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Biodiversity and Temporal Diversity in Archaeological Landscapes: Towards a New Perception

Tessa Matteini

University of Florence
https://orcid.org/0000-0002-8522-1173

Abstract

Reflecting on several crucial issues regarding the protection, planning, and management of archaeological landscapes from the point of view of the Discipline of Landscape Architecture, the article focusses on the roles of the vegetal component and plant biodiversity in the landscaping of archaeological sites.

After outlining a background framework of the theoretical, cultural, and ecological relationships between vegetation and ruins adopting a landscape architecture approach, the article proposes a set of conceptual and operational tools to deal with active and inventive[1] conservation of archaeological landscapes, striving to adopt the "strong forward-looking" attitude recommended by the European Landscape Convention (Florence 2000).

By re-reading the consolidated concept of biodiversity (CBD, 1992) according to a different research dimension, the concept of temporal diversity is explored and proposed as a key issue in the interpretation and planning of layered landscapes.

Focusing in particular on design issues in the management of ruin and vegetation integration, an innovative approach is presented in regards to various greenery-related potentialities in the landscaping and management of archaeological sites.

The article's concluding remarks aim to open new trans-disciplinary windows of research on active and inventive conservation of archaeological landscapes to foster further exploration of this potentially broad ambit of investigation.

Keywords

landscape architecture, archaeological sites, temporal diversity, biodiversity

[1] The term Inventive Conservation has been proposed and explored by Pierre Donadieu in Aubry et al. (2006).

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Introduction

After outlining a background framework of the theoretical, cultural, and ecological relationships between vegetation and ruins adopting the landscape architecture approach, this contribution proposes a set of conceptual and operational tools to deal with active and inventive conservation of archaeological landscapes, striving to adopt the "strong forward-looking" attitude recommended by the European Landscape Convention (Florence 2000).

The disciplinary field of Landscape Architecture has undergone a long yet quite discontinuous evolution relating to the protection, planning, and management of archaeological landscapes.

There have been many case studies since the earliest Archaeological Promenades were conceived in Europe at the beginning of the 18th century, especially in Italy and south of France (Matteini, 2009).

In the previous century alone, some extremely skilful professionals (such as Giacomo Boni in Rome from 1899, Ralph Griswold in 1953, and Dimitris Pikionis in 1954 in Athens, Pietro Porcinai in Selinunte from 1972) developed and applied their consolidated methodologies for shaping landscapes to outstanding heritage places.[2]

Grounded in these experiences, contemporary design culture needs to focus on a specific and crucial issue, which this article attempts to explore: the fertile and complex interaction between ruins and vegetation in the archaeological ambit. To deal with this topic, a preliminary investigation into the background of the theoretical and cultural framework seems to be necessary in order to develop further research leading to the recognition of the multiple roles of vegetation and the importance of plant biodiversity in landscaping archaeological sites.

Ruins and Vegetation: A Cultural Framework

The literary and iconographic coupling of ruins and vegetation was consolidated in the 16th century with the discovery by humanists and painters of the "archaeological landscape" and thus its representation in paintings by such artists as Andrea Mantegna and Giorgione and in the pages of a founding text of European garden culture, the *Hypnerotomachia Poliphili* (Poliphilo's Strife of Love in a Dream) by Francesco Colonna (Matteini, 2011, pp. 465–466).

[2] A detailed exploration of all these cases has been presented in Matteini (2009). For Porcinai's work in Selinunte, see also Matteini (2012, 2015).

Observing the desolate landscapes that characterize Mantegna's San Sebastian (1480), we see the *continuum* of time depicted as vegetation in the form of a *Ficus carica* thrusting out of the cracks of crumbling columns (Battisti, 2004, p. 172). This juxtaposition of fig and classical ruins represents a dialectic contrast between Nature and Architecture (see Battisti, 2004, pp. 174–177), and their dissonant pace of transformation is paradigmatic of the continuous evolution and the dynamics of becoming, which were evoked even earlier by Lucretius in *De Rerum Natura* (Battisti, 2004, p. 172).

Around the same time (1499) and in a similar cultural milieu, Colonna described all the biological diversity of the flora inhabiting the ruins explored by Poliphilo during his dream *quête*, which constitutes the principle reference for all subsequent literary and iconographic representations of landscapes with ruins:

> Among the broken and decayed places, wherof great sundrie wall weeds and hearbes, especially the unshaking Anagyre, the Leatise of both kindes, beares foote, dogges head, Gladengreene, spotted Ivie, Centarie, and divers such like. And in the myldered places of broken walles grew Howslike, and the hanging Cymbalaria bryers, and pricking brambles, among the which crept Swifts and Lyzarts which I saw crawling among the overgrowne stones, which at the first sight in this silent and solitarie place, made me warily afraid of them […]. (Collona, 1592, p. 6)

With a passing glance at John Vanbrugh's 1709 *memorandum*, drawn up to preserve the ruins of Woodstock Manor, which already contains indications for the use of "picturesque" vegetation to emphasize the evocative power of ruins (Dixon Hunt & Willis, 1988, pp. 120–121), our rapid *excursus* cannot overlook the equally "picturesque" views of John Ruskin a century and a half later, whose predilection stated in *The Lamp of Memory* was for the "sublimity of the rents, or fractures, or stains, or vegetation, which assimilate the architecture with the work of Nature, and bestow upon it those circumstances of colour and form which are universally beloved by the eye of man" (Ruskin, 1849, p. 178).

In this vein, we can recall that the integrated approach to reading Nature experimented by Ruskin (both as an artist and a writer) generated a powerful theoretical and interpretative device to build a dynamic and systemic vision of natural phenomena, anticipating the richness and the complexity of modern ecological thinking (Frost, 2017).

Moreover, Ruskin's lesson on the ethical and aesthetic value of ruins and the importance given to the work of vegetation in ruderal contexts

can be considered part of a more ambitious and visionary attitude, linked to a landscape and place-making oriented dimension (Dixon Hunt, 1997).

The poetics of landscape gardening, due to the acceptance of both *emblematic gardening* and *expressive gardening*, as proposed by Whately (1771–2005, p. 134), has its main *topoi* in a celebratory combination of vegetation and ruins (authentic or artificial). But we cannot forget that an important precedent defining the image of the 18th century *landscape garden* was the portrayal of the renowned 16th and 17th century formal gardens in Lazio (Villa d'Este, the Farnese gardens, Villa Madama, Villa Barberini), reduced to ruins and abandoned to the vigorously reconquering power of vegetation in the paintings of the young Hubert Robert and Honoré Fragonard (Dixon Hunt, 2002, p. 113; de Cayeux, 1987, pp. 35–47).

It was only at the end of the 19th century with the theoretical and practical work of Giacomo Boni (De Vico Fallani, 1988; Matteini, 2017a, pp. 58, 65) that a "scientific" definition of the subject was formulated; thanks to his professional experience in the setting out of the Roman archaeological areas, Boni was able to study the interactions between archaeological ruins and vegetation over time and, using his *corpus* of observations, delineate the first indications of an intervention method. Starting with the acknowledgment of the documentary and ethical value of ruins, already pointed out by Ruskin,[3] and using the direct observation of spontaneous flora as an indication of processes underway or already concluded on the sites in his charge, Boni acquired solid scientific knowledge of the ecological and environmental mechanisms and equilibriums in archaeological landscapes, eventually introducing the concept of *stability* or *instability* of the relative ecological systems (Caravaggi, 1989, pp. 461–463), and providing critical observations on the presence of exotic infesting species such as *Ailanthus altissima* or *Robinia pseudo-acacia* (Boni, 1912, p. 18; 1913, p. 66; 1917, p. 27).

In 1911, the appearance of Georg Simmel's *Die Ruine* constituted another tile in the vast and composite theoretical mosaic dedicated to the fertile combination of ruins and vegetation. It interpreted ruins from a philosophical standpoint as a "pacification" between the otherwise dialectical categories of architecture and nature. Ruins represented the moment "spiritual" forms were destroyed through the action of "natural" forces and, at the same time, could be perceived as a tranquillizing return to Nature, Goethe's *good Mother*: "In other words, it is the fascination of the ruins that here the work of man appears to us entirely as a product of Nature.

[3] For a detailed analysis of the human and cultural relationships between Ruskin and Boni, see De Vico Fallani (1988, pp. 21–29) and Matteini & Ugolini (2019, pp. 296–297).

The same forces which give a mountain its shape through weathering, erosion, faulting and the growth of vegetation; here do their work on old walls" (Simmel, 1958, p. 380).

All the iconographic and theoretical suggestions belonging to this cultural current likely influenced the surprising choice of the Caetani family who, in the early decades of the 20th century, decided to bring back to life the site of Ninfa (a family property since the end of the 13th century), thereby commencing the progressive *landscaping* of an entire archaeological area comprising the ruins of a medieval city enclosed by two rings of city walls on eight hectares of land, with a castle, seven churches, around 150 homes, a lake and waterworks (Matteini, 2011; Rossi Doria, 2017, pp. 193–206).

Throughout these various explorations of aesthetics, philosophy, and design, a *fil rouge* delineating the intimate relationship between archaeological places and vegetation can be outlined and tracked over the centuries.

Consequently, a landscape architecture approach to planning/designing archaeological sites must firstly take into account this valuable cultural heritage and consider all the potentialities of the natural component as along with biodiversity issues.

Landscape and Layering: Exploring the Time dimension

In regards to the concept of biodiversity, we can quote the definition proposed by the Rio Convention (CBD, 1992): "[…] the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems."

Starting from this concept of biodiversity and re-reading it according to a different research dimension, we can venture to speak of *temporal diversity* to define the variability of historical phases and chronological documentation present at a given site (Matteini, 2011).

Potentially richly endowed with biodiversity, archaeological areas are by definition deposits of temporal diversity. In analogy to biological diversity, which tends to increase the complexity, and consequently – the resistance, of an ecological system, temporal diversity evidently contributes to increasing the cultural complexity of an archaeological landscape, definable as a combination of various time frames (Augé, 2004, p. 103).

When temporal diversity combines with biological diversity, as generally happens in places characterized by archaeological remains, the environmental and cultural systems (and therefore, the landscape) greatly increase

their level of complexity and their historical, cultural, and ecological value, introducing particularly tough challenges for project designers and maintenance supervisors. Thus, one of the primary objectives of a landscape project is to succeed in understanding, reconnecting, and communicating an archaeological area's potential and its temporal diversity, and for which the interpretation and restitution of its various chronological layers becomes one of the most interesting research directions (Matteini, 2017b).

In the culture of restoration, Isa Belli Barsali's motto "You don't peel a garden" (Belli Barsali, 1983, pp. 32–36) is used to express the ethical and documentary value of each of the layers present in a historical garden.

Instead, an archaeological site is generally "peeled" back to identify, read and interpret its stratigraphic components according to current scientific methodology. "Temporal windows" are thus opened in the landscape *continuum* that need to be managed when designing a project; in many cases the project can (must?) take on the task of recomposing and associating differing areas, communicating layers that either no longer exist or do not exist yet (in the sense that they are beneath the level visitors walk on) (Matteini, 2009, pp. 111–112).

Biodiversity and Temporal Diversity

For nearly three centuries – the landscaping of archaeological sites has been debated since the 18th century – projects and preliminary studies (with some fundamental and extraordinary exceptions) have mostly attempted to normalize and reduce the complexity of these places, both from the point of view of biodiversity and that of temporal diversity.

The aspiration to the total site control and simplification of site maintenance exhibited by project designers, not always entirely aware of the ecological implications and dynamics of ruins and vegetation (already evidenced, conversely, by Giacomo Boni at the beginning of the 20th century), tended to construct a monumental, abstract image of ruins inserted in a landscape with increasingly well-specified rules for vegetation.

In the cultural context of the early 20th century, and also thanks to the great 1931 exhibition, *Mostra del Giardino Italiano*[4] held in Florence, a non-historical "Italian-style garden" was re-invented according to the autarchic logic of the fascist regime which favoured references to Roman times and a misconstrued *autochthonous* landscape where pines, Holm oaks

[4] A great exhibition illustrating the history of Italian gardens was held in Palazzo Vecchio in Florence in April 1931. See the foreword by Ugo Ojetti in the exhibition catalogue, *Mostra del Giardino Italiano*, published in 1931 by Enrico Ariani for the Municipality of Florence, pp. 23–25.

and cypresses became the only permissible species for archaeological sites (Matteini, 2007, pp. 422–425).

Particularly significant in this sense are the words of Corrado Ricci regarding the arboreal exedras in Piazza Venezia, reported in a letter to Benito Mussolini dated 17th of October 1931: "Frame, nay, isolates the monument from all the other 'anomalous' features enclosed with an immense arboreal exedra […]. No other architectural or sculptural forms near the monument; no other candid marbles; but rather the shade and green of the cypresses and pines in those marvellous appearances that immobile nature has given them and that are as suitable for ruins as for intact buildings" (as cited in De Vico Fallani, 1985, p. 110).[5]

The assimilation of eternal ruins with perennial evergreen species, considered "immobile nature" in the early decades of the 20th century, reveals a total incomprehension of any ecological dynamic in favour of the creation of an unchanging image isolated from the "anomalies" (of the surrounding urban landscape) that has little in common with the complex wealth of variable relationships and transformations actually present in every archaeological site.

This tendency to reduce and simplify the diversity which is naturally present in this kind of environment makes the challenge of cultivating historical and archaeological places more difficult, and therefore more imperative (Matteini, 2017b) in the pursuit of increasing ecological complexity, resilience, and adaptation to climatic stress, in short, of promoting active and inventive conservation (Ugolini & Matteini, 2016, pp. 461–470).

The Vegetation Component in Landscaping Archaeological Sites[6]

Interpretative studies of the vegetation component in the landscape of archaeological sites are complex (Caneva, 1997) and the project aspects addressed therein are numerous and diverse (Morganti, 1999), as already demonstrated by Boni. Based on Boni's writings and interventions on Roman archaeological sites, Massimo De Vico Fallani developed a kind of *manual* for the architect-archaeologist's repertoire of indications, the "Instructions for Greenery in Ancient Monuments", identifying six categories of

[5] The Italian text reads: "Incorniciare anzi isolare il monumento da tutte le 'anomalie' vicine con un'immensa esedra arborea […]. Non altre forme architettoniche o sculture, vicino al monumento; non altri candori marmorei; ma le ombre e il verde dei cipressi e dei pini in quei meravigliosi aspetti che la natura immobile ha dato loro e che convengono ugualmente alle rovine, come agli edifici integri". "Letter to the Head of Government" in *La Tribuna* 1931, October 17th.

[6] Some of the content of this section was explored in Matteini and Ugolini (2013).

intervention which define the system of interactions between archaeological structures and vegetation: "[…] damaging, beautifying, hiding, protecting, functional, and image integration" (De Vico Fallani, 1988, pp. 105–112).

Attempting to carry out a contemporary re-reading of the project variables of these relationships, we can identify the compatibility of species and the plant community as being fundamental since they will need to integrate with such a precious and fragile context as that of an archaeological site and sidestep critical cultural, environmental, and stratigraphic issues while, of course, being appropriate for the specific climatic, edaphic, and historical conditions (Caneva, 1997).

Particular attention needs to be paid to the interaction between archaeological structures and vegetation, to possible conflicts and to the danger that some botanical species pose to historical architectural elements present on the site. While it is true that vegetation can contribute to the conservation and maintenance of an archaeological area (branches and roots function as protection against collapsing walls and as consolidation of unstable crags), it is also true that the same vegetation can become one of the main indirect causes of deterioration (chemical action, mechanical action of the root system, stagnant water). Therefore, the parameters to take into consideration in evaluating risk caused by vegetation (the *risk index* defined by M. Adele Signorini) regard *the biological category*, *invasiveness*, *vigour*, *and type of root system* (Signorini, 1996; Signorini, 2017, pp. 293–299).

Development of the interpretive reading and project of the vegetative structure can potentially take numerous directions when upgrading an archaeological landscape. In some cases, the surface vegetation becomes an important bio-indicator for aerial readings of submerged stratigraphy, or an indicator of anthropic impact; in other cases, the presence of calciphile plants may reveal the location and distribution of underground structures to archaeologists (Caneva, 1997, p. 128).

As also previously formulated by Boni, the suggestion to use vegetation to integrate the image of an archaeological structure, by definition devoid of its original form and function, should be taken into due consideration. The intentional use of certain species or plant communities can provide support for didactic, informative, and organizational communication purposes, contributing to evoke or suggest features of the site's primitive state, its original functions, or ecological dynamics currently underway. In archaeological site projects, the concept of "image integration" (Carbonara, 1987, p. 85) has often been translated as an attempt to reconfigure a space by using vegetative elements that confer a new spatial and narrative structure to a lost historical design in places where there are no original references. In some situations, the vegetation can be used as a volumetric component to reintegrate lost architectural parts of ruins in order to facilitate the com-

prehension and reading of the original profile by suggesting parts of lost curtains, colonnades, pathways, or flooring (Marino, Gaudio, & De Caria, 2003). The application of these practices requires exhaustive comprehension of the ecological dynamics and particular attention to the cultural compatibility of species.

Moreover, it is clear that the re-composition of an appropriate and compatible vegetation structure inside an archaeological area supports important ecological functions since archaeological areas are also essential nodes in the construction of a coherent system of ecological and landscape continuity, particularly in urban contexts. For this reason, attention during the botanical and landscape design of a project becomes essential (especially when it comes to recuperating and increasing biodiversity).

The creation of an appropriate vegetative structure can also favour the conservation of archaeological structures by reducing solar radiation, wind, atmospheric precipitation and polluting agents that are equally important degrading factors.

A technology in widespread use in Anglo-Saxon countries, previously reported by Boni, is to top walls with soil and vegetation in order to preserve them.[7] This has numerous advantages including a potential increase in biodiversity. In 1913, Boni wrote about the *pelliccie erbose* (green mantles, or soft capping): "They grow on a thin layer of humus on the top of ruins and protect them from scorching heat and bitter cold, forming an interlacing of slender fibrous roots. The tops of ancient brick or concrete walls, subject to breaking up from bad weather, are protected from infiltrations by *cocciopesto* on which soil mixed with seeds is spread to favour the formation of a green mantle" (Boni, 1913, p. 66).[8]

For some time it has been known that in many cases, uncontrolled removal of vegetation, even when apparently "invasive," accelerates the deterioration of archaeological structures, triggering processes that are difficult to control.

(Non-)concluding Remarks

As historic iconography confirms, for centuries ruins were a part of the ordinary lives of residents and travellers, inhabiting the many-sided and

[7] For an overview of the techniques and related bibliography, see the term *zolle erbose* by Maglie (Marino, 2003, p. 235).

[8] The Italian text reads: "Le pelliccie erbose, fatte crescere su un sottile strato di humus alla sommità dei ruderi li proteggono dall'arsura e dal gelo, formando un tessuto di radichette. La cresta dei muri, d'opera testacea e cementizia, facile a disgregarsi per le intemperie, viene tutelata dalle infiltrazioni mediante coccio-pesto, sul quale si stende il terriccio misto a seme di fieno, per agevolare il formarsi d'una verde pelliccia."

mutating identity of historic places as familiar, reassuring presences. Andreina Ricci emphasizes how this proximity was progressively lost during the second half of the 20th century (Ricci, 2006, pp. 78–81). Concerns about arbitrarily reproposing "public use of history," linked in people's minds with the instrumental visions of totalitarian regimes, has discouraged attempts to "translate" and communicate the historic value of ruins, which have often been abandoned to a destiny of isolation through physical and perceptual inaccessibility.

In this cultural situation, apart from archaeologists, only a few artists, poets, and designers have continued to dialogue with archaeological remains, bringing them to life as catalysts of narrative energy to reveal their "presence and poetry,"[9] or to imagine new chronological dimensions and possible definitions of landscape.

It is time to consciously reappropriate these archaeological landscapes we have lost confidence in and affection for and re-hone our capacity to socially manage and specifically design projects for them.

We must learn to conserve, re-read, and reinvent the diffuse and diversified archaeological patrimony that inhabits our ordinary rural and urban landscapes, imagining new connections and experimenting with alternative modes of management for future shared "public use" of historical open spaces in which the value of biological and temporal diversity is finally recognized and so preserved and fostered.

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[9] The italian version is "Presenza e poesia" from a Pier Paolo Pasolini's poem "10 giugno 1962". In Pasolini (2006, p. 23).

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