binding mortar can be progressively dissolved by organic acids in the soil; root penetration can create microfissures in the tesserae and destroy successive bedding layers; burrowing animals can break through from either top or bottom, and again, mosaics atop hypocausts are at risk as the voids can form pathways for mammals; invertebrates active in degraded mortar can accelerate its change into a soil matrix.⁸⁷ Human intervention can have disastrous effects on buried mosaics through theft, illicit excavation, plowing, and vandalism; even conservation work can be damaging to mosaics if carried out improperly. The use of impermeable membranes placed in direct contact with a mosaic can trap roots and moisture; trapped invertebrates can decompose, staining the tesserae; insufficient burial cover can lead to the same type of damages that occurred prior to the intervention, namely frost damage, vegetation intrusion, vandalism and exposure by erosion.

As with any buried remains, mosaics reach a level of equilibrium with their surrounding matrix; once the matrix is removed the process of decay begins anew in the presence of water in the form of humidity, condensation, or ground water.⁸⁸ Mosaics also suffer harm from plant growth, micro-organisms, animal intrusion, falling debris, visitor damage and vandalism, and damage from careless excavations. The first intervention on a

⁸⁶ Stewart 2004, 239.

⁸⁷ Stewart 2004, 240.

⁸⁸ Mora 2008, 99.

mosaic must be the safeguarding and protection of the site, particularly the diverting and draining of water; once this has been accomplished, conservation in earnest may begin.⁸⁹

At some point before, during, or after the restoration, the decision must be made whether to leave the mosaic exposed, or to rebury it. There are various reasons why a conservation project might decide to rebury a mosaic, but the general breakdown usually falls around short-, medium-, and long-term reburials. Short-term reburials would occur between excavations seasons, or during the winter when touristic levels are low. Medium-term reburials might occur during conservation planning for the site or mosaic; during periods of fund-raising; or during the construction of a shelter to protect the mosaic. Finally, long-term reburial programs are usually instituted for minor mosaics or mosaics located in remote sites where monitoring and maintenance would be difficult or cost-prohibitive.⁹⁰ Until a proper inventory of the mosaics at the Palazzo is completed, there is no way of knowing if long-term reburial would be appropriate; but as the conservation work at the site will be a multi-year project, short- and medium-term reburial will no doubt be a component of the restoration work.

Reburial considerations, materials, and processes

Before detailing the steps and materials involved in the reburial of mosaics, a brief look at two case studies from Israel involving reburial will illustrate notable failures in the reburial process.

⁸⁹ Mora 2008, 99.

⁹⁰ Stewart 2004, 243.

Case study: Tel Itztaba—Church of the Metropolit Andreas mosaic;

“Martyr Church” mosaic⁹¹

This mosaic was originally excavated in 1991-93, and then reburied with a locally available, non-woven textile placed directly on top of the mosaic, then covered with 10-20cm of local soil. No maintenance or monitoring system was set up, and the mosaic was left unassessed until 2001. At that time the following problems were documented: portions of the mosaic left exposed were lost; some portions of the mosaic that had been covered were lost due to visitors removing the backfill; a large amount of soluble salts had migrated away from the backfill and crystallized on the exposed areas of the mosaic.

A second mosaic at the Tel Itztaba, this one in the “Martyr Church,” was excavated in 1994 and, except for some detachment problems, was nearly complete. The excavation project and the site itself were abandoned due to lack of funding, and the mosaic was left exposed and without maintenance for seven years. The result of this abandonment was extensive damage throughout; vegetation had penetrated underneath the bedding layers and detached numerous tesserae; visitors, including local cows, had also caused major destruction. The mosaic was finally reburied in 2003 with the following regimen: 10cm of clean sand; a non-woven textile layer; 40cm of soil backfill. What had been a near-complete mosaic was almost lost due to poor decision-making and lack of long-term planning by the original excavation team.

⁹¹ Neguer 2004, 247-258.

*Case Study: Horvat Minim—Palace of Khirbet Minya*⁹²

The five eight-century CE mosaics in this case study were originally excavated in 1937. Mosaic #1 was mostly complete, with a large central lacuna; mosaic #2 consisted only of an edge design preserved in fragments; mosaics #3-4-5 were all intact, and in excellent condition. Excavation reports from the time are frustratingly spotty, merely noting, with no details, that the mosaics were re-covered. An inspection was made in 1943, noted some grass damage, and the mosaics were again re-covered, again with no details in the report. Between 1959 and 1992, several small lacunae were filled using cement-based mortar. It wasn't until 1993 that a major cleaning and stabilization program was launched. At that time the mosaics were reported to be in relatively good and stable condition, although the lacuna at the center of mosaic #1 had increased slightly in size. The reburial program consisted of a black plastic mesh laid directly on the mosaic; a thick, non-woven textile laid next; 15cm of volcanic pellets (8-12mm in diameter); and 15cm of sand.

