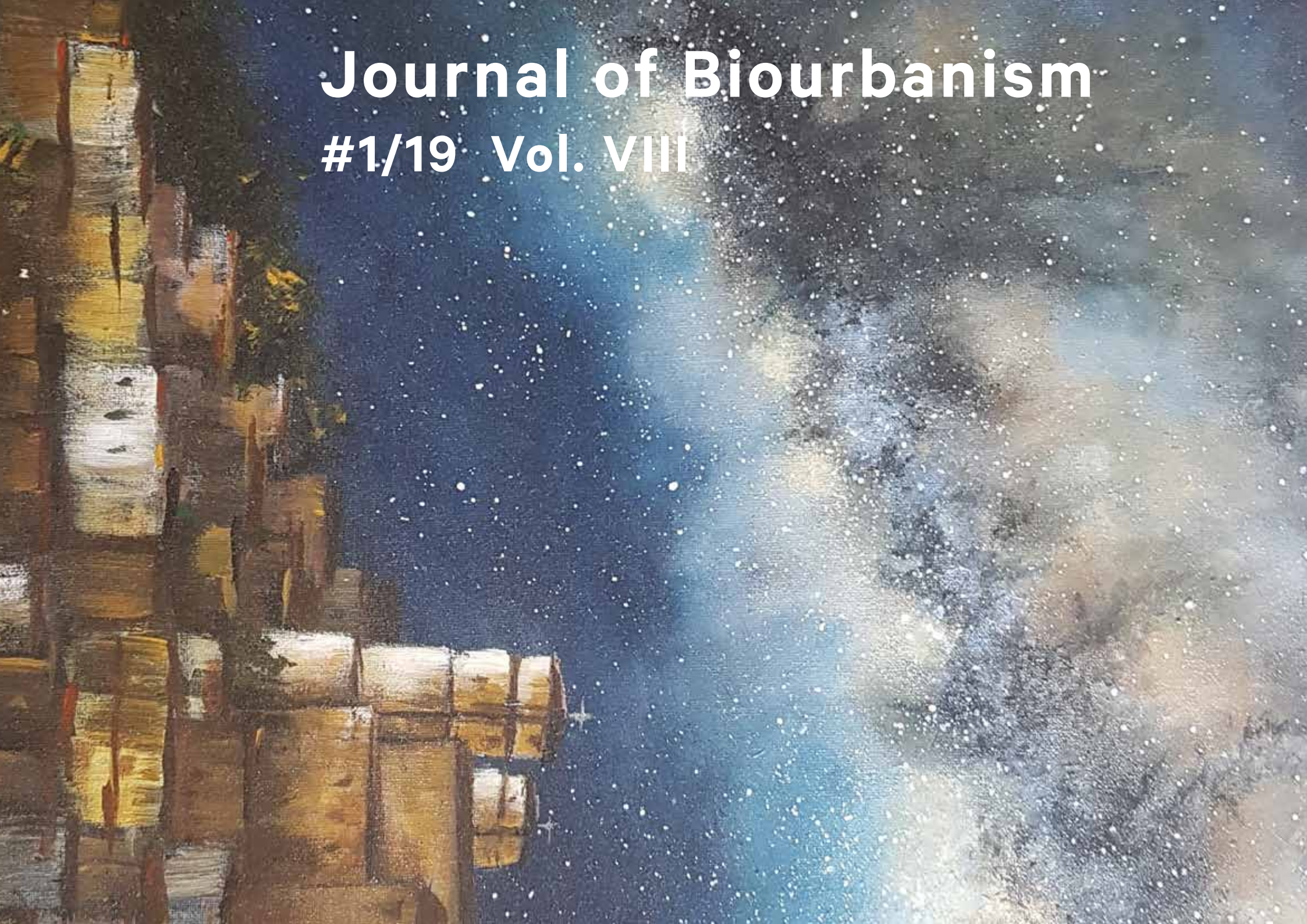


Journal of Biourbanism

#1/19 Vol. VIII

INTERNATIONAL SOCIETY OF BIOURBANISM

Cover: Artena Total Cosmos by Anca Mihaela Negrii (2019). Courtesy of Sara Bissen & Stefano Serafini.
The leaves reproduced throughout the issue are from the circular artistic practice “A Forest of Words” by Sara Bissen (Biourbanism Summer School: Designing a Home of Language, Artena, July 13–20, 2019). Photographs by Stefano Serafini.

JOURNAL OF BIOURBANISM

INTERNATIONAL SOCIETY OF BIOURBANISM
Publisher

Editor in Chief
Stefano Serafini

Managing Editors
Sara Bissen & Stefano Serafini

#1/2019
Vol. VIII

Published August 2020
ISSN 2240–2535

Rome ITALY
E-mail jbu@biourbanism.org
www.journalofbiourbanism.org
www.biourbanism.org

The **Journal of Biourbanism JBU** is a biannual peer-reviewed, interdisciplinary, international online journal. The journal takes an incisive look into the bios/life of urbanism through perspectives in architecture, planning, environmental studies, and other social sciences. The journal aims to critically review and define the notions of biourbanism. Assessing human-centered or need-based design sensibilities is a predominant concern, while attempting to address the disconnect between theory and practice in participating disciplines. The journal publishes cutting-edge research, methods, and innovative design approaches on biourbanism.

CONTENTS

Editor's Note: The Politics of Murmur

Stefano Serafini
Editor in Chief, International Society of Biourbanism

The making of an independent journal requires an amount of freedom (first of all in the form of time), which is becoming increasingly scarce. This issue was supposed to come out one year ago to propose a reflection on the experience of the fourth Biourbanism summer school, held in Artena, Italy from July 13–20, 2019, where brilliant minds such as Marwa al-Sabouni and Sergio Los contributed. A communication on the International Society of Biourbanism website ("Toward a home of language", 2019) and a few, sparse, private exchanges among some of the participants occurred instead. The quested "home of language"—in a world where both the concepts of home and reciprocal understanding are precipitously fading away—showed again to be made rather of silence. At the same time, though, it felt like meaning needed to seep deep underground to escape the drought that exterminates the woods of words we once used (or believed) to inhabit.

The end of the famous dystopian novel, *Farhenheit 451*, has a group of clandestines, mostly former scholars, hiding in the woods. By memorizing entire pieces of literature, philosophy, or poetry, they cultivate another woods, made of words, inside themselves. In fact, the urban civilization they had escaped from burns every book and condemns to death those who try to keep and preserve even just a bunch of printed paper leaves. The city drive imagined by Bradbury is made of consumption, dizziness, and solitude. People interact with screens ("the parlor") rather than with other humans, and every talk they have is utilitarian and deaf. Conformism permeates society. Control is everywhere. Nobody understands nor is interested in understanding anybody else for the last words, in a way, have been told already once and for all. The novel ends with the logical consequence of such a state of affairs: the urban civilization of consumption destroys itself deploying a quick and technologically efficient war. Only the rebels in the woods survive. They had seen the war coming; it is no surprise to them. They knew that the end of the city was only a matter of time.

The people of the forest have somehow put aside their individualities by becoming carriers of meaning, which transcends its record or means of transmission: "We are all bits and pieces of history and literature and international law, Byron, Tom Paine, Machiavelli, or Christ, it's here" (Bradbury, 1953, p. 145). They are aware that the essence of any word is the entire discourse these words contribute to bring to life. The entire woods speaks through the murmur of each leaf and, as precious as it may be, no single leaf can express the whole and terribly real meaning spoken by the woods.

> My grandfather (…) hoped that some day our cities would open up and let the green and the land and the wilderness in more, to remind people that we're allotted a little space on earth and that we survive in that wilderness that can take back what it has given, as easily as blowing its breath on us or sending the sea to tell us we are not so big. When we forget how close the wilderness is in the night, my grandpa said, some day it will come in and get us, for we will have forgotten how terrible and real it can be. (Ibidem, p. 150)

We continuously forget the silence from which design should flow, and that it is so much bigger than we and our projects are: "…this special silence that was concerned with all of the world" (Ibidem, p. 139). In fact, we can only envision the positive, uttered side of things and actions. This puts us in a

condition of subalternity to the current "urban civilization," if we want to keep Bradbury's metaphor going, which only can design to dominate.

Therefore, coming to this issue of the *Journal of Biourbanism*, I wonder: can agro-tourism really support the rurality of Nigeria against the noisy expansion of the city that comes with sewage, services, and drug consumption? Are we really protecting and bettering our cities when we try to patch them with our forestry, biourbanism, and biophilic design? Are our protests against the monstruosity of *Amazon urbanism* making a substantial difference?

In brief, we need uttered words, explained political alternatives, and well-illustrated projects. However, these come to light as signs of a system of measurement and control, "nature made audible in its estrangement" (Adorno & Horkheimer, 2002, p. 31), "equivalence" that "makes dissimilar things comparable" (Ibidem, p. 4). This is all fuel for the thanatic, unstoppable dialectic that twists every resistance strategies into its all-devouring counter-strategy. Words and actions establish moments of truth. Yet, immediately after, they become interface and a point of leverage for the stupidity of power, which is one reason Christopher Alexander fought against the concept of planning and design his entire life. This caveat is especially valid for those who look for a way out into the forest: "Nature, in being presented by society's control mechanism as the healing antithesis of society, is itself absorbed into that incurable society and sold off" (Ibidem, 2002, p. 119).

My question is about the ever-growing environment of radiant ideas we inhabit. This imaginary environment has been built by systematically exterminating any trace of darkness and woods, and it is the model of our deaf material urban civilization of consumption and utilitarianism, which frantically flies from the encounter with death and, hence, life.

> Enlightenment's mythic terror springs from a horror of myth. It detects myth not only in semantically unclarified concepts and words, as linguistic criticism imagines, but in any human utterance which has no place in the functional context of self-preservation (Ibidem, p. 22).

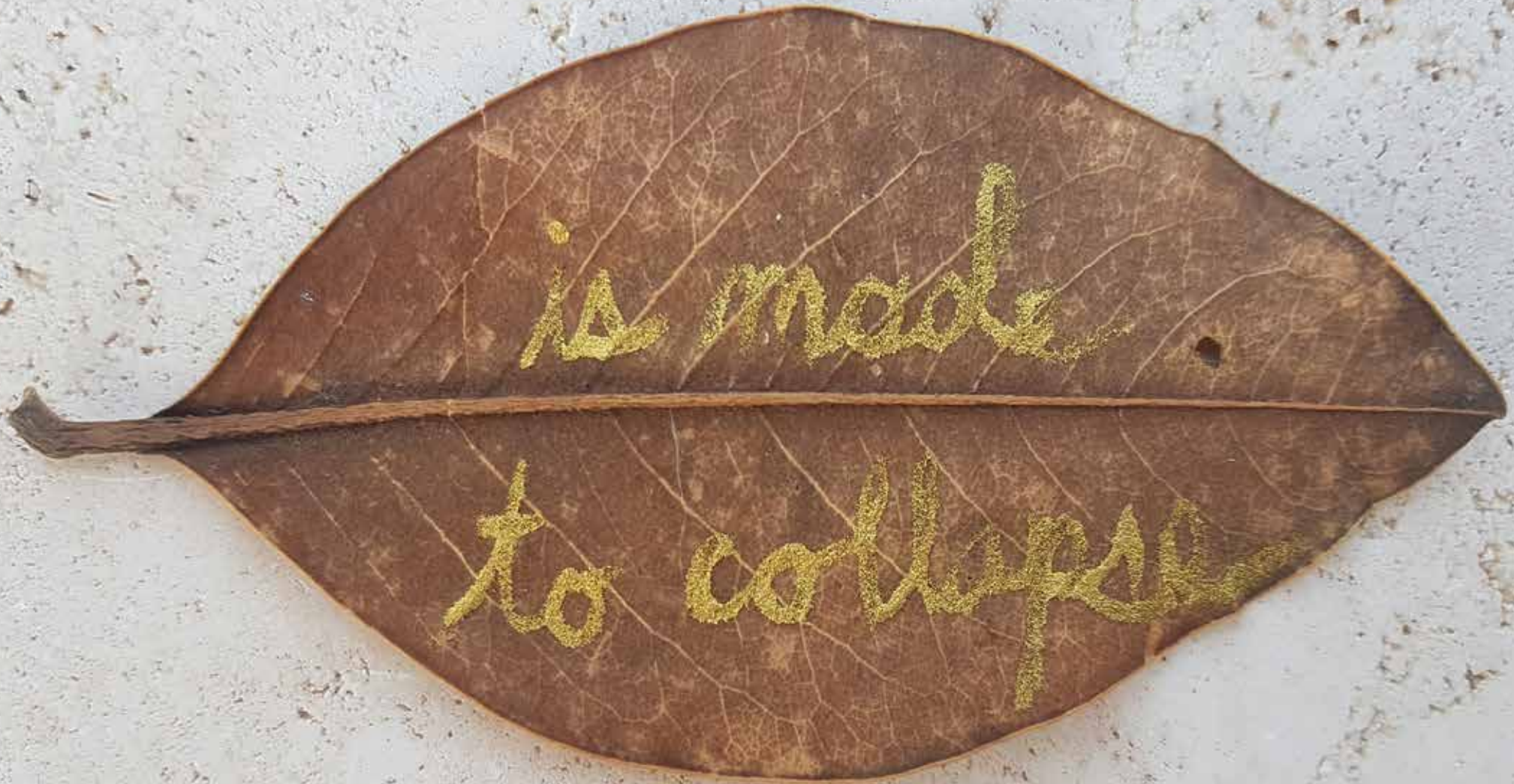
We will be unable to leave behind the dead city if we do not get rid of the word that is hollowed to become domination. We will not succeed in reentering the woods without renovating our own, common intentionality. We need to act and design not with words nor silence—trying to let biourbanism be a politics of murmur.