In 1998, mosaics #1 and #4 were selected for condition assessment, with disappointing results. Mosaic #1 had been severely impacted by vegetation; roots up to 3cm in diameter were discovered growing the full length of the covering and had attached themselves to both the textile and the plastic mesh. As the mosaic was exposed, it became evident that the *tessalatum* was almost completely detached from the lower bedding layers, leaving a large void below. The central lacuna had increased in size by approximately 50% since its original excavation. Mosaic #4 had suffered small root penetration through the textile to the surface of the mosaic; some of the roots had

⁹² Neguer 2004, 247-258

attached themselves to individual tesserae which pulled away from the *tessalatum* as the mesh was rolled up.

The 1998 assessment team determined that the problems with the previous reburial regimen had been threefold: vegetation was cut back, but not treated with an herbicide, which allowed it to grow back; the lacuna in mosaic #1 was concave, but not filled in as part of the treatment, resulting in water accumulation; numerous unfilled lacunae and cracks allowed easy access to wet soil for root, which created networks beneath the *tessalatum* resulting in more acute damage.

Preservation of a mosaic by reburial requires a thorough knowledge of its constituent materials and structure, its condition, and the risks posed to it by the environment; the ultimate aim of the reburial is to restore or improve the conditions that prevailed before its excavation.⁹³ Proper reburial materials should allow for liquid and water vapor transport; provide chemical stability and prove long-lasting in a burial environment; and be easily available at a reasonable cost.⁹⁴ The necessary environmental criteria that the regimen must meet are:

1. The reburial covering must be able to manage surface water.
2. Maintain continuous and intimate contact between the mosaic surface and the covering materials. The object is to prevent the crystallization of soluble salts on the mosaic by promoting the continuous movement of water through the mosaic and burial cover.

⁹³ Stewart 2004, 241.

⁹⁴ Roby 2004, 234.

3. The cover materials must be chemically inert, or chemically and physically compatible with the mosaic. Lime mortars are alkaline, as are most other mosaic materials; only those materials with a compatible pH should be used.
4. The reburial must provide thermal protection to the mosaic.
5. The covering must inhibit vegetative growth; using sterile cover materials that are inhospitable to vegetation is critical.
6. The covering must deter burrowing animals.
7. The cover materials must be well-compacted, but their combined weight should be taken into account, especially on hypocausts.⁹⁵

The functional criteria of the materials can be put more concisely; they should deter theft and vandalism; be re-usable and lightweight—especially for short-term reburials; and they should be low maintenance.⁹⁶

The steps involved in the reburial of a mosaic are similar to those taken when planning the conservation of an entire site; in fact, one should consider the mosaic as a site within a site, and attend it with the same level of care and commitment. The tasks taken prior to the reburial are critical if the regimen is to be successful; regardless of the length of the reburial, the project should be undertaken with the long-term in mind.

A condition assessment is the first step in the reburial process; documenting the mosaic to archaeological and conservational standards will enable conservators to monitor any changes in the future. Check the condition of the *tessalatum*, and note any substrate or hypocaust structures. Be sure also to document the local environment and

⁹⁵ Stewart 2004, 241-242.

⁹⁶ Stewart 2004, 242.

ground conditions. As in the overall site condition assessment, this documentation must record only effects, not causes.

Next is the risk analysis, identifying all hazards and their potential consequences over the short-, medium-, and long-term. It is in the risk analysis that the causes of damages detected in the condition assessment should be noted. The reburial materials should be assessed next, making sure that the materials chosen are most appropriate for the project at hand. It may be necessary to test the physical and chemical properties of the materials to ensure their suitability for use and their compatibility with the mosaic materials.

The next step is to plan the reburial regimen, specifying access routes to the buried mosaic; any surface protections necessary; the sequence of the reburial process; and the monitoring and maintenance requirements. Once the regimen had been determined, consolidation of the mosaic may begin; reburial and consolidation work in conjunction with each other, each reinforcing the other to provide as much resistance as possible to the agents of deterioration. Use mortar edging to retain any exposed tesserae; grout structural voids in the bedding layers—these should be strong enough to support the weight of the reburial materials. Finally fill in any open joints to prevent infiltration of reburial material by invasive vegetation.

The final, ongoing task is maintenance and monitoring of the mosaic; the frequency and intensity of which should be based on the nature of the covering and specific local risks. An effective method of monitoring, where feasible, is the creation of “window boxes”—horizontal retaining walls of inorganic, non-metallic materials that

create a “window” to the mosaic below—rather than the laborious process of disturbing the entire site.⁹⁷

Protective Structures

There is currently only one protective structure at the Palazzo; a metal-framed scaffolding supporting a hard, plastic-paneled roof covering the Victorious Charioteers mosaic in the *caldarium*. The structure was erected during Alfredo Marinucci’s 1986-87 excavation that uncovered the *caldarium*, and shows no signs of having been maintained by the Soprintendenza in the intervening years. The supports and fittings are thoroughly rusted; winds have broken off several of the roofing panels, which now lie scattered in several places throughout the site. Many of the structural supports for the roofing are placed directly on the caldarium structure itself; whatever benefits the structure might once have provided to the building and mosaic are now nearly outweighed by the potential threat it poses to both. The current shelter is practically a textbook example of the common problems associated with covering structures: it provides insufficient protection from weather infiltration, wind-driven water and other environmental agents; its materials are incompatible with the archaeological remains;⁹⁸ lack of maintenance has reduced whatever effectiveness it may once have had, and rendered it all but impossible to repair due to the deterioration of its constituent parts.

It will be a clear priority for the conservation project to erect a new shelter that meets modern standards of reduced environmental and landscape impact; structural lightness; high resistance to weathering and other aggressive environmental agents;

⁹⁷ Stewart 2004, 244-245.

⁹⁸ Musso 2008, 321.

limited physical interference with the remains to be protected; ease of maintenance and reduced cost; and ease of assembly.⁹⁹ Should other mosaics be uncovered at the site and the decision made to keep them exposed after restoration, any protective shelters erected would of course need to complement the caldarium mosaic in order to maintain visual harmony within the site while instituting an aesthetic cohesive theme to the Palazzo.

⁹⁹ Musso 2008, 323.

Chapter Four: Management, Interpretation, and Presentation

Given that the Palazzo is located within the context of the Ostia archaeological park, management of the site will be in the hands of the Soprintendenza, and the conservation team will need to work closely with that authority to create and execute a workable plan that is acceptable to all stakeholders. There will no doubt be challenges for the conservation team in working with the bureaucracy, especially now that the Soprintendenza di Ostia Antica is no more, and the administration of the site is in the hands of the Roman Soprintendenza, a larger and more remote bureaucracy; Ostia has now become one site among many to the Roman authorities, and no longer the central focus of a smaller authority. Phase five of the Plan seeks to form a working partnership with the site authority and the state-run agency that is the ultimate player in the oversight of Ostia in general and the Palazzo in particular. The fifth phase is also the stage wherein site interpretation, presentation, visitor management, and the marketing of the project will be addressed.

The purpose of a post-conservation management plan is to protect the values of the site as identified by the stakeholders at the beginning of the planning process.¹⁰⁰ To fulfill this function, and to work effectively within a bureaucratic reality, a management plan must be financially feasible and economically viable.¹⁰¹ In order to maintain economic viability, it is vital that the plan be sufficiently flexible to allow for review, improvement, and alteration, while maintaining a long-term view to provide it with the stability that bureaucracies crave.¹⁰² Input into the management plan from all

¹⁰⁰ de la Torre and MacLean 1997, 13.

¹⁰¹ Sullivan 1997, 23.

¹⁰² Sullivan 1997, 23.

stakeholders is a critical component of its development; the end result should be a clear, accessible plan that is easily grasped by a broad audience.¹⁰³ Maintaining these two points, clarity and accessibility, must be guiding principles through the formulation of all stages of the Plan.

Interpretation and Presentation

Visitors to Ostia are in a real sense left to their own devices to find their way around an enormous site with little or no signage to help them make sense of what they see around them. Certainly one of the pleasures of a visit to the site is its quiet, its shadiness, its slow pace after the manic energy of Rome. But adequate interpretive amenities would be welcome to anyone visiting; what little there is throughout Ostia is often illegible or in disrepair. An archaeological site without information is not easily understood by non-specialists, and even specialists may find interpretation of scanty remains difficult; archaeologists are not particularly helpful in site presentation as their training does not typically prepare them to speak to the general public.¹⁰⁴ Ostia has no visitor center where tourists can learn the history and function of the ancient city; decent guidebooks are available in the gift shop, but proper on-site presentation prepared by those who know the structure most intimately is invaluable for a visitor to gain a full understanding and appreciation of a Roman building.

When considering the best way to interpret the Palazzo for visitors, the three main characteristics to emphasize are its location, its function, and its physical composition.

The Palazzo's proximity to the Tiber reveals its intimate connection with the river that is

¹⁰³ Demas 2000, 48. Individual strategy plans should be separated out from the broad outline, but with a clear link to the general plan to provide a continuity of purpose.

¹⁰⁴ de la Torre and MacLean 1997, 9.

now all but invisible not only from the Palazzo but from Ostia as a whole. The artery that was once so vital in the life of the ancient city now bears no relation to it at all; the two granite columns that sit at the extreme northern end of the Palazzo mark what was once the riverside entrance to the complex, but now sit at the base of the Tiber embankment, towered over by a yacht that has been sitting out of the water atop the berm for years now. Reintegrating the river into the presentation of the Palazzo will enable visitors to correlate its riparian location with one aspect of its ancillary functions, the warehousing of cargo on- and off-loaded from barges in the river. A proposed riverwalk¹⁰⁵ that would run from the bookshop/cafeteria area to at least as far as the Hadrianic warehouses east of the Palazzo would bridge the gap between the river and the city; it will be incumbent upon the Palazzo conservation team to propose that the riverwalk be extended to include the Palazzo as well.¹⁰⁶ Interpretive features such as visual reality kiosks like those in use at Tell Dan, Israel¹⁰⁷ could provide visitors with recreations of not only the Palazzo and surrounding buildings, but also the river with its barges, sailors, dockside features and activities. Of course, virtual reality and other multi-media presentations run the risk of becoming “more Hollywood than heritage” by attempting to capture the imagination and going beyond what scholarship has ascertained.¹⁰⁸ The purpose of site interpretation and presentation is education, not a deceptive, non-sustainable form of “edutainment.”¹⁰⁹ But such multi-media presentations, properly executed, can bring a site to life in the minds of its visitors much more effectively than didactic signage can ever hope to do.

¹⁰⁵ Funding for the riverwalk has already been approved and allocated, according to a personal communication to me by Roberto Crivellaro of the grounds department at Ostia.

¹⁰⁶ An extension of the riverwalk to the Palazzo is sure to cause conflict with the boat owners who moor their vessels at the bank of the Tiber north of the Palazzo, and with the Commune di Roma who collects the rents on those mooring sites.

¹⁰⁷ Sivan 1997, 59.

¹⁰⁸ Silberman and Callebant 1997, 44.

¹⁰⁹ Palumbo 1997, 38.

The functions of the Palazzo were threefold: a commercial center, a residential complex, and a bathing establishment. While there is some overlap, these three functions existed primarily in their own zones; commercial activities in the north, residential in the south, and bathing in the center. Presentation strategies that exploit these thematic divisions can be employed at the Palazzo to give the visitor a concrete visualization of these divisions. At the Tell Mozan (Urkesh) site in Syria, a conservation scheme for the mud-brick walls was created that involved a system of metal frames that followed the outlines of the walls, each one with a tight-fitting canvas cover that served as protection. These canvas covers were painted in different colors to differentiate between the various zones of the building; green-colored canvas indicated service areas, and gold-colored canvas indicated the formal wings.¹¹⁰ Given a site as complex as the Palazzo, with warrens of rooms and sudden expansive spaces, thematic presentation devices will help the visitor understand not only the function of each area of the complex, but also how those areas interact, or do not interact, with one another.

Didactic signage will always be a staple of archaeological sites, as they are effective in educating visitors, economically viable, and if well-designed, unobtrusive. Supplements to signage, in the form of dioramas, models, and sculpture installations can accomplish all the things that signage does, while adding a sense of interactivity and creativity to a site. At Advat in Israel, a sculptural installation depicts an arriving caravan to the city, another shows a wine merchant enjoying his product at home.¹¹¹ At the same location, at the Church of St. Theodore, a bronze interpretive model of the original

¹¹⁰ Buccillati 1997, 79.

¹¹¹ In both cases, the sculptures are flat, black metal silhouettes, not realistic representations of people or animals.

building sits on site to aid visitors in identifying the remains they see around them.¹¹²

These supplements to traditional signage help the visitor to gain a more integrated understanding of the building, its functions and its life.

Like most of the buildings at Ostia, the Palazzo Imperiale has been cut off at the knees; the average height of the remaining walls is somewhere around two meters, and it is only in the *frigidarium* that we begin to get any idea of this structure as something more substantial; although even there the number of walls of any height at all is only four. Yet the presence of large reinforcing piers, put in place during the Severan-era expansion of c. 190-200 CE, indicate that the large room was vaulted at that time; today, of course, it is impossible to get any sense of that volume of enclosed space, or what such a vaulted ceiling would look like. Recreating the volume of the space and the extent of the vault might be possible with the erection of a metal framework that would provide the outline of the now-missing walls and roof, much the same way the Benjamin Franklin house in Philadelphia was recreated as three-story outline on its original foundation. The effect would be similar to how the protective structures at Piazza Armerina replicate the volumes of the original building without attempting a Knossos-like reconstruction. A similar effect might be achieved, at a substantially reduced cost, by the creation of a scale-sized model place within the room. A presentation of the Palazzo should attempt to convey to visitors the complexity of the building in all of its forms, functions and compositions.

Due to its isolation from the main excavation area, the Palazzo currently gets very little foot traffic; as a result visitor management has never been a pressing issue. Should

¹¹² Sivan 1997, 56.

that change—for example, if the proposed riverwalk should extend down the Tiber bank to the Palazzo—attention will need to be paid to ways to successfully channel visitors through the site, as well as protecting the structures from harm caused by careless tourists. There is little need at the Palazzo for intrusive barriers or locked gates as there are no truly fragile areas at the site—other than the innate fragility of any ancient remains—but to successfully protect the exposed mosaics the management portion of the Plan must include guidelines on restricting movement in these areas, while maintaining visitor access to view the mosaics. In other parts of the Ostian park, some mosaics are protected from visitors walking on them by the chaining off the doorways leading into the decorated room. This method may or may not be effective, but its conservative value is questionable at best; chains must be anchored into the masonry of the walls, further weakening them and accelerating their deterioration. They are of little aesthetic value, especially after years of exposure to rain and humidity, which causes them to rust, thus furthering their unattractiveness.

Entry to the Palazzo from the north via the riverwalk will put the modern tourist in the footsteps of the original users of the building, and the natural north/south flow of the building will guide visitors through its full length. East/west movement is facilitated by the large north and south cortiles, as they open out the building plan and provide natural access to the southwest commercial space, the west side mithraeum, and the northwest commercial complex by means of the room 63 “corridor.” This path returns the tourist to the riverwalk which will return her to the main body of the excavations, or perhaps lunch at the cafeteria. Guiding visitors through the Palazzo by means of its

inherent circulation provisions¹¹³ can help to render the building more understandable, as they are duplicating the movement patterns of its ancient inhabitants and in so doing hopefully establish a sense of continuity with them.

¹¹³ Stubbs 1986, 81.

Conclusion

The development of a comprehensive conservation and management plan for the Palazzo Imperiale will necessitate a commitment of time and energy, by a multidisciplinary team; the ability of a lead authority within that team to work with the governmental bureaucracy; and a willingness to collaborate not only with other team members, but also with the various stakeholders identified in the initial planning process. As always, uncovering sources of funding will be a major project in and of itself. Government monies are available, but tightly controlled and not always forthcoming when promised (see page 31). Private institutions, such as the Getty Conservation Institute and the Packard Foundation are resources to be tapped, but as with governmental funding money is tight and competition is keen. There will no doubt be conflict and disagreement, not only in developing the Plan but also in its execution. Developing a mechanism to cope with disharmony within the core team, and between the team and the other stakeholders in the project is essential if the project is to be completed (it is hoped) on time and on budget. Compromise is to be expected in the early planning stages, but the practical considerations during execution will mean that compromise will of necessity take a back seat to the uncompromising conservation needs of the Palazzo itself.

Conserving the remains of the past means that we are able to see beyond the immediate and desire to create, not a bridge with the past, since a bridge by its nature passes over all the intermediate time and space between there and here, but a pathway to the past that allows us to see how we got from then to now. Heritage conservation is not simply an exercise in preserving the material remains of societies long gone, but a dedication to believing in the people of the past as living beings inhabiting a living world

that was just as modern to them as our world is to us. Archaeological sites allow us to walk down their sidewalks, to enter their markets and houses and meeting halls, to inhabit their spaces in the same physical relationship to them as they did so that the pathway to the past becomes a little straighter and a little less dark.

Appendix I: The Mosaics

The following is a list of mosaics known to have been discovered during past excavations at the Palazzo Imperiale:¹¹⁴

1. *Frigidarium* 70. A polychrome geometric mosaic, now on the floor of the Sala dell'Immacolata Concezione in the Vatican Museums (18 x 13.37 m.). Part of the mosaic seems to be on the floor of San Paolo alle Tre Fontane.
2. Room 19. Mosaic with five athletes. Lost.
3. Room to the south of room 19. Mosaic of an *amorino* on a dolphin. Lost.
4. Room 17, Mosaic with a marine monster. Lost.¹¹⁵
5. Room 68. Black-and-white mosaic with geometric and floral motifs (4 x 18 m.).
6. Room 66. Black-and-white mosaic with floral motifs.
7. Room 64. Black-and-white mosaic with geometric motifs.
8. Room 71. Black-and-white mosaic with geometric motifs.
9. Exedra to the north of room 71. Black-and-white mosaic with geometric motifs.
10. Room 38. Black-and-white mosaic with geometric motifs.
11. Latrine 44. Black-and-white mosaic with geometric motifs.
12. Courtyard 73. Black and white mosaic (29.50 x 19.40 m.). Along the edge a city wall with towers on the corners and gates. In the center is a labyrinth around the lighthouse of Portus.
13. Room 77. Black-and-white mosaic with geometric and floral motifs.
14. Courtyard 83. Black-and-white mosaic with geometric motifs. Lost.

¹¹⁴ Ostia: Harbour City of Ancient Rome. "Topographical Dictionary: Regions I and II," <http://www.ostia-antica.org/regio1/pi/pi.htm> (Accessed 11/18/2012).

¹¹⁵ This mosaic was rediscovered during excavations in 2009.

15. From a room near the *mithraeum*, now on the floor of San Paolo alle Tre Fontane (5.63 x 4.80 m.). Polychrome mosaic with busts of the four seasons, accompanied by inscriptions (VER, AESTAS, AVTV[---], HIEMS).
16. Precise place of discovery unknown. Polychrome mosaic with floral motifs and birds. Now on the floor of the Sala della Galleria dei quadri moderni in the Vatican Museums.
17. Precise place of discovery unknown. Polychrome mosaic with a depiction of Hercules and the bull. Disappeared.
18. North part of building. Mosaic with fishes, the lighthouse of Portus and the inscription FELIX FAMILIA. Disappeared.
19. Precise place of discovery unknown. Black-and-white mosaic with geometric motifs. Lost.

Appendix II: Conservation of the Victorious Charioteers mosaic¹¹⁶

The mosaic known as “Victorious Charioteers” was uncovered during the 1986-1987 excavations of the *caldarium* (room 11, see Figure 1) in the Palazzo carried out by Alfredo Marinucci under the authority of the Soprintendenza. The mosaic, measuring approximately 6m x 5m and in the black-and-white style so prevalent in Ostia, depicts six charioteers holding victory palms; each figure is labeled with his name in Greek. Beside each charioteer are placed several small columns, representative of his winnings in the races. The mosaic lies on a hypocaust floor separating two marble-revetted hot pools; the charioteers are oriented to the hot pools, three on each side of the mosaic, so that bathers in each pool are facing a grouping of three figures. A simple black band borders the entire mosaic.

The collapse of sections of the hypocaust have created a shearing effect, which has resulted in several large gaps where portions of the mosaic have fallen to a lower level than others; where the mosaic has collapsed more slowly, depressions have formed, causing the floor to bow downward and creating slopes, stretching the setting bed on the bottom of the mosaic, and compressing the *tessalatum* on the surface. Apart from these major defects, much of the surface of the mosaic is in very good condition, with few if any lacunae, few loose tesserae, and firm bedding layers.

The first question the conservation team must face is, Must the mosaic be lifted to effect the restoration? Lifting a mosaic is a dangerous and traumatic act, and unless a

¹¹⁶ All information on the conservation of the Victorious Charioteers mosaic based on personal communication to the author by Valerio Commandatore, owner of the mosaic conservation firm Mosaikando Restauri.

small test section is lifted first, there is no telling how the mosaic will react to this invasive procedure. The next question is in what state to preserve the mosaic; in a re-flattened condition to approximate the original form? Or do we preserve it in its present sloping state as testimony to its history? Attempting to flatten out a mosaic that has become bowed is a difficult and perilous process: constant pressure must be maintained on the back of the mosaic as it sits in the lab, which results in the modification of its equilibrium and proportions, making it extremely difficult to remount in place.

Once these questions have been answered, conservation of the mosaic will best be handled by two separate treatments: intervention on the perimeter sections which will remain in place on their more firm foundation, and restoration of the central depression and broken areas. Treating the perimeter will be a simple matter of gauze intervention to increase the solidity of the tesserae; intervention on the remainder is a more involved, multi-step process.

1. Clean the mosaic thoroughly, removing all organic and inorganic materials.
2. Measure, photograph, draw, and document the mosaic, in general and in detail.
3. Draw and number each section to be lifted.
4. Detach a sample section of the mosaic, so that methodologies may be modified based on the reality of the mosaic.
5. Before detaching and lifting the sections, create molds of each section. These molds will be used in the lab for laying each section upside-down upon, rather than placing them on a flat worktable.
6. Lift the sections and transport them to the lab for reassembly in the molds.

7. Thorough cleaning and stabilization of the back of the mosaic.
8. Preparation of new bedding layer and application to sections.
9. Transportation and reassembly of mosaic on its new support.

Since the restored mosaic will no longer be resting on the hypocaust system, during the mosaic restoration, a conservation intervention will be carried out at the same time on the *caldarium* itself by a team of specialized conservators. This will involve cleaning, documentation, and stabilization of the perimeter sections of the mosaic still in place as well as the *caldarium* base, and the construction of the new support for the mosaic. A new protective shelter will be necessary, as the present one is past its useful life and in very bad repair. A shelter that harmonizes with the landscape and made of natural materials such as wood and tile would be ideal; improved protection from the weather is of course the main concern, but attention will need to be paid to the prevention of animal intrusion into the *caldarium* and their subsequent damage to the mosaic.

Bibliography

- Abrey, Graham. "Condition surveys of masonry ruins." *Conservation of Ruins*, edited by J. Ashurst, 45-81. Oxford: Elsevier Ltd., 2007.
- Archaeological Institute of America. "Code of Professional Standards." <http://www.archaeological.org/news/advocacy/132> (Accessed March 13, 2013).
- Ashurst, John and Colin Burns. "Philosophy, technology and craft." *Conservation of Ruins*, edited by J. Ashurst, 83-145. Oxford: Elsevier Ltd., 2007.
- . "Materials and techniques." *Conservation of Ruins*, edited by J. Ashurst, 309-318. Oxford: Elsevier Ltd., 2007.
- Associazione Nazionale Archeologi. "Codice Deontologico.", Art. 1.2, <http://www.archeologi.org/web/news.asp?id=315> (Accessed March 13, 2013).
- Buccellati, Giorgio. "Conservation qua Archaeology at Tell Mozan/Urkesh." *Of the Past, For the Future: Interpretation, Archaeology and Conservation*, edited by Neville Agnew and Janet Bridgland, 73-81. Los Angeles: The Getty Conservation Institute, 2006.
- Camardo, Domenico. "Archaeology and Conservation at Herculaneum: from the Maiuri campaign to the Herculaneum Conservation Project." *Conservation and Management of Archaeological Sites*, Vol. 8, number 4 (2007), 205-214.
- Cleere, Christopher, Jessica Trelogan, and Stuart Eve. "Condition recording for the conservation and management of large, open-air sites: a pilot project at Chersonesos (Crimea, Ukraine)." *Conservation and Management of Archaeological Sites*, Vol. 8, number 1 (2006), 3-16.
- Confederazione italiana archeologi. "Codice Deontologico." http://www.archeologi-italiani.it/index.php?option=com_content&view=article&id=46&Itemid=233&lang=en (Accessed March 13, 2013).
- Deetz, James. *Flowerdew Hundred: The Archaeology of a Virginia Plantation, 1619-1864*. Charlottesville: University Press of Virginia, 1993.
- . "Discussion: Archaeologists as Storytellers." *Historical Archaeology*, Vol. 32, No. 1, 1998. 94-96.
- DeGuichen, Gael. "Object Interred, Object Disinterred." *Conservation on Archaeological Sites: with Particular Reference to the Mediterranean Area*, edited by N. P. Stanley Price, 21-29. Rome: ICCROM, 1984.
- Demas, Martha. "Planning for Conservation and Management of Archaeological Sites: A Values-Based Approach." *Management Planning for Archaeological Sites*, edited

- by Jeanne Marie Teutonico and Gaetano Palumbo, 27-54. Los Angeles: The Getty Conservation Institute, 2000.
- Fagan, Brian. "Looking Forward, Not Backward: Archaeology and the Future of the Past." *Of the Past, For the Future: Interpretation, Archaeology and Conservation*, edited by Neville Agnew and Janet Bridgeland, 7-12. Los Angeles: The Getty Conservation Institute, 2006.
- Giavarini, Calo and Maria Laura Santarelli. "Dimensional variations of Roman masonry subjected to wetting-drying cycles." *Conservation and Management of Archaeological Sites*, Vol. 4, number 4 (2000), 213-218.
- Grant, Michael. *The History of Rome*. London: Weidenfeld and Nicolson, 1978.
- The Herculaneum Conservation Project. "Objectives: Sustainability."
<http://www.herculaneum.org/hcp-home/eng/sostenibilita.html> (Accessed January 4, 2013).
- The Herculaneum Conservation Project. "Site Activities,"
<http://www.herculaneum.org/hcp-home/eng/attivitasito.html> (Accessed January 5, 2013).
- The Herculaneum Conservation Project. "Site Activities: Insula Orientalis I,"
<http://www.herculaneum.org/hcp-home/eng/orientalis.html> (Accesses January 4, 2013).
- How, Chris. "Stability and Survival." *Conservation of Ruins*, edited by J. Ashurst, 11-43. Oxford: Elsevier Ltd., 2007.
- Jokilehto, Jukka. "Conservation Concepts." *Conservation of Ruins*, edited by J. Ashurst, 3-9. Oxford: Elsevier Ltd., 2007.
- Kinzel, Moritz. "Take a Look, Make a Sketch, and Re-Think It: Surveying and 4-D Models for Reconstructing Archaeological Sites." *ARCHAIA: Case Studies on Research Planning, Characterisation, Conservation, and Management of Archaeological Sites*, edited by Niccoló Marchetti and Ingolf Thuesen, 91-95. Oxford: Archeopress, 2008.
- la Repubblica, May 14, 2011 "Dal teatro alla schola di Traiano via al restyling di Ostia Antica."
<http://ricerca.repubblica.it/repubblica/archivio/repubblica/2011/05/14/dal-teatro-alla-schola-di-traiano-via.html> (Accessed April 1, 2013).
- Lega Italiana Protezione Uccelli. "Riserva del Litorale Romano: il decreto,"
www.lipuostia.it/riserva/decreto.htm (Accessed March 15, 2013).
- Lettelier, Robin, Werner Schmid, and François LeBlanc. *Recording, Documentation, and Information Management for the Conservation of Heritage Places*. Los Angeles: The Getty Conservation Institute, 2007.

- Lipe, William D. "Public Benefits of Archaeological Research." *Public Benefits of Archaeology*, edited by Barbara J. Little, 20-28. Gainesville, Florida: University of Florida Press, 2002.
- Mason, Randall, and Erica Avrami. "Heritage Value and Challenges of Conservation Planning." *Management Planning for Archaeological Sites*, edited by Jeanne Marie Teutonico and Gaetano Palumbo, 13-26. Los Angeles: The Getty Conservation Institute, 2000.
- Molyneux, B. L. "The Represented Past." *The Presented Past: Heritage Museums and Education*, edited by Peter G. Stone and Brian L. Molyneux, 1-13. London: Routledge, 1994.
- Mora, Paola. "Conservation of Excavated Intonaco, Stucco, and Mosaics." *ARCHAIA: Case Studies on Research Planning, Characterisation, Conservation, and Management of Archaeological Sites*, edited by Niccoló Marchetti and Ingolf Thuesen, 97-107. Oxford: Archeopress, 2008.
- Morin, Ran. "Creative Preservation: the development of an artistic approach to the preservation and presentation of the past." *Conservation and Management of Archaeological Sites*, Vol. 3, number 4 (1998), 191-201.
- Musso, Stephen. "Low-Impact Restoration Techniques, Coverings and Fixed Devices in an Archaeological Park: A Case Study at Tilmen Höyük in Turkey." *ARCHAIA: Case Studies on Research Planning, Characterisation, Conservation, and Management of Archaeological Sites*, edited by Niccoló Marchetti and Ingolf Thuesen, 319-329. Oxford: Archeopress, 2008.
- Neguer, Jacques. "Reburial and protective covering of ancient mosaic pavements: the experience of the conservation department of the Israel Antiquities Authority." *Conservation and Management of Archaeological Sites*, Vol. 6, numbers 3-4 (2004), 247-258.
- Ostia: Harbour City of Ancient Rome. "Topographical Dictionary: Regions I and II," <http://www.ostia-antica.org/regio1/pi/pi.htm> (Accessed 11/18/2012).
- Palumbo, Gaetano. "Privatization of State-Owned Cultural Heritage: A Critique of Recent Trends in Europe." *Of the Past, For the Future: Interpretation, Archaeology and Conservation*, edited by Neville Agnew and Janet Bridgland, 35-39. Los Angeles: The Getty Conservation Institute, 2006.
- , "Threats and Challenges to Archaeological Heritage in the Mediterranean." *Management Planning for Archaeological Sites*, edited by Jeanne Marie Teutonico and Gaetano Palumbo, 3-12. Los Angeles: The Getty Conservation Institute, 2000.
- Pesaresi, Paola and Monica Martelli Castaldi. "Conservation measures for an archaeological site at risk (Herculaneum, Italy)." *Conservation and Management of Archaeological Sites*, Vol. 8, number 4 (2007), 215-236.

- Pisa, Paola Rossi, Gabrielle Bitelli, Marco Bitelli, Maria Speranza, Lucia Ferroni, Pietro Catizone, and Marco Vignudelli. Environmental Assessment of an Archaeological Site for the Development of an Archaeological Park." *ARCHAIA: Case Studies on Research Planning, Characterisation, Conservation, and Management of Archaeological Sites*, edited by Niccoló Marchetti and Ingolf Thuesen, 273-283. Oxford: Archeopress, 2008.
- Praetzelis, Adrian. "Introduction: Why Every Archaeologist Should Tell Stories Once in a While." *Historical Archaeology*, Vol. 32, No. 1, 1998. 1-3.
- Ringbeck, Birgitta. *Management Plans for World Heritage Sites: A Practical Guide*. Bonn: German Commission for UNESCO, 2008.
- Roby, Thomas. "The reburial of mosaics: an overview of materials and practice." *Conservation and Management of Archaeological Sites*, Vol. 6, numbers 3-4 (2004), 229-236.
- Scientific American. "Weed-whacking Herbicide Proves Deadly to Human Cells." <http://www.scientificamerican.com/article.cfm?id=weed-whacking-herbicide-p> (Accessed January 12, 2013).
- Silberman, Neil, and Dirk Callebrant. "Interpretation as Preservation: Rationale, Tools, and Challenges." *Of the Past, For the Future: Interpretation, Archaeology and Conservation*, edited by Neville Agnew and Janet Bridgland, 43-46. Los Angeles: The Getty Conservation Institute, 2006.
- Sivan, René. "The Presentation of Archaeological Sites." *The Conservation of Archaeological Sites in the Mediterranean Region*, edited by Marta de la Torre, 51-59. Los Angeles: The Getty Conservation Institute, 1997.
- Spurza, Joanne. "The Building History of the Palazzo Imperiale at Ostia: Evolution of an Insula on the Banks of the Tiber River." *Meded* 58, 129-142.
- Stanley Price, Nicholas. "Excavation and Conservation." *Conservation on Archaeological Sites: with Particular Reference to the Mediterranean Area*, edited by N. P. Stanley Price, 1-10. Rome: ICCROM, 1984.
- Stewart, John. "Conservation of archaeological mosaic pavements by means of reburial." *Conservation and Management of Archaeological Sites*, Vol. 6, numbers 3-4 (2004), 237-246.
- Stubbs, John H. "Protection and Preservation of Excavated Structures." *Conservation on Archaeological Sites: with Particular Reference to the Mediterranean Area*, edited by N. P. Stanley Price, 79-96. Rome: ICCROM, 1984.
- Sullivan, Sharon. "A Planning Model for the Management of Archaeological Sites." *The Conservation of Archaeological Sites in the Mediterranean Region*, edited by Marta de la Torre, 15-26. Los Angeles: The Getty Conservation Institute, 1997.

- Torraca, Giorgio. *Lectures on Materials Science for Architectural Conservation*. Los Angeles: The Getty Conservation Institute, 2009.
- UNESCO. "Cultural Landscape." <http://whc.unesco.org/en/culturallandscape/#1> (Accessed March 12, 2013).
- UNESCO. "Documents." <http://whc.unesco.org/archive/1987/sc-87-conf005-4e.pdf> (Accessed March 12, 2013).
- UNESCO. "Documents." <http://whc.unesco.org/archive/1997/whc-97-conf208-17e.pdf> (Accessed March 12, 2013).
- Wallace-Hadrill, Andrew. "The Herculaneum Conservation Project: Introduction." *Conservation and Management of Archaeological Sites*, Vol. 8, number 4 (2007), 187-190.
- Ward, Philip. *The Nature of Conservation: A Race Against Time*. Los Angeles: The Getty Conservation Institute, 1986.
- Warnotte, Anna, Marianne Tinant, and Pierre Hupet. Strategic Management of Enhancement Projects on Urban Archaeological Sites: The APPEAR Method." *ARCHAIA: Case Studies on Research Planning, Characterisation, Conservation, and Management of Archaeological Sites*, edited by Niccoló Marchetti and Ingolf Thuesen, 367-374. Oxford: Archeopress, 2008.
- Young, Peter A. "The Archaeologist as Storyteller." *Public Benefits of Archaeology*, edited by Barbara J. Little, 239-243. Gainesville, Florida: University of Florida Press, 2002.