REFERENCES

Adorno, T. W., & Horkheimer, M. (2002). *Dialectic of Enlightenment: Philosophical fragments*. (Trans. E. Jephcott). Stanford: Stanford University Press.

Bradbury, R. (1953). *Farhenheit 451*. New York: Ballantine Books.

Toward a home of language: Conclusion of the 2019 Biourbanism Summer School in Artena. (July, 2019). Retrieved from http://www.biourbanism.org/towards-a-home-of-language/


is made
to collapse

The Biophilic Healing Index Predicts Effects of the Built Environment on Our Wellbeing

Nikos A. Salingaros
Department of Mathematics, University of Texas at San Antonio, United States of America

ABSTRACT

By estimating certain features of the built environment, we can predict positive healing effects that spaces and structures may have on users. This can be estimated *before* something is built. Anticipating people's eventual response to a new building or urban space is a radically new tool that links design to public health. Nothing like this is performed in current practice, however, which makes no attempt to quantify assessments of future healing effects. The proposed "biophilic healing index *B*"—a number from 0 to 20—permits us to quickly evaluate those factors responsible for improved human health as a result of the environmental geometry. The biophilic healing index is also very useful for repair, since it identifies which aspects of an existing building or space could be improved by renovation. Different portions of a structure could have widely different biophilic healing indices. Ten factors constitute the biophilic healing index, and identify different ways in which nature affects our body in an intrinsic yet subconscious manner. We expect healing responses from long-term physical experience of regions with a high value of the biophilic healing index. Existing data support this quantitative approach to designing healing environments. Experiments are proposed to explore the mechanisms responsible for the biophilic effect.

***Keywords*:** architecture, design, biophilia, biophilic design, complexity, fractals, salutogenesis, healing environments, neuroscience, design intent, wellbeing

INTRODUCTION: BIOPHILIA AND ITS EFFECTS ON PEOPLE

Biophilia denotes the human response to living things and to very special "biophilic" geometries in our environment. While biophilia was discussed by Erich Fromm (1973) and Edward O. Wilson (1984), its specific application to shaping the built environment is due to Stephen R. Kellert (Kellert & Wilson, 1995). Biophilia's positive effects come from two distinct sources:

> (*i*) Close proximity and visual contact with plants, animals, and other people.
>
> (*ii*) Positive response to artificial creations that follow geometrical rules for the structure of organisms.

People's neurological reactions to biophilic environments have a positive physiological effect, measurable by medical sensors such as heart rate, skin temperature and conductivity, adrenaline level, pupil size, et cetera. The primary literature presenting the experimental evidence is cited below, and in (Joye, 2007a; Kellert, 2018; Kellert, Heerwagen, & Mador, 2008; Ryan & Browning, 2018).

Claims for the health advantages of biophilia rest upon a variety of measurements. Exposure to a biophilic environment helps speed up post-operative healing, as documented in the classic experiments of Roger Ulrich (Ulrich, 1984). Patients' recovery times were compared for those whose hospital room faced a blank wall, versus those who had an immediate view of trees. Visual contact with nature showed a significant improvement in healing for the latter group (Kellert, Heerwagen, & Mador, 2008; Mehaffy & Salingaros, 2015). After an embarrassing delay of several decades, these findings have finally triggered the implementation of biophilic design guidelines for hospitals (Ryan & Browning, 2018; Totaforti, 2018).

The rapidly growing topics of "healing environments" and "salutogenesis" are developing without reference to biophilia, even though the basic effects are the same (Salingaros, 2015). Healing environments are reviewed from the point of view of the healthcare profession in (Huisman, Morales, van Hoof, & Kort, 2012; Iyendo & Alibaba, 2014; Rakel, Sakallaris, & Jonas, 2018; von Lindern, Lymeus, & Hartig, 2016). Investigations of healing environments tend to include a broader range of factors than biophilia does (such as pathogens, pollutants, and toxins), which makes causal analysis more problematic. We instead wish to focus strictly upon those effects due to the geometry and surfaces. In addition, healthcare professionals are easily diverted from biophilic effects intrinsic in the built environment. Hence, they often accept architects' designs having very poor biophilic properties without question, and this point is what the present paper tries to clear up. Due to this misunderstanding, new hospitals that claim to reduce stress and anxiety may actually be increasing them.

Long-term effects of biophilic design impact human health. Existing results reveal that our immune mechanism is reinforced and our stress level is reduced in biophilic environments. More research is needed to establish the evidential basis for this effect; data suggest that our body is healed through direct exposure to natural environments (Frumkin, 2008; Frumkin et al., 2017; Joye & van den Berg, 2011; Ryan & Browning, 2018; Velarde, Fry, & Tveit, 2009). For example, a positive correlation exists between cortisol hormone levels and the close, direct experience of nature (Ward-Thompson et al., 2012); physical activity in green places shows a measurable positive mood and increase of self-esteem (Barton & Pretty, 2010); the overall health of those who live near forests and green spaces is statistically better (Beyer, Kaltenbach, Szabo, Bogar, Nieto, & Malecki, 2014; Engemann et al., 2019; Li, Kobayashi, & Kawada, 2008); there is a significant correlation between living near forests and healthy brain structure (Kühn et al., 2017) and improved mental health (Bratman et al., 2019; Preuss et al., 2019); and more evidence of the health benefits of closeness to green spaces (Brethour, Watson, Sparling, Bucknell, & Moore, 2007; Dravigne, Waliczek, Lineberger, & Zajicek, 2008).

The reasons behind biophilia's healing effects remain a mystery, however. This paper (consistent with a few other authors) argues that the *complex geometry* of the environment is responsible for the biophilic effect, but it has to be a special type of complexity. New buildings and urban spaces that employ biophilic design promise a major health factor for their users. This approach lends itself to immediate practical applications. A more intense type of healing environment everywhere is possible today, and accomplishing this does not rely exclusively upon proximity to plants.

Yet, despite the enormous implications for human wellbeing, design typologies continue to be based on abstract images that are neutral in their biophilic impact, or worse, explicitly anti-biophilic (Salingaros, 2015). A radical change in design intentionality would discard present-day architectural formalisms to adopt a completely new method of healthy design (Buchanan, 2012). This is imperative for the world's health. In promoting a major reorientation in architectural culture, it is useful to have a simple numerical measure for biophilia that architects can easily compute and apply, and that is provided here.

QUANTIFYING BIOPHILIA BY ESTIMATING THE "BIOPHILIC INDEX" OF A BUILDING

Trying to quantify biophilic effects makes the assessment of architectural projects more objective. We ought to be able to predict the healing effects of specific environments *before* they are built, which will save an enormous amount of resources. This robust scientific approach contrasts with the usual assessments of architects based on dubious aesthetics. Ten factors responsible for biophilia estimate the biophilic content of any physical setting. These factors are described and justified in the next section, and discussed in detail in (Salingaros, 2015). They are very easy to estimate using the descriptions given later. The whole point of the paper is to back up the following conjecture:

> **Conjecture**: "*The Biophilic Index correlates directly with long-term healing effects of the built environment.*"

The present discussion is intended to spark interest for more experimentation to support the conjecture on healing effects (but direct verification is left to future publications). A confluence of results from neurology, physiology, and environmental psychology justifies the simple quantitative model presented here. The biophilic index is immediately understandable to the general public, representing an important environmental component that affects our health. This biophilic influence on human wellbeing was important historically, and still is in traditional cultures, but was neglected after the rise of industrialism.

1. **Sunlight**: preferably from several directions
2. **Color**: variety and combinations of hues
3. **Gravity**: balance and equilibrium about the vertical axis
4. **Fractals**: things occurring on nested scales
5. **Curves**: on small, medium, and large scales
6. **Detail**: meant to attract the eye
7. **Water**: to be both heard and seen
8. **Life**: living plants, animals, and other people
9. **Representations-of-nature**: naturalistic ornament, realistic paintings, reliefs, and figurative sculptures—including face-like structures
10. **Organized-complexity**: intricate yet coherent designs—and extends to symmetries of abstract face-like structures

Table 1. Ten components of the biophilic index B

The proposed model adds these ten biophilic criteria together into a single number. Instead of merely counting the number of biophilic factors present in a building or urban space, a simple numerical estimate permits a more accurate result. In fact, this method was developed earlier to measure organized complexity as the analogy of "Life" in a building (Salingaros, 2006). We can estimate an integer value from 0 to 2 for the intensity and presence of every one of the ten biophilic qualities as follows.

Estimates: { none = 0, some = 1, a large amount = 2 }.

Definition: *"Biophilic index B"* = Light + Color + Gravity + Fractals + Curves + Detail + Water + Life + Representations-of-nature + Organized-complexity.

Range: $0 \leq B \leq 20$.

Summing the estimates for the ten individual qualities gives the "biophilic index *B*", which is a number ranging from 0 to 20. This metric is useful in assessing the biophilic content of different buildings. We can compare buildings in distinct architectural styles, from different periods and locations, and in different shapes and sizes (independently of the usual stylistic concerns, which play no role in this model). The biophilic index works for different locations within a single building, and to compare interior with exterior spaces, open with closed spaces, et cetera. The index thus enables us to measure the biophilic—hence healing—impact of very different buildings in a relatively objective manner.

We do not normally expect any single building to have a maximum score of the biophilic index, $B = 20$, although some of the best-loved historical buildings could approach it (Salingaros, 2006). An architect can aim for a high value of *B* in his/her design, as allowed by the budget and practical constraints. There are various distinct ways to increase the biophilic index, as noted in the ten factors. Buildings created according to different styles will incorporate healing effects in their own individual manner, by emphasizing one or more of the biophilic criteria. Knowing how to achieve this is key to hospital design and long-term health in living and work environments.

HOW DO WE DESIGN BIOPHILIC BUILDINGS AND ENVIRONMENTS?

Rules for biophilic design are straightforward to implement once we understand the dual origins of this basic effect. First, human beings require intimate contact with nature and with other living beings. This part of biophilia is directly and intuitively understood as the healing influence of nature (Kellert, 2018; Kellert, Heerwagen, & Mador, 2008). While such effects are rooted in traditional medicine in all societies, important new experimental measurements are rapidly accumulating on the healing properties of natural environments (Bratman et al., 2019; Greven, 2017). Second, but more abstract, is to represent a special "biophilic" geometry in the artificial built environment. The intended effect duplicates the positive healing feedback that a user experiences from living matter. Designers create shapes that trigger the same sensation as biological forms, but without necessarily mimicking them.

The biophilic index represents a quantitative formulation of biophilic design. Similar but distinct checklists of biophilic criteria have been proposed by Stephen Kellert (Kellert, 2018), the Terrapin Bright Green group (Browning, Ryan, & Clancy, 2014; Ryan, Browning, Clancy, Andrews, & Kallianpurkar, 2014), and the present author (Salingaros, 2015). The pluralism of those lists indicates that different researchers are converging on the subject from slightly different directions, which is to be expected for a discipline that is still evolving. A useful checklist taken from a booklet used in courses for architecture students (Salingaros, 2015) will be further supplemented, below.

First checklist of biophilic design criteria.

1. **Sunlight** — natural light on two sides of a room (Alexander, Ishikawa, Silverstein, Jacobson, Fiksdahl-King, & Angel, 1977). Our eyes focus better and we can use our stereo vision to see three-dimensional depth (Read, 2015). Circadian rhythms and vitamin D production need sunlight to function (Hasegawa & Arita, 2013; Holick, 2019; Remi, 2015). Sunlight also has direct therapeutic qualities (Edelstein & Macagno, 2012; Walch et al., 2005).

2. **Color** — comes from both the hue of transmitted light and pigments on surfaces. Many bright or intense colors affect our mood positively (Jacobs & Hustmyer, 1974; Kardan et al., 2015; Kurt & Osueke, 2014), whereas gray and dark brown are associated with depression and remind us of putrification, illness, and death (Carruthers, Morris, Tarrier, & Whorwell, 2010; Osmond, 1966; Salingaros, 2003).

3. **Gravity** — buildings need to reinforce the vertical axis and not appear about to fall down on our head. The balance mechanism of our inner ear checks for the horizontal and vertical, and triggers nausea and vomiting whenever those reference axes are violated (Chin, 2018; Gallagher & Ferrè, 2018).

4. **Fractals** — forms that are subdivided in a regular manner going all the way down in scales. This is evident in all traditional architectures, which rely upon rich borders, frames, moldings, ornament, and the use of natural materials with ordered textures (Joye, 2006; 2007b; Salingaros, 2012; Taylor, 2006). People refuse to look at empty, non-fractal shapes and surfaces (Sussman, & Ward, 2017), since minimalism triggers emotional discomfort (Leach, 2016; Salingaros, 2003; van den Berg, Joye, & Koole, 2016).

5. **Curves** — balanced curves in a building's structure act independently, or together with bringing the curves of plants up close to and into buildings. Our eye and brain have specific curvature sensors, thus we instinctively seek curves all around us (Bar & Neta, 2006; Berman et al., 2014; Dazkir & Read, 2011; Gómez-Puerto, Munar, & Nadal, 2016).

6. **Detail** — meaningful and obvious details in our immediate surroundings. The eye was designed to look for and interpret details that are essential for our survival (Ramamurthy & Lakshminarayanan, 2015; Salingaros, 2003). We "read" intentions in the details of an animal or human face (Leopold & Rhodes, 2010). That is why we respond positively to the details in natural materials such as wood, travertine limestone, colored marble, et cetera. (Rice, Kozak, Meitner, & Cohen, 2006; Sakuragawa, Miyazaki, Kaneko, & Makita, 2005).

7. **Water** — seeing and hearing water helps to calm us (Nichols, 2015; Wheeler, White, Stahl-Timmins, & Depledge, 2012; White et al., 2010). Probably an ancestral effect from our evolution, it is used extensively in Islamic architecture to promote psychological wellbeing.

8. **Life** — lots of plants, non-threatening animals, and other people near us. Built structures blend with plants by having green courtyards, many interior mini-gardens as small as one square meter, and buildings with a meandering footprint that semi-encloses and protects outside trees so we can see them closely through windows (Barton & Pretty, 2010; Greven, 2017; Takano, Nakamura, & Watanabe, 2002; Ward-Thompson et al., 2012).

Biophilic design is not a list of rigid rules, but rather a set of mechanisms that allow an infinite number of design solutions within the ten biophilic constraints. There is tremendous freedom in designing with biophilia while respecting the above basic guidelines. The specifics of each project

are left up to the imagination and creativity of the individual architect, and in how he/she interprets and implements the above factors.

TWO ARTIFICIAL BIOPHILIC CRITERIA

The list is completed by considering two additional biophilic qualities having specifically human origins. They are more complex than the first eight biophilic factors, which are called "low-level visual features" by some researchers. (For this reason, we can refer to the two new components as "higher-level visual features"). These factors estimate representations of nature that we connect to: the first is explicit, and the second implicit. Visual representations of animals, people, and plants have a long history in human evolution, playing a defining role for the artistic and religious heritage of particular group cultures. Humans have also mimicked the mathematical properties of natural structures in their more abstract art forms, at least prior to the 20th Century (Salingaros, 2019). These qualities relate to the type of visual complexity the human brain requires for navigating the world.

Additional criteria for biophilic design

9. **Representations-of-nature** — a category that includes realistic depictions of plants, animals, and people either as photographs, paintings, or sculptures. While not part of architectural tectonics, all of these contribute to biophilia in a major way.

10. **Organized-complexity** — purposeful complication that is also accompanied by a high degree of organization (Alexander, 2001; Salingaros, 2006; 2018). Abstract architectural ornament in the Islamic world exemplifies this effect. There are two opposite states that diminish this factor: either empty simplicity, or disorganization.

Since the early days of humanity, a realistic depiction of plants, animals, and people was inseparable from other aspects of architecture. That practice was indeed automatic before interior decoration split away from architecture, with architects left to practice only tectonics. Experiments show that images of nature have healing effects similar to direct exposure to nature (Brown, Barton, & Gladwell, 2013; Tse, Ng, Chung, & Wong, 2002; Yin, Zhu, MacNaughton, Allen, & Spengler, 2018). Throughout history, domestic, religious, and civic architectures represented living forms as images that were integral to the wall surfaces. Representation does not refer only to portable paintings put up on a wall (even though those do play a significant role), but to frescoes, mosaics, and sculptural reliefs forming a permanent part of the building. Traditional buildings the world over have their interiors ornamented with organic motifs.

The **Representations-of-nature** component of the biophilic index is straightforward to measure, yet the iconoclastic turn that art took in the 20th Century towards abstraction complicates the present situation. For several decades, it is uncommon to see sponsored representational art featuring animals, people, and plants. Therefore, architects will have to resurrect an artistic interest that is all but dead in the "official" world of art, although it is paradoxically central in advertising and commercial art. Also, realistic depictions have always been a vibrant expression of folk art in the form of unofficial murals. People are viscerally attracted to **Representations-of-nature**.

One promising entry into experiments to verify this component has already been achieved by discovering the innate attraction of faces. Recent neuroscience experiments reveal that mammalian brains devote considerable resources to recognizing faces in general, and known faces in particular (Chang & Tsao, 2017). This is an essential advantage for the survival of our species, and therefore we seek faces and figures—other people, strangers and acquaintances, as well as faces represented in

and on our buildings. Eye-tracking devices show that people look for other human figures in a landscape *before* focusing on any particular architectural or structural feature (Sussman & Ward, 2017). Empty, minimalist "design" components preferred by present-day architectural culture do not draw the eye at all—they might as well not be there!

The bilateral symmetries of an animal or human face can be reflected in an entire building to draw attention to it. People respond positively when the abstract geometry of a face is represented in a building's structure (Sussman & Ward, 2017). Contained in the two additional biophilic factors **Representations-of-nature** and **Organized-complexity** is how closely a building entrance or façade resembles some stylized giant animal face, with characteristic vertical symmetry axis, and symmetrically distributed focal points roughly corresponding to mouth, eyes, ears, et cetera. (Salingaros, 2017). We feel a kind of deep kinship to such a building, much more than to a building with an abstract design that eschews facial symmetries.

While these last two biophilic factors can be identified in almost all traditional and vernacular architectures, with modern times we come to a schism. A strong desire to erase biophilic properties drives the surface appearances of the minimalist design style (Buchanan, 2012; Salingaros, 2006; 2015; 2018). Just as with similarly intolerant iconoclastic movements throughout history, 20th century architectural culture (starting with Bauhaus modernism) became intolerant of historic design practices (Curl, 2018). Industrial minimalism also erased the abstract, mathematically rich ornamentation responsible for **Organized-complexity** that is a central feature of all varieties of Islamic architecture (Salingaros, 2006; 2019).

Non-representational ornament represents a distinct approach to encoding biophilia in artifacts and buildings. The goal is to (subconsciously) mimic the complex geometry of natural forms through abstract designs. For example, the symmetrical alignment of windows in a wall could reflect the multiple subsymmetries defined by those windows. Linking different scales, the internal symmetries of traditional windows reflect larger scaling symmetries present in the building, which might be scaled-up motifs from ornament. Traditional design methods mimic the fractal geometry of natural forms. Moreover, symmetry breaking by adding variety on smaller scales prevents information collapse; i.e. information cannot be compressed below the threshold.

Organized-complexity is fundamental in understanding human responses to architectural form and environments. Our mind seeks meaningful information around us. Because this topic is misunderstood and not even well-defined, little useful research has been done. Using measures of organized complexity from Christopher Alexander (Alexander, 2001) and the present author (Salingaros 2006; 2014; 2018), experiments find a marked preference for **Organized-complexity** (Coburn et al., 2019). The brain is set up to process complex images that are neither random (with too much uncorrelated information), nor simplistic (informationally trivial). A threshold degree of ordered complexity establishes a physiological reference, and departures either way generate emotional discomfort.

The present author reported earlier that **Organized-complexity** is responsible for enhanced animal brain development in "enriched environments"; hence one can assume that the same effect probably occurs in humans (Mehaffy & Salingaros, 2012). Independent support for **Organized-complexity** comes from data on the healthy brain development of children living near green spaces (Kühn et al., 2017). Those researchers found a strong correlation for people living near forests (high degree of **Organized-complexity**), but only a weak correlation with urban green areas, which tend to contain lawn, or isolated bushes and trees (low degree of **Organized-complexity**). This result was surprising, considering that many studies have linked positive health effects with urban green, but is explained because of the increased *complexity* of green that is more than just flat lawn.

These last two (higher-level) biophilic factors **Representations-of-nature** and **Organized-complexity** overlap somewhat with (low-level) previous ones: **Color**, **Fractals**, **Curves**, and **Detail**. It's not essential to have an irreducible set of biophilic qualities, but only a useful checklist that architects can use for improving their designs before implementation. The above ten criteria cover what is important to a designer and architectural practitioner interested in biophilia. There exist distinct biophilic descriptors proposed by others, mentioned below, and perhaps there are additional mechanisms that we are as yet unaware of.

BIOPHILIC DESIGN WAS INSTINCTIVE IN THE PAST

It turns out that traditional architectures throughout history were driven by biophilia. Two separate sets of design tools combine to achieve this effect:

(a) Make real nature intimately accessible.

(b) Build by using lessons from the geometry of nature.

There are definite and important advantages to this approach of shaping the built environment. Yet a determining though subconscious motivation for healthy design is not new but timeless. A major effort at understanding healing environments was undertaken by Christopher Alexander and his associates, first in documenting "design patterns" (Alexander, Ishikawa, Silverstein, Jacobson, Fiksdahl-King, & Angel, 1977), then in uncovering the geometrical principles behind those patterns (Alexander, 2001). Newly-documented patterns are published recently (Mehaffy, Kryazheva, Rudd, & Salingaros, 2019). Socio-geometric patterns repeat throughout millennia of human building activity, and are found in every traditional culture around the world. Those discovered design solutions represent invariants that help support human health.

Patterns anticipate and support biophilic design by using nature as a source of mental and physical nourishment. Design patterns predate the introduction of biophilia into architecture, and there exists an intimate connection between them (Salingaros & Masden, 2008). While not all design patterns relate to biophilia, many of the critical ones do. Human beings crave environments with a high biophilic index, as evidenced in traditional built environments. Unfortunately, at the time when design patterns were initially introduced, dominant architectural culture dismissed them as some personal preference. They certainly are preferred: when the design intention is to create a healing environment.

Here, I wish to establish the precedent set by patterns in documenting design solutions that were re-discovered during the more recent developments of biophilic design. For those readers unfamiliar with patterns, I am providing my own summary of each pattern mentioned (Alexander et al., 1977). All of the components of the Biophilic Index can be correlated with patterns, as described below.

For example, the component **Sunlight** of the biophilic index comes from three Alexandrian patterns:

PATTERN 107 WINGS OF LIGHT. Rather than having a compact building whose interior needs to be artificially lit, design the footprint so that the building consists of fairly narrow wings. In this way, every wing will receive sunlight generously.

PATTERN 128 INDOOR SUNLIGHT. Take advantage of sunlight, which in the Northern Hemisphere requires a predominantly Southern exposure. A building that optimizes for this will have to be elongated in an East-West direction.

PATTERN 159 LIGHT ON TWO SIDES OF EVERY ROOM. Natural light coming from two separate directions satisfies a fundamental psychological need. Try to design the most useful rooms with this feature.

In the same way, the component **Color** comes from this pattern:

PATTERN 250 WARM COLORS. A warm light in a room (as far as color temperature) is the combined effect of outside sunlight, artificial light, and interior color surfaces. Perceiving the ambient light as warm has positive psychological consequences.

The biophilic component **Water** is related to the three patterns:

PATTERN 25 ACCESS TO WATER. The land-water interface should not be treated industrially, or left derelict, but instead developed to promote easy and positive psychological contact.

PATTERN 64 POOLS AND STREAMS. Instead of automatically covering up open water and streams, create permanent structures and paths alongside them, and bridges to cross over them. Where there is no water, create a fountain.

PATTERN 71 STILL WATER. Shape one side of a local pond so that it provides access for stepping into. Where possible, and conditions permitting, provide an open swimming pool to the community.

The biophilic component **Organized-complexity** relates to the following pattern.

PATTERN 249 ORNAMENT. Ornament serves an important connective function between architectural components. Correctly used, ornament will join the edges of two elements into one larger whole, rather than having pieces come up to one another abruptly.

… and so on.

Many societies naturally mix greenery and water with the built urban fabric for a very successful biophilic effect. Traditional buildings of all kinds emphasize the vertical axis and avoid unbalanced diagonals—this choice is instinctive, and it took a concerted effort to suppress sensory feedback before architects could design unbalanced and twisted buildings. Such forms still alarm the public (and will continue to do so), despite bogus explanations. The physiological need for a vertical reference discredits prize-winning buildings that produce anxiety and vertigo. This criticism has triggered a huge public controversy: but not for jeopardizing human health. Instead, critics are themselves attacked for daring to question dominant design fashions (Buchanan, 2015; Mehaffy & Salingaros, 2015; 2018; Silber, 2007).

To get an idea of how our own biology directs the shape of what we build, look at the majority of built structures on the Earth, which are in fact erected without architects (Alexander, 1979). Owner-built settlements rely upon the builders' own intuition in optimizing their psychological experience, and are to a very large extent biophilic. Those self-built forms result from using the body's instinctive reactions to make design judgments at each stage of the process. Biophilia drives unselfconscious design. Such informal buildings historically evolved into the more formalized typologies that we find in every traditional form language (but contradict current design fashions).

Traditional landscape architects intuitively know many of the biophilic design rules: after all, they work primarily with plants. But they seldom get to influence the urban design plan or the building's footprint, being given responsibility only for the garden. The built environment would greatly

improve by giving landscape architects greater design responsibility over the architecture as well. Working together with contemporary classical architects, landscape architects have created perfectly biophilic buildings and urban spaces (usually without calling them as such, since the term is only now being adopted by design professionals).

People like buildings or not because they judge them according to their own visceral responses, and not by applying formal criteria as architects invariably do. In the great disconnect from evolved traditions that resulted in International Modernism (Buchanan, 2012; Curl, 2018; Salingaros, 2006), many biophilic design rules, which were understood but unwritten, were discarded. The major positive development, however—an almost obsessive emphasis on glass curtain walls—promotes the biophilic factor of **Sunlight**. Modernist architects recognized its health benefits (Yuko, 2018). The best-loved among early modernist buildings turn out to rely upon satisfying some of the criteria for biophilia, i.e. detail in natural materials, some color, pools of water, views onto nature, et cetera. (Salingaros, 2015). Biophilic design works to improve a project, even within a strictly modernist style. Nevertheless, the formal intentionality of modernist design is incompatible with the other biophilic factors.

The framework for healing environments presented in this essay, which is supported by massive experimental and observational evidence, defines an old-fashioned picture for architecture and design. Not for reasons of nostalgia, but because our ancestors intuitively reached the same conclusions that today took concerted research efforts. Components of healing environments include structures on the human scale (the opposite of inhumanly-scaled giant buildings); the use of natural materials possessing fine-grained organic structure visible to the eye; and, most important of all, the ornamental traditions common to all cultures. Biophilia contradicts two standard building typologies: sterile industrial glass and steel skyscrapers, and minimalist concrete surfaces.

BIOPHILIC MEASURES USED BY OTHER AUTHORS

An architect interested in implementing biophilia in his/her design today faces some minor confusion, because different authors propose slightly different sets of metrics. The intent is the same, yet, since the discipline is still evolving, there is no uniform consensus. The table below might help to offset any confusion. Open-source descriptors used by Kellert (Kellert, 2018) and the Terrapin Bright Green group (Browning, Ryan, & Clancy, 2014) are compared to the ones described here. Sometimes, two or more qualities are combined in order to find the equivalent class proposed by the other authors.

Kellert	**Terrapin**	**Salingaros**
Light	Dynamic and diffuse light	Sunlight
Color	—	Color
Natural geometries + Shapes and forms + Information richness	Biomorphic forms and patterns	Fractals + Curves + Detail
Water	Presence of water	Water
Plants + Animals	Visual connection with nature + Nonvisual connection with nature	Life
Images	—	Representations-of-nature
Organized complexity	Complexity and order	Organized-complexity

Table 2. Equivalent biophilic metrics

Kellert proposes a list of 25 qualities, whereas Terrapin lists 14. Those authors do not suggest combining the measures in a quantitative manner for reference. There is an advantage in the model presented here that sums up ten biophilic qualities to obtain a single number for the biophilic index. It is worth noting that Paul Downton and his collaborators felt the need for **Representations-of-nature** while using the Terrapin biophilic metrics, and introduced an additional equivalent metric as "Virtual Connection with Nature" (Downton, Jones, Zeunert, Roös, 2017).

One can correlate the above authors' further descriptors (not listed here) to find direct or indirect correspondences. Those are not included in this paper because they are better identified as non-biophilic design patterns (in this author's opinion). Spatial design patterns definitely lead to improved wellbeing, but are not directly related to biological structure. The present approach prefers to separate biological structures from notions of spatiality described by large-scale geometries (handled by design patterns). Among such descriptors are "Prospect" and "Refuge" (combined together by Kellert, but listed separately by Terrapin). The Alexandrian pattern 114 HIERARCHY OF OPEN SPACE contains these two effects (Salingaros, 2015).

Berto and Barbiero (working with other colleagues) have registered what they call the "Biophilic Quality Index" at *Società Italiana Autori ed Editori* (SIAE) in Rome (Berto & Barbiero, 2014; Berto, Barbiero, Pasini, & Unema, 2017; Berto, Barbiero, Barbiero, & Senes, 2018). Apparently, their index is quantitative, just like the biophilic index introduced in this paper. Because of the proprietary nature of their model, however, there is little public information available. Neither the general public, nor interested researchers can work with an index that is kept a trade secret. The few published details of their model indicate that the number of factors is considerably larger than the ten used for the present model.

HEALTHIER ARCHITECTURE IS POSSIBLE THROUGH BIOPHILIA

A building that achieves intimate contact with nature triggers positive emotions from close interaction of the user with plants (Brethour, Watson, Sparling, Bucknell, & Moore, 2007; Dravigne, Waliczek, Lineberger, & Zajicek, 2008). More and more contemporary buildings pay attention to including more green; yet anxiety-inducing industrial forms, materials, and typologies remain firmly in place as the current architectural paradigm. Plants satisfy only one part of biophilia that depends upon proximity to nature, but could obscure the need for healing geometries in the fabric of the building itself.

For example, some contemporary architects build anti-biophilic industrial/mechanical buildings set in a garden, hence the result is schizophrenic. Superficially the plants are biophilic, but the built structures are not. Ingrained unnatural architectural styles override biophilia, and so they mix positive with negative biophilic factors. This approach confuses not only the public but also other researchers in biophilia. Failing to distinguish between the opposite geometries of anxiety-inducing and healing elements, buildings with contradictory qualities are unfortunately mistaken as "good" examples.

Traditional and vernacular architectures generate fractal, ordered, and ornamented buildings. Pre-industrial design subdivided forms to define **Fractals** and **Organized-complexity**, and employed **Color** variety, ordered **Detail**, ornament, **Curves**, and **Sunlight** (Salingaros, 2006; van den Berg, Joye, & Koole, 2016). Incorporating **Organized-complexity** into a structure results in old-fashioned ornamented façades, entrances, and interiors. Those satisfy several of the criteria for biophilia, creating positive salutogenic effects. Yet without plants and mini-gardens enclosed or semi-enclosed by the building, or views to nature, the biophilic effect remains incomplete.

Implementing biophilia exclusively with inert materials, therefore, can only go so far. The biophilic quality of new buildings does not depend primarily upon materials, but upon a special type of **Organized-complexity** in their structure, as well as real connections to nature. Traditional architects can already do much of that—all they need is a good traditional landscape architect to work with. Biophilic buildings relax formal design to embrace nature intimately.

Traditional architecture is replete with design solutions that rely upon the successful and sustainable use of green. Those are documented in three Alexandrian design patterns (Alexander et al., 1977):

PATTERN 118 ROOF GARDEN. Design a building so that there is place for a roof garden on different storeys. Guarantee easy access to the garden from that level.

PATTERN 174 TRELLISED WALK. A garden path with a trellis over it and plants growing on it creates a special healing environment. Additionally, this typology serves to define a useful semi-permeable vertical boundary for an area of the garden.

PATTERN 246 CLIMBING PLANTS. Allow and encourage climbing plants to grow vertically on a sunny exterior wall.

The problem, however, occurs when architects promote biophilic design mainly through images of far-fetched schemes of urban greening. Among interesting biophilic experiments are some typologies that look good, but are both resource-expensive and far too expensive to maintain economically in the long term. These include green roofs, vertical gardens on a wall, and trees growing in the balconies of high-rises. It now seems that those ideas have limited application, with proven successes being highly climate-specific (namely, in regions of the world with sustained high rainfall). Otherwise, such typologies can become another extremely costly, high-maintenance, high-tech gimmick to sell a project. We see them nowadays in the renderings for competition entries, but most of those are not sufficiently thought out to guarantee sustainability (Mehaffy & Salingaros, 2015).

The key considerations for these attractive biophilic elements of design are that they should be *adaptive*, *low-maintenance*, and *low-tech*. If plants can be encouraged to grow up a wall or on a roof, then that creates a positive and useful feature (Downton, 2009; 2016). This design development conceives the human built environment as an integral part of the natural ecosystem. Genuinely natural schemes presuppose that the climatic conditions are appropriate. Yet contemporary architectural culture often promotes the opposite: a brutal industrial imposition of “techno-green” schemes favored by supporting industries of global real-estate speculation, together with the construction and structural engineering industries. Alarmingly, this is what we see illustrated in many references to biophilia in the glossy architecture magazines.

BIOPHILIA AND NEUROSCIENCE

Evaluating responses to architectural environments through neuroscience is creating an important new discipline (Mehaffy & Salingaros, 2018; Robinson & Pallasmaa, 2015; Ruggles, 2017; Salingaros, 2017; Sussman & Hollander, 2015; Sussman & Ward, 2017). Neuroscience confirms preferences for special geometrical structures in our environment, which were derived much earlier using information optimization, organizational principles, and from mathematical arguments anchoring biophilia (Salingaros, 2006; 2012; 2014). Evolution adapted our body to recognize and seek specific patterns and structures essential for our health and wellbeing; therefore, our normal neural responses instinctively privilege those specific mathematical patterns.

Neuroscientists who have turned to studying people's responses to environments seek the same goals as in this paper: "[to] predict what this influence [is] in the early stages of design and before the structure is built" (Edelstein & Macagno, 2012). Architectural practice could then be changed dramatically so it leads more purposefully to improved human health. As originally argued by Ary Goldberger (Goldberger, 1996), what we create reflects the structure of our brain (see also Mikiten, Salingaros, & Yu, 2006)). But this is only true for unselfconscious creation, which relies upon direct human feeling and feedback. Architects learn to consciously break away from the instinctive human need for biophilic geometries. Working according to the directives of contemporary architectural culture, they are taught to ignore their own body's intuitive responses, and to instead impose abstract formal criteria for design (Salingaros, 2017). It is known, though rarely publicized, that architects and laypersons have almost diametrically opposite architectural preferences (Brown & Gifford, 2001; Gifford, Hine, Muller-Clemm, & Shaw, 2002; Wilson, 1996).

Measuring our physiological state and cerebral responses ought to show either healing or fight-or-flight responses to objects, spaces, and environments. An unforeseen complication occurs, however, because architects have been conditioned through their training to privilege forms that generate anxiety (Salingaros, 2017; Sussman & Chen, 2017). They have therefore numbed and suppressed their innate biophilic preferences. This statement generates protests from the profession, but is supported by observations (Salingaros, 2006). It is essential for any future experiments on biophilia to identify the neurological responses of common people to environments as a baseline, and only then to test the contradictory responses from trained architects.

Many famous buildings that dominant architectural culture supposes to be paradigmatic *positive* examples elicit, in fact, strongly *negative* responses (Salingaros, 2017). But whenever experimental results supporting biophilia threaten to invalidate architectural icons, cognitive dissonance forces architects to ignore the data, or to interpret it in a biased manner. Their reactions to proposed neuroscience experiments are split into two: (*i*) disinterest in discovering what influences the human experience; and (*ii*) adopting selected results only if those prop up accepted architectural icons. Architects judge according to learned aesthetics superimposed onto their visceral responses, and already "know" the "correct" finding before an experiment is even set up.

This controversial point must be addressed; otherwise neurological research into human responses is destined for failure. A lot of research funding has already been wasted in trials that give ambiguous and confusing results. The reason is obvious. Professional designers simply cannot accept that they have been practicing anti-biophilic design, and have been misleading students and others in that choice. The health consequences for generations of users are immense. Cross-disciplinary teams investigating responses to the environment tend to include both neuroscientists and architects, but the latter inject their historical and stylistic prejudices into the design of the experiment. The neuroscientists naively trust the architects' opinion on what is a 'good' building, and could even accept some 'iconic' building as a reference for calibrating the experiment. Confirmation bias consequently invalidates all those efforts.

SUGGESTIONS FOR EXPERIMENTAL VERIFICATION

First, a simple general experiment is made possible by having available the quantitative biophilic index defined here. We can measure long-term health effects of buildings and places with different biophilic indices on their users, keeping in mind that this is still only one of many influences. The choice of specific physiological measurements is best left up to healthcare professionals who should run the experiments. Data will show whether healthier environments have higher biophilic index, as

many of us believe based upon the existing evidence. Accumulated findings should reinforce the health benefits of biophilic design.

Second, we would like to evaluate the possible relative weighting of each of the ten biophilic factors discussed in this paper. As presented now in the simplest hypothesis, they contribute equally to the biophilic effect, which was chosen as a working assumption. Architects interested in applying this model to their projects immediately ask: "which are the most important components of the biophilic index, so that I can neglect the others?" As yet, we have no way of knowing whether some factors might have more impact on our health than others. Any difference, if such exists, ought to be straightforward to measure by isolating each individual biophilic effect. Then, if desired, a weighted re-definition of the biophilic index B could be introduced later to reflect those findings.

This second set of experiments could resolve the question of what is the actual basis for the biophilic effect. This fundamental question yet remains unresolved. Some researchers associate the healing effect only with direct exposure to nature. (Yet this still does not explain the actual mechanism.) For them, imitations and representations of nature are secondary, and are conjectured to be only weakly effective in inducing the biophilic effect. Others, including this author, attribute comparable weight to natural environments and to artificial environments that contain the appropriate biophilic geometries. In this latter approach, mathematical complexity rather than some mysterious vitalistic force holds the explanatory key to biophilia.

Lately, many experimental groups are joining the broad research effort into questions about salutogenic environments. However, without an epistemological basis for addressing the problem, those results tend to be interpreted in a confusing manner. The related topics of aesthetics, affective benefits, attention restoration, beauty, cognitive preferences, mental and physical health, stress reduction, et cetera. tend to overlap and become jumbled. In the absence of a simple and practical model—such as the one presented here—collected data is not always presented in the best format for understanding how the human body reacts to its environment. Hopefully, we will soon see greater clarity in both theory and the interpretation of experiments.

CONCLUSION

Biophilic design promises a better built environment; one more adapted to a sustainable human future. Since biophilia is an essential part of human biology, building according to its principles automatically guarantees a more "natural" result. Doing this satisfies part of what is required for sustainability, in two ways. (*i*) The built structures are conceived as extensions of our biology and our ecosystem. (*ii*) We feel healthier in them, and therefore we will be more motivated to preserve them against wear and tear and replacement. Biophilic design, therefore, presents an alternative and complementary component to resilience and sustainability of the human habitat.

The ten biophilic qualities discussed in detail here represent strong interconnections among many different aspects and scales of the human-experienced environment. Those all affect us emotionally and physiologically. Biophilic design thus raises our consciousness up to a larger encompassing scale. Biophilia merges the building with its immediate surroundings: paying attention to context, position, orientation, main approach, paths, connection to urban fabric, et cetera. Forward-thinking people have been urging the design professions to adopt a broader systems approach as a prerequisite for solving problems in resilience and sustainability. We now have such an opportunity through biophilia.

In particular, biophilic design teaches us to think in terms of systems. By recognizing a variety of complex and dynamic factors, the principles of biophilic design define a systems approach to the

built environment. This follows from considering the multiple interacting variables that affect human health and psychology: the system is composed of human users interacting with the surfaces and volumes of a building. By contrast, architectural practice has for the past several decades emphasized design based upon formal abstractions, and neglected human responses to built forms (Mehaffy & Salingaros, 2015; 2018; Salingaros, 2006; 2012; 2017; 2018). Its "system" is strictly limited to the tectonic structure.

REFERENCES

Alexander, C. (1979). *The timeless way of building*. New York: Oxford University Press.

Alexander, C. (2001). *The nature of order, Book 1: The phenomenon of life*. Berkeley: Center for Environmental Structure.

Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I., & Angel, S. (1977). *A pattern language*. New York: Oxford University Press.

Bar, M., & Neta, M. (2006). Humans prefer curved visual objects. *Psychological Science*, 17, 645–648. doi.org/10.1111/j.1467-9280.2006.01759.x

Barton, J., & Pretty, J. N. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental Science and Technology*, 44, No. 10, 3947-3955. doi.org/10.1021/es903183r

Berman, M. G., Hout, M., Kardan, O., Hunter, M., Yourganov, G., Henderson, J., Hanayik, T., Karimi, H., & Jonides, J. (2014). The perception of naturalness correlates with low-level visual features of environmental scenes. *Plos One*, December 22. doi.org/10.1371/journal.pone.0114572

Berto, R., & Barbiero, G. (2017). The biophilic quality index: A tool to improve a building from "green" to restorative. *Visions for Sustainability*, 8, 38-45. doi.org/10.13135/2384-8677/2333

Berto, R., Barbiero, G., Barbiero, P., & Senes, G. (2018). An individual's connection to nature can affect perceived restorativeness of natural environments. Some observations about biophilia. *Behavioral Sciences*, 8, 34. doi.org/10.3390/bs8030034

Berto, R., Barbiero, G., Pasini, M., & Unema, P. (2014). Biophilic design triggers fascination and enhances psychological restoration in the urban environment. *Journal of Biourbanism, 3*(1&2), 27–34. https://journalofbiourbanism.files.wordpress.com/2016/01/jbu5.pdf

Beyer, K., Kaltenbach, A., Szabo, A., Bogar, S., Nieto, J., & Malecki, K. (2014). Exposure to neighborhood green space and mental health: Evidence from the survey of the health of Wisconsin. *International Journal of Environmental Research and Public Health, 11*(3), 3453–3472. doi.org/10.3390/ijerph110303453

Bratman, G. N., Anderson, C., Berman, M. G., Cochran, B., de Vries, S., Flanders, J., … & Daily, G. (2019). Nature and mental health: An ecosystem service perspective. *Science Advances, 5*(7), July. doi: 10.1126/sciadv.aax0903

Brethour, C., Watson, G., Sparling, B., Bucknell, D., & Moore, T. (2007). *Literature review of documented health and environmental benefits derived from ornamental horticulture products*. Guelph: George Morris Centre. Retrieved from https://www.agrireseau.net/horticulturearbresdenoel/documents/Reports_Ornamentals_Health_Benefits.pdf

Brown, D. K., Barton, J. L., & Gladwell, V. F. (2013). Viewing nature scenes positively affects recovery of autonomic function following acute-mental stress. *Environmental Science & Technology*, 47, No. 11, 5562–5569. doi.org/10.1021/es305019p

Brown, G., & Gifford, R. (2001). Architects predict lay evaluations of large contemporary buildings: Whose conceptual properties? *Journal of Environmental Psychology, 21*(1), 93–99.

Browning, W. D., Ryan, C. O., & Clancy, J. O. (2014). *14 patterns of biophilic design: improving health and well-being in the built environment*. New York: Terrapin Bright Green LLC. Retrieved from https://www.terrapinbrightgreen.com/reports/14-patterns/

Buchanan, P. (2012). The big rethink part 7: Place and aliveness – Pattern, play and the planet. *Architectural Review*, 24 July. Retrieved from https://www.architectural-review.com/essays/campaigns/the-big-rethink/the-big-rethink-part-7-place-and-aliveness-pattern-play-and-the-planet/8633314.article

Buchanan, P. (2015). Empty gestures: Starchitecture's swan song. *Architectural Review*, 27 February. Retrieved from https://www.architectural-review.com/essays/viewpoints/empty-gestures-starchitectures-swan-song/8679010.article

Carruthers, H. R., Morris, J., Tarrier, N., & Whorwell, P. J. (2010). The Manchester color wheel: Development of a novel way of identifying color choice and its validation in healthy, anxious and depressed individuals. *BMC Medical Research Methodology, 10*(12). doi.org/10.1186/1471-2288-10-12

Chang, L., & Tsao, D. Y. (2017). The code for facial identity in the primate brain. *Cell, 169*(6), 1013–1028. doi.org/10.1016/j.cell.2017.05.011

Chin, S. (2018). Visual vertigo: Vertigo of oculomotor origin. *Medical Hypotheses*, 116, 84–95. doi.org/10.1016/j.mehy.2018.04.025

Coburn, A., Kardan, O., Kotabe, H., Steinberg, J., Hout, M., Robbins, A., MacDonald, J., Hayn-Leichsenring, G., & Berman, M. G. (2019). Psychological responses to natural patterns in architecture. *Journal of Environmental Psychology*, 62, 133–145. https://doi.org/10.1016/j.jenvp.2019.02.007

Curl, J. S. (2018). *Making Dystopia: The strange rise and survival of architectural barbarism*. Oxford: Oxford University Press.

Dazkir, S., & Read, M. A. (2011). Furniture forms and their influence on our emotional responses toward interior environments. *Environment and Behavior, 44*(5), 722–732. doi.org/10.1177/0013916511402063

Downton, P. F. (2009). *Ecopolis: Architecture and cities for a changing climate*. Heidelberg: Springer.

Downton, P. (2016). "Green roofs and walls", in *Your home: Australia's guide to environmentally sustainable homes*, (Ed. C. McGee). 5th edition. Canberra: Department of Industry, Innovation and Science, 299–307. Retrieved from http://www.yourhome.gov.au/materials/green-roofs-and-walls

Downton, P., Jones, D., Zeunert, J., & Roös, P. (2017). Biophilic design applications: Putting theory and patterns into built environment practice. *KnE Engineering – The international conference on design and technology*, 59–65. doi.org/10.18502/keg.v2i2.596

Dravigne, A., Waliczek, T. M., Lineberger, R. D., & Zajicek J. M. (2008). The effect of live plants and window views of green spaces on employee perceptions of job satisfaction. *HortScience (American Society for Horticultural Science), 43*(1), 183–187. doi.org/10.21273/HORTSCI.43.1.183

Edelstein, E. A., & Macagno, E. (2012). Form follows function: Bridging neuroscience and architecture, in S. Rassia & P. Pardalos (Eds.). *Sustainable environmental design in architecture: Impacts on health*. New York: Springer, 27–41. doi.org/10.1007/978-1-4419-0745-5_3

Engemann, K., Bøcker-Pedersen, C., Arge, L., Tsirogiannis, C., Bo-Mortensen, P., & Svenning, J. C. (2019). Residential green space in childhood is associated with lower risk of psychiatric disorders from adolescence into adulthood. *Proceedings of the National Academy of Sciences*, published ahead of print February 25, 2019. doi.org/10.1073/pnas.1807504116

Fromm, E. (1973). *The anatomy of human destructiveness*. New York: Holt, Rinehart and Winston.

Frumkin, H. (2008). Nature contact and human health: building the evidence base. In S. R. Kellert, J. H. Heerwagen, & M. L. Mador (Eds.). *Biophilic design: The theory, science and practice of bringing buildings to life* (pp. 107–118). Hoboken: Wiley.

Frumkin, H., Bratman, G., Breslow, S., Cochran, B., Kahn, P. H., Lawler, J., Levin, P., Tandon, P., Varanasi, U., Wolf, K., & Wood, S. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives, 125*(7): 075001. doi.org/10.1289/EHP1663.

Gallagher, M., & Ferrè, E. R. (2018). The aesthetics of verticality: A gravitational contribution to aesthetic preference. *Quarterly Journal of Experimental Psychology, 71*(12), 2655–2664. doi.org/10.1177/1747021817751353

Gifford, R., Hine, D. W., Muller-Clemm, W., & Shaw, K. (2002). Why architects and laypersons judge buildings differently: Cognitive properties and physical bases. *Journal of Architectural and Planning Research, 19*(2), 131–148.

Goldberger, A. L. (1996). Fractals and the birth of Gothic. *Molecular Psychiatry*, 1, 99–104.

Gómez-Puerto, G., Munar, E., & Nadal, M. (2016). Preference for curvature: A historical and conceptual framework. *Frontiers in Human Neuroscience*, 16 January 2016. doi.org/10.3389/fnhum.2015.00712

Greven, K. M. (2017). The healing influence of nature. *Practical Radiation Oncology, 7*(6) 369–372. doi.org/10.1016/j.prro.2017.04.007

Hasegawa, Y., & Arita, M. (2013). Circadian clocks optimally adapt to sunlight for reliable synchronization. *Journal of the Royal Society Interface*, 11:20131018.

Holick, M. F. (2016). Biological effects of sunlight, ultraviolet radiation, visible light, infrared radiation and vitamin D for health. *Anticancer Research, 36*(3), 1345–1356.

Huisman, E. C., Morales, E., van Hoof, J., & Kort, H. S. (2012). Healing environment: A review of the impact of physical environmental factors on users. *Building and Environment*, 58, 70–80. Retrieved from https://core.ac.uk/download/pdf/82518574.pdf

Iyendo, T.O., & Alibaba, H. Z. (2014). Enhancing the hospital healing environment through art and day-lighting for user's therapeutic process. *International Journal of Arts and Commerce, 3*(9), 101–119. Retrieved from https://www.researchgate.net/publication/306394295

Jacobs, K. W., & Hustmyer, F. G. (1974). Effects of four psychological primary colors on GSR, heart rate and respiration rate. *Perceptual and Motor Skills*, 38, 763–66. doi.org/10.2466/pms.1974.38.3.763

Joye, Y. (2006). An interdisciplinary argument for natural morphologies in architectural design. *Environment and Planning B, 33*(2), 239–252. doi.org/10.1068/b31194

Joye, Y. (2007a). Architectural lessons from environmental psychology: The case of biophilic architecture. *Review of General Psychology, 11*(4), 305–328. doi.org/10.1037/1089-2680.11.4.305

Joye, Y. (2007b). Fractal architecture could be good for you. *Nexus Network Journal*, *9*(2), 311-320. https://link.springer.com/content/pdf/10.1007/s00004-007-0045-y.pdf

Joye, Y., & van den Berg, A. (2011). Is love for green in our genes? A critical analysis of evolutionary assumptions in restorative environments research. *Urban Forestry & Urban Greening, 10*(4), 261–268. doi.org/10.1016/j.ufug.2011.07.004

Kardan, O., Demiralp, E., Hout, M., Hunter, M., Karimi, H., Hanayik, T., Yourganov, G., Jonides, J., & Berman, M. G. (2015). Is the preference of natural versus man-made scenes driven by bottom-up processing of the visual features of nature? *Frontiers in Psychology*, 6:471. doi: 10.3389/fpsyg.2015.00471

Kellert, S. R. (2018). *Nature by design*. New Haven: Yale University Press.

Kellert, S. R., Heerwagen, J. H., & Mador, M. L. (Eds.). (2008). *Biophilic design. The theory, science and practice of bringing buildings to life*. Hoboken: Wiley.

Kellert, S. R., & Wilson, E. O. (Eds.). (2013). *The biophilia hypothesis*. Washington: Island Press.

Kühn, S., Düzel, S., Eibich, P., Krekel, C., Wüstemann, H., Kolbe, J., Martensson, J., Goebel, J., Gallinat, J., Wagner, G., & Lindenberger, U. (2017). In search of features that constitute an "enriched environment" in humans: Associations between geographical properties and brain structure. *Scientific Reports*, 7: 11920. doi.org/10.1038/s41598-017-12046-7

Kurt, S., & Osueke, K. K. (2014). The effects of color on the moods of college students. *SAGE Open, 4*(1). doi.org/10.1177/2158244014525423

Leach, J. (2016) Psychological factors in exceptional, extreme and torturous environments. *Extreme Physiology & Medicine, 5*(7). doi.org/10.1186/s13728-016-0048-y

Leopold, D. A., & Rhodes, G. (2010). A comparative view of face perception. *Journal of Comparative Psychology, 124*(3), 233–251. doi.org/10.1037/a0019460

Li, Q., Kobayashi, M., & Kawada, T. (2008). Relationships between percentage of forest coverage and standardized mortality ratios (SMR) of cancers in all prefectures in Japan. *The Open Public Health Journal, 1*(1), 1–7. Retrieved from https://benthamopen.com/contents/pdf/TOPHJ/TOPHJ-1-1.pdf

Mehaffy, M. W., Kryazheva, Y., Rudd, A., & Salingaros, N. A. (2019) *A new pattern language for growing regions: Places, networks, processes*. Portland: Sustasis Press and Stockholm: Centre for the Future of Places KTH Royal Institute of Technology, in press.

Mehaffy, M. W., & Salingaros, N. A. (2012). Science for designers: Intelligence and the information environment. *Metropolis*, 25 February 2012. Retrieved from https://www.metropolismag.com/uncategorized/science-for-designers-intelligence-and-the-information-environment/

Mehaffy, M. W., & Salingaros, N. A. (2015). *Design for a living planet: Settlement, science, and the human future*. Portland: Sustasis Press. doi.org/10.1007/s00004-999-0009-5

Mehaffy, M. W., & Salingaros, N. A. (2018). The neuroscience of architecture: The good, the bad, and the beautiful. *Traditional Building Magazine*, 19 February 2018. Retrieved from https://www.traditionalbuilding.com/opinions/the-neuroscience-of-architecture

Mikiten, T. M., Salingaros, N. A., & Yu, H.-S. (2000). Pavements as embodiments of meaning for a fractal mind. *Nexus Network Journal*, 2, 63–74.

Nichols, W. J. (2015). *Blue mind: The surprising science that shows how being near, in, on, or under water can make you happier, healthier, more connected, and better at what you do*. New York: Back Bay Books/Hachette.

Osmond, D. H. (1966). *Some psychiatric aspects of design. Who designs America?* New York: Anchor Books.

Preuss, M., Nieuwenhuijsen, M., Marquez, S., Cirach, M., Dadvand, P., Triguero-Mas, … & Zijlema, W. (2019). Low childhood nature exposure is associated with worse mental health in adulthood. *International Journal of Environmental Research and Public Health, 16*(10), 1809. doi.org/10.3390/ijerph16101809

Rakel, D., Sakallaris, B. R., & Jonas, W. (2018). Creating optimal healing environments. In D. Rakel (Ed.), *Integrative Medicine*, 4th Edition, Amsterdam: Elsevier, 12–19. doi.org/10.1016/B978-0-323-35868-2.00002-5

Ramamurthy, M., & Lakshminarayanan, V. (2015). Human vision and perception. In R. Karlicek, C.-C. Sun, G. Zissis, & R. Ma (Eds.). *Handbook of advanced lighting technology*. Cham: Springer International. doi.org/10.1007/978-3-319-00295-8_46-1

Read, J. C. A. (2015). What is stereoscopic vision good for? In N. S. Holliman, A. J. Woods, G. E. Favalora, & T. Kawai (Eds.). *Proceedings 9391. SPIE/IS&T electronic imaging, 8–12 February 2015*: Stereoscopic displays and applications XXVI. doi.org/10.1117/12.2184988

Remi, J. (2015). Humans entrain to sunlight – Impact of social jet lag on disease and implications for critical illness. *Current Pharmaceutical Design, 21*(24), 3431–3437. doi.org/ 10.2174/13816128 21666150706110228

Rice, J., Kozak, R., Meitner, M., & Cohen, D. (2006). Appearance wood products and psychological well-being. *Wood and Fiber Science, 38*(4), 644–659. Retrieved from https://pdfs.semanticscholar.org/2015/aa11035830e4f066518789b0d1cf7ab4ac52.pdf

Robinson, S., & Pallasmaa, J. (Eds.). (2015). *Mind in architecture: Neuroscience, embodiment, and the future of design*. Cambridge: MIT Press.

Ruggles, D. H. (2018). *Beauty, neuroscience, and architecture: Timeless patterns and their impact on our well-being*. Denver: Fibonacci Press.

Ryan, C. O., & Browning, W. D. (2018). Biophilic design. In R. A. Meyers (Ed.). *Encyclopedia of sustainability, science and technology*. New York: Springer, 1–44. doi.org/10.1007/978-1-4939-2493-6_1034-1

Ryan, C. O., Browning, W. D., Clancy, J. O., Andrews, S. L., & Kallianpurkar, N. B. (2014). Biophilic design patterns: Emerging nature-based parameters for health and well-being in the built environment. *Archnet-IJAR: International Journal of Architectural Research, 8*(2), 62–76. Retrieved from http://archnet-ijar.net/index.php/IJAR/article/view/436

Sakuragawa, S., Miyazaki, Y., Kaneko, T., & Makita, T. (2005). Influence of wood wall panels on physiological and psychological responses. *Journal of Wood Science, 51*(2), 136–140. doi.org/10.1007/s10086-004-0643-1

Salingaros, N. A. (2003). The sensory value of ornament. *Communication & Cognition, 36*(3-4), 331–351. Reprinted in Salingaros, N. A. (2006, 2014). *A theory of architecture*. Portland: Sustasis Press, 84–104.

Salingaros, N. A. (2006, 2014). *A theory of architecture*. Portland: Sustasis Press.

Salingaros, N. A. (2012). Fractal art and architecture reduce physiological stress. *Journal of Biourbanism, 2*(2), 11–28. https://journalofbiourbanism.files.wordpress.com/2013/09/jbu-ii-2012-2_nikos-a-salingaros.pdf. Reprinted in Salingaros, N. A. (2013). *Unified architectural theory.* Portland: Sustasis Press, 170–190.

Salingaros, N. A. (2014). Complexity in architecture and design. *Oz Journal*, 36, 18–25. Retrieved from http://newprairiepress.org/cgi/viewcontent.cgi?article=1527&context=oz

Salingaros, N. A. (2015). *Biophilia and healing environments*. New York: Terrapin Bright Green LLC and Amherst: Levellers Press. Retrieved from https://www.terrapinbrightgreen.com/wp-content/uploads/2015/10/Biophilia-Healing-Environments-Salingaros-p.pdf

Salingaros, N. A. (2017). How neuroscience can generate a healthier architecture. *Conscious Cities Journal*, 3. Retrieved from https://www.ccities.org/neuroscience-can-generate-healthier-architecture/

Salingaros, N. A. (2018). Adaptive versus random complexity. *New Design Ideas, 2*(2), 51–61. Retrieved from http://jomardpublishing.com/UploadFiles/Files/journals/NDI/V2N2/SalingarosN.pdf

Salingaros, N. A. (2019). How mathematics will save the built world! *Common Edge*, 28 January 2019. Retrieved from https://commonedge.org/how-mathematics-will-save-the-built-world/

Salingaros, N. A., & Masden, K. G. (2008). Neuroscience, the natural environment, and building design. In S. R. Kellert, J. H. Heerwagen, & M. L. Mador (Eds.). *Biophilic design: The theory, science and practice of bringing buildings to life* (pp. 59–83). Hoboken: Wiley.

Silber, J. (2007). *Architecture of the absurd*. New York: Quantuck Lane Press.

Sussman, A., & Chen, K. (2017). The mental disorders that gave us modern architecture. *Common Edge*, 22 August 2017. Retrieved from http://commonedge.org/the-mental-disorders-that-gave-us-modern-architecture/

Sussman, A., & Hollander, J. B. (2015). *Cognitive architecture*. New York: Routledge.

Sussman, A., & Ward, J. M. (2017). Game-changing eye-tracking studies reveal how we actually see architecture. *Common Edge*, 27 November 2017. Retrieved from http://commonedge.org/game-changing-eye-tracking-studies-reveal-how-we-actually-see-architecture/

Takano, T., Nakamura, K., & Watanabe, M. (2002). Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *Journal of Epidemiology & Community Health, 56*(12), 913–918. doi.org/10.1136/jech.56.12.913

Taylor, R. P. (2006). Reduction of physiological stress using fractal art and architecture. *Leonardo, 39*(3), 245–251. doi.org/10.1162/leon.2006.39.3.245

Totaforti, S. (2018). Applying the benefits of biophilic theory to hospital design. *City, Territory and Architecture, 5*(1). doi.org/10.1186/s40410-018-0077-5

Tse, M. M., Ng, J. K., Chung, J. W., & Wong, T. K. (2002). The effect of visual stimuli on pain threshold and tolerance. *Journal of Clinical Nursing, 11*(4), 462–469. doi.org/10.1046/j.1365-2702.2002.00608.x

van den Berg, A., Joye, J., & Koole, S. (2016). Why viewing nature is more fascinating and restorative than viewing buildings: A closer look at perceived complexity. *Urban Forestry & Urban Greening*, 20, 397–401. doi: 10.1016/j.ufug.2016.10.011

von Lindern, E., Lymeus, F., & Hartig, T. (2016). The restorative environment: A complementary concept for salutogenesis studies. In M. B. Mittelmark, S. Sagy, M. Eriksson, G. F. Bauer, J. M. Pelikan, B. Lindström, & G. Arild Espnes (Eds.). *The handbook of salutogenesis*. Cham: Springer, 181–195. doi.org/10.1007/978-3-319-04600-6_19

Walch, J. M., Rabin, B. S., Day, R., Williams, J. N., Choi, K., & Kang, J. D. (2005). The effect of sunlight on post-operative analgesic medication usage: A prospective study of patients undergoing spinal surgery. *Psychosomatic Medicine, 67*(1), 156–163. doi.org/10.1097/01.psy.0000149258.42508.70

Ward-Thompson, C., Roeb, J., Aspinall, P., Mitchell, R., Clowd, A., & Miller, D. (2012). More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and Urban Planning, 105*(3), 221–229. doi.org/10.1016/j.landurbplan.2011.12.015

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*, 420. doi.org/10.1126/science.6143402

Velarde, M. D., Fry, G., & Tveit, M. (2007). Health effects of viewing landscapes – Landscape types in environmental psychology. *Urban Forestry & Urban Greening, 6*(4), 199–212. doi.org/10.1016/j.ufug.2007.07.001

Wheeler, B.W., White, M., Stahl-Timmins, W., & Depledge, M. H. (2012). Does living by the coast improve health and wellbeing? *Health & Place, 18*(5), 1198–1201. doi.org/10.1016/j.healthplace.2012.06.015

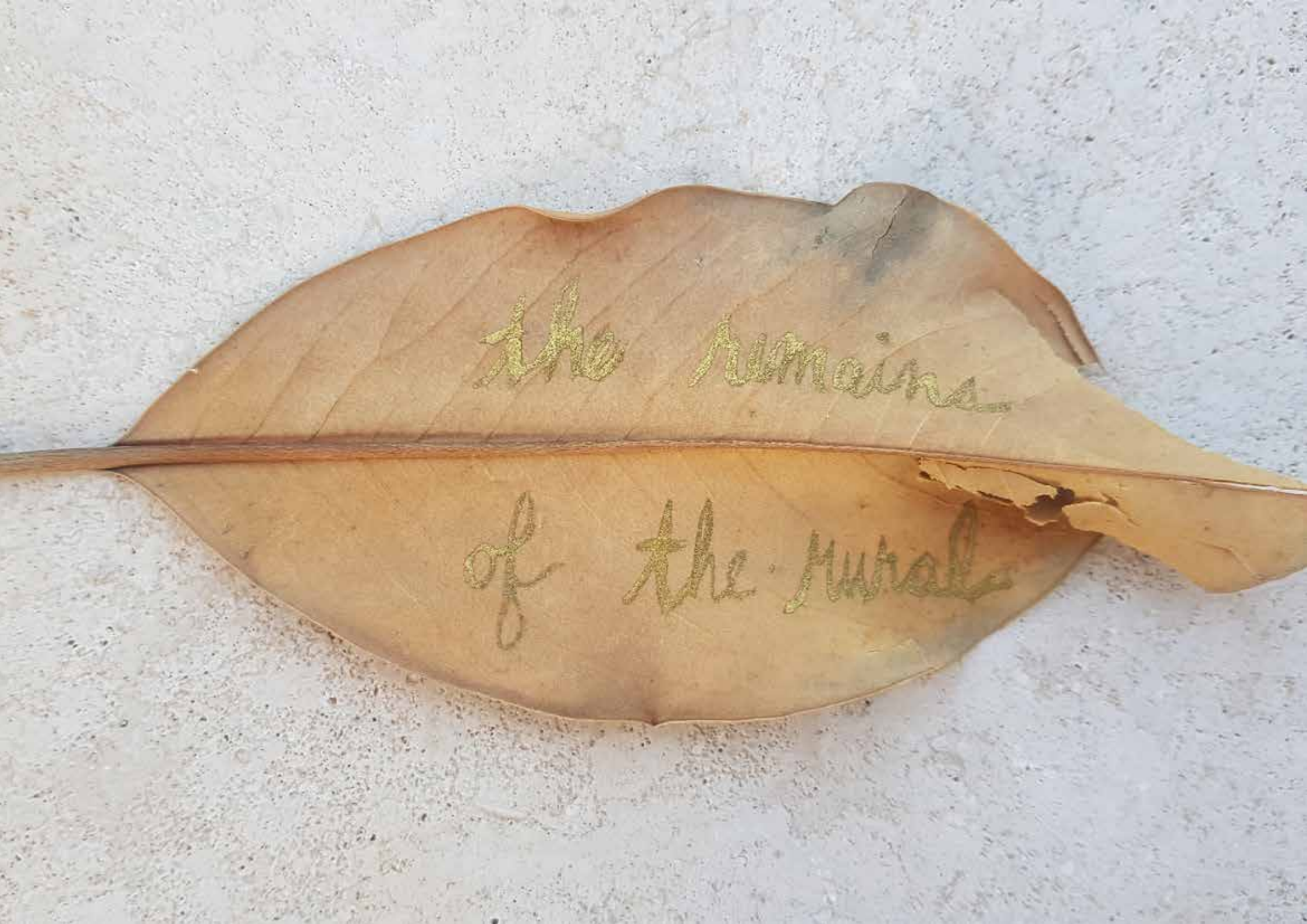
White, M., Smith, A., Humphryes, K., Pahl, S., Snelling, D., & Depledge, M. (2010). Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes. *Journal of Environmental Psychology, 30*(4), 482–493. doi.org/10.1016/j.jenvp.2010.04.004

Wilson, E. O. (1984). *Biophilia*. Cambridge: Harvard University Press.

Wilson, M. A. (1996). The socialization of architectural preference. *Journal of Environmental Psychology, 16*(1), 33–44. doi.org/10.1006/jevp.1996.0003

Yin, J., Zhu, S., MacNaughton, P., Allen, J., & Spengler, J. (2018). Physiological and cognitive performance of exposure to biophilic indoor environment. *Building and Environment, 132*, 255–262. doi.org/10.1016/j.buildenv.2018.01.006

Yuko, E. (2018) How the tuberculosis epidemic influenced modernist architecture. *CityLab*, 30 October. Retrieved from https://www.citylab.com/design/2018/10/how-tuberculosis-epidemic-influenced-modernist-architecture/573868/


the remains
of the mural

Ecological Notes on the Territory of Artena: Villa Borghese

Andrea Margiotti
Natural Scientist, Italy

ABSTRACT

This work proposes an overview of the natural environment in the municipal territory of Artena, Italy. The Villa Borghese urban park is the focus. This park is relevant for its culture and landscape, offering a glance over the Roman countryside's remarkable heritage.

***Keywords*:** Artena, Sacco River Valley, Villa Borghese, vegetation, park

CENOSPHERE OF ARTENA

Artena's municipality occupies part of the Roman countryside. It is situated on the northernmost slopes of the Lepini Mountains, on the edge of the Sacco River Valley, and near the volcanic complex of the Alban Hills.

The historic town is located on a rather steep limestone side that faces north. Its territory spreads over a mainly hilly area of the Lepine relief and includes a limited flat area of the upper Sacco Valley. This is made up of alluvial sediments derived mostly from the erosion of volcanic materials, originating from the ancient activity of the Latium Volcano.

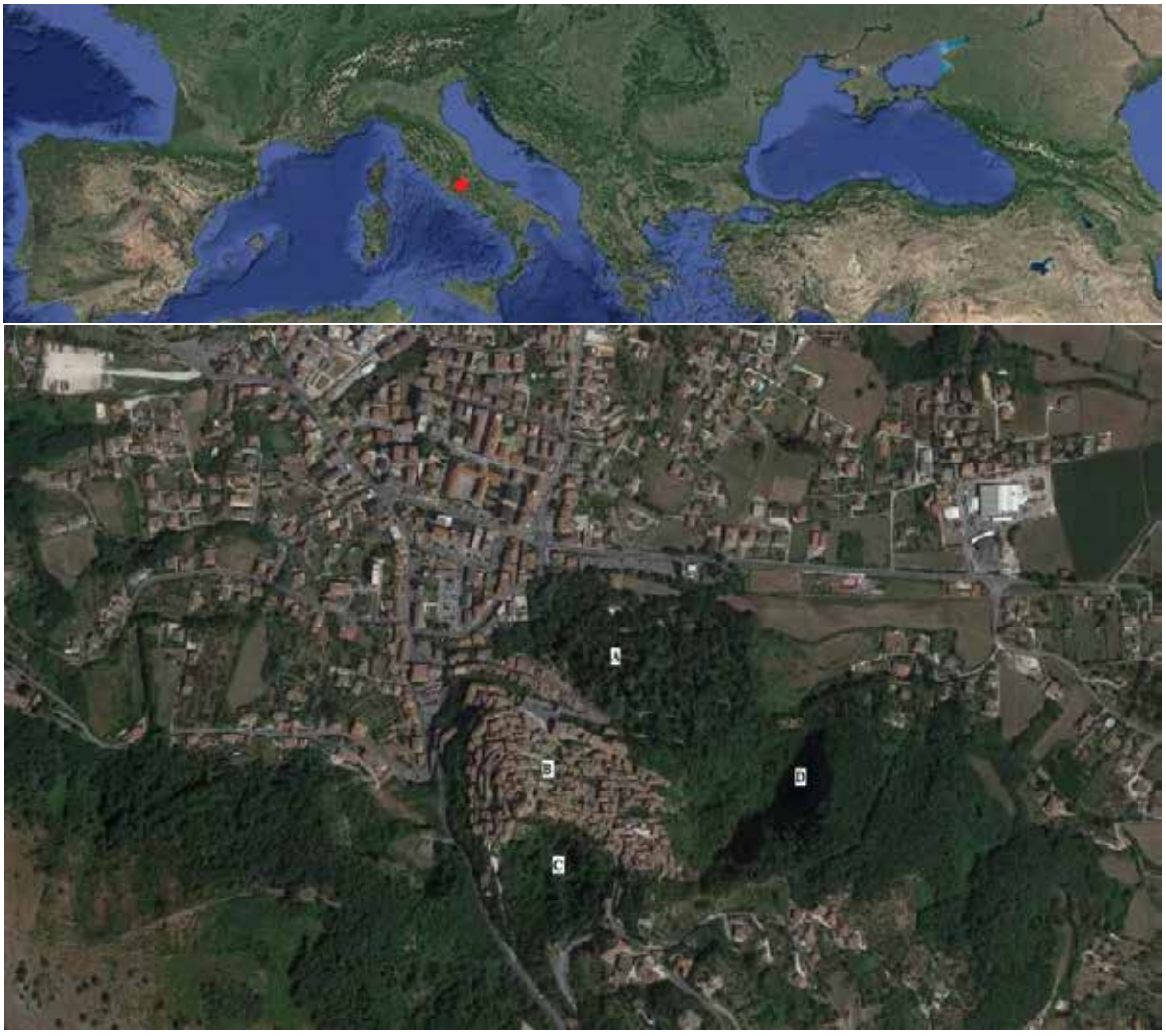


Figure 1. Google geolocalization (above) and satellite view (below) of the Villa Borghese park (A), the historical center of Artena (B), the northern sinkhole (C), and the eastern sinkhole (D).

The predominantly agricultural vocation of the region has led to great vegetal transformations over the centuries. Large extensions for grazing and cereal crops, especially on the less-sloped sides and in the valley floors, were once occupied by sessile and common oak (*Quercus petraea, Q. robur*). Even the wooded slopes have been affected by cultivation. Therefore, tree species of greater value and economic interest, especially chestnut (*Castanea sativa*), replaced the prevalent spontaneous species, such as the Turkey oak (*Quercus cerris*) and the European hop hornbeam (*Ostrya carpinifolia*). Olive and vine crops, on slopes with the most favorable exposure, typically replaced

more thermophilic vegetation, like holm oak (*Quercus ilex*) mixed with the aforementioned European hop hornbeam and South European flowering ash (*Fraxinus ornus*).

What is known as potential vegetation, i.e. the plants that would be present in the wild without human intervention, resist in various parcels of our territory. These are the "protected" historical parks (such as the Villa Borghese park) or the areas that turn out to be too difficult to reach and work, like the rock spurs and the slopes of the two northwest and southeast karst chasms, commonly referred to as the *Preci* that surround Artena's historical center. This residual evidence of wilderness supports the attributions of "theoretical" potential vegetation based on observations conducted in similar settings throughout the Lazio region and Italy. Moving back from the actual plant population to the conditions suitable for their life allows for inferring certain climate conclusions. For example, the highest inhabited area, known as *For de porta*, features a Mediterranean climate. This is witnessed by the presence of Mediterranean scrub elements, such as terebinth (*Pistacia terebinthus*), holm oak, mock privet (*Phillyrea latifolia*), South European flowering ash, et cetera. Strong sun exposure plus autumn and spring rain characterize this type of climate where aridity is accentuated by sloping or rapidly draining soils. On the contrary, despite the rainy regime is obviously the same, common oak, hazel (*Corylus avellana*), European hornbeam (*Carpinus betulus*), and maples, among others, announce the more mesophilic, continental climate of the valley floor. This is due to the northern/northwestern exposure plus the greater availability of groundwater in the valley floor.

Figure 2. Artena and its wilderness are represented in this 17th-century fresco from the Borghese Palace. This fresco, once attributed to Paul Brill, was most possibly painted by Giovanni Battista Corradini (Photograph by S. Serafini, February 2020, courtesy of the Niké Arrighi Borghese family).

European hop hornbeam, downy oak (*Quercus pubescens*), Turkey oak, and field maple (*Acer campestre*), as well as the extreme variability of wood and grass species that accompany them (known as the companion species), follow the ground characteristics. This includes soil type, slope, rock presence, or more or less accentuated exposure toward the south. This underlies a nuanced series of intermediate environmental conditions.

Regardless of the level of wilderness, however, large areas of greenery, be they woods, pastures or crops, strongly characterize the territory. This condition is suitable for numerous wild animal species, including rare ones. It is quite common to see nocturnal or diurnal raptors. Owls (*Athens noctua*) often sit on the poles that line the countryside roads and can be heard at night. On the other hand, it is less easy to spot the night flight of the common barn owl (*Tyto alba*). The common kestrel (*Falcus tinnunculus*) flies over the fields in search of prey, even in close proximity to the town, while the buzzard (*Buteo buteo*) nests and hunts along the road winding up to Vivaro and across the pastures toward Colleferro. I was able to observe a pair of nesting peregrines (*Falco peregrinus*) on the *Prece* cliffs, just below the Borghese Palace. There is also evidence of carnivorous mammals, such as the fox (*Vulpes vulpes*), the European pine marten and beech marten (*Martes martes, M. foina*), the European badger (*Meles meles*) and, even if sporadic, the wolf (*Canis lupus*). Insectivores, such as the hedgehog (*Erynaceus europaeus*) and the mole (*Talpa sp.*), and rodents like the porcupine (*Hystrix cristata*), the squirrel (*Sciurus vulgaris*), and the hazel dormouse (*Muscardinus avellanarius*) have also been spotted.

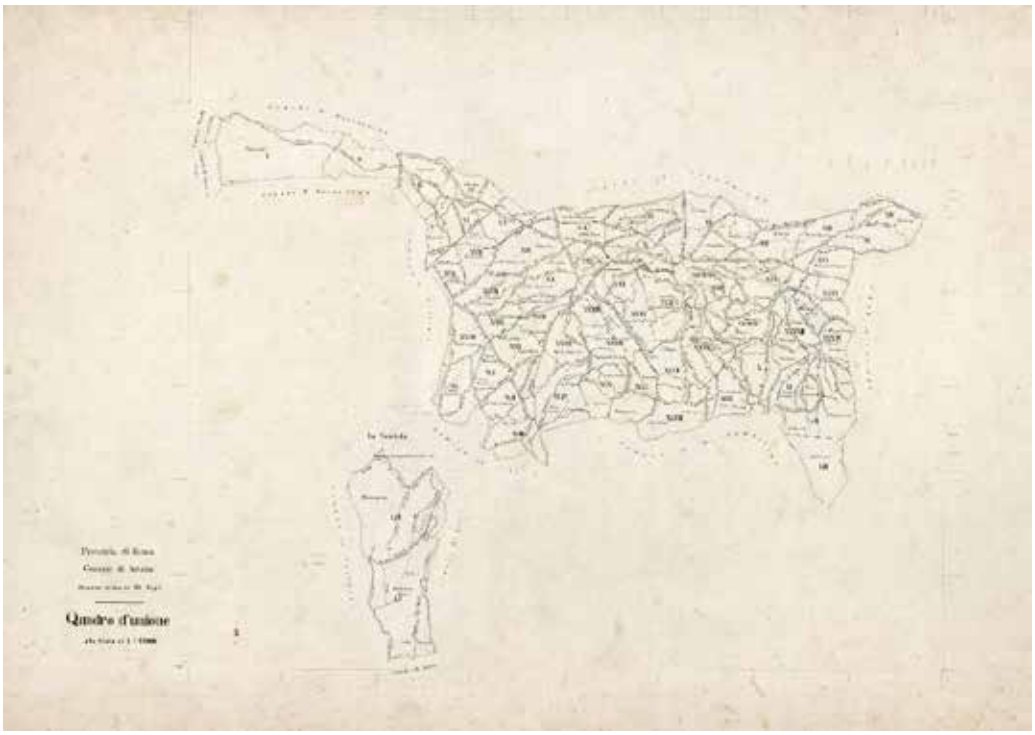


Figure 3. Cadastral general view of Artena's municipality territory including Lake La Torre (Courtesy of Arch. Nicola Gentili).

This overview of Artena's natural environment does not claim to be exhaustive. However, its typical lake environment must not be omitted. Lake La Torre is located within the borders of the Giulianello municipality (hence, its more popular name: Lake Giulianello), but it is an enclave administered by the municipality of Artena. There are quite possibly just a few who know that a Presidential decree from the Lazio regional authority declared Lake La Torre a natural monument in 2007. This oval volcanic basin has a perimeter of 1.8 km and is surrounded by crops and woods. Although I will not

linger on its fish species, they are of great interest for a large group of anglers loyal to its shores. The reservoir adds a fairly well-preserved lake landscape to the countryside features. Its reeds offer refuge to various species of migratory birds, among which are the almost ubiquitous grey heron (*Ardea cinerea*) and species of seasonal *Anatidae*.

VEGETATION OF THE VILLA BORGHESE PARK

The vegetative area, commonly known as *Parco della Villa Borghese*, stands out within the Artenese natural environment and landscape. Such a countryside stretch lies next to Via Latina and expands southwest between this ancient road and Artena's historical center. Lush vegetation, a marked slope, and a pronounced northern orientation characterize it. Its woods slope down toward eastern meadows on the way to Colleferro. These meadows, which had once been cultivated, border the Maiotini district. The limestone cliffs of the Lepini Mountains' easternmost slopes represent its hedge background along with the defining *Prece* sinkhole, originating from a remote karst phenomenon.

The park is still owned by the Borghese family and belongs to the noble palace above. Its use has been granted to the Municipality and citizens of Artena based on a decades-long rental contract. The sole exception is the westernmost part, which is the owner's exclusive use and thus enclosed. There, a monumental gate opens to Via Cardinale Scipione Borghese.

Figure 4. Centuries-old specimens of sessile oak in the background of the Via Latina road (Photograph by Stefano Serafini, February 2020).

The species in the park were detected through a series of inspections. Different features of the woods and the specimens prevalent in their different typologies were highlighted. Also, the relationships between the obviously alien species, the spontaneous local ones, and those typical of our environment were studied. An arranged, regular pattern provides evidence of a garden design, although not recent.

Five physiognomies with greater or lesser evidence of anthropic influence were easily identified. They are described below.

The first physiognomy corresponds to a very open lot. This is the lower and flatter area near the access to the park. It shows a rather sparse distribution of specimens that are not particularly old. Among them, mainly autochthonous species, recur in all the following typologies: first, there is field maple (*Acer campestris*) accompanied by the Norway maple (*Acer plathanoides*) and the European hop hornbeam (*Ostrya carpinifolia*). The abundance of large-leaved linden (*Tilia platiphyllos*), which is often used as an ornamental and urban tree, witnesses the park's artificial design. In fact, rows of linden run along the lower outer border, while Lebanon cedar (*Cedrus libani*) is visible along the driveway that climbs through the park. Just as ornamental trees, the sporadic presence of allochthonous species, such as boxelder maple (*Acer negundo*), European spruce (*Picea abies*), and maritime pine (*Pinus pinaster*) is also evidently artificial. There is also a cherry tree (*Prunus avium*). An olive tree (*Olea europea*) has recently been planted.

Figures 5 and 6. A wonderful specimen of white poplar starting to blossom (left) and the trunk of an ancient oak, whose majesty is enhanced by the absence of leaves (Photographs by Stefano Serafini, February 2020).

A low-slope area is adjacent to the first one that leads up into the thicker woods. Sparse trees and lack of undergrowth also characterize this lot because the town has used it as a stage for the folkloric festival called "Palio delle contrade" for the past 20 years. Here, specimens of South European flowering ash (*Fraxinus ornus*) prevail. This tree is typical of warm woods, like evergreen holm oak (*Qercus ilex*). The latter, in fact, covers the *Prece* cliffs above. There are also considerably large specimens of the aforementioned field maple, the Norway maple, and the European hop hornbeam, as well as beautiful specimens of large-leaved linden, elm (*Ulmus sp.*), the European nettle tree (*Celtis australis*), and laurel (*Laurus nobilis*). One can also observe common shrubs, such as hawthorn (*Crathaegus sp.*), elderberry (*Sambucus nigra*), and cornelian cherry (*Cornus mas*). Among

remarkable non-local species, surely planted by man, are a Lebanon cedar (*Cedrus libani*), a wonderful white poplar (*Populus alba*) typical of the river margins, and the European beech (*Fagus sylvatica*), which is characteristic of the mountain.

Figure 7. Area near the park's access used for gatherings and events: the ancient town of Artena is visible in the background (Photograph by Stefano Serafini, February 2020).

Figure 8. This patch of land, just a few steps from the well-attended park, is shaded by noble and ancient trees and exhibits a marked wild character (Photograph by Stefano Serafini, February 2020).

The lower east lot (toward Maiotini and Colleferro) is home to a vestigial testimony of our climates' plain woods. It is an oak grove with residual wilderness features. A few majestic, centuries-old specimens of sessile oak (*Q. petraea*) characterize it. Among the dominant specimens, in addition to oak, are splendid field maple, mountain maple, and Bosnian maple (*A. opalum var. obtusatum*). The companion species include elm, South European flowering ash, European hop hornbeam, and the European nettle tree, plus specimens of the Oriental hornbeam (*Carpinus orientalis*) and checker tree (*Sorbus torminalis*) that reinforce the woods' wild character. The undergrowth full of seedlings and young specimens of oak, elm, maple, and ash are proof of this in that it exhibits dynamism typical of a spontaneous vegetal cenosphere.

The woods grow denser with tall trees along the driveway that runs diagonally across the slope. These are mostly large and old maples of the aforementioned species—especially field and mountain maples. In addition to these, one can observe chestnut (*Castanea sativa*), deemed to be of anthropic introduction on most of the national territory, and Turkey oak (*Quercus cerris*). Laurel, elderberry, cornelian cherry, hazel (*Corylus avellana*), walnut (*Juglans regia*), and abundant ivy (*Hedera helix*) are the dominant arboreal layer. Large amounts of fruit on the ground in autumn reveals the presence of an imposing sorb tree (*Sorbus domestica*) specimen of particular value. The woody plants are accompanied by a rich undergrowth of herbaceous species. These include ferns (*Pteridium aquilinum*), numerous flowering plants, such as buttercups and anemones, bulbous-like cyclamen (*Cyclamen repandum, C. autumnalis*), *Scilla bifolia*, and graminacea *Melica uniflora*, typical of the mesophilous deciduous woods. On the other hand, the specimens of black poplar (*Populus nigra*), cherry laurel (*Prunus laurocerasus*), cypress (*Cupressus sempervirens*), cedar of Lebanon, and beech are clearly anthropogenic. It is worth noting that these beech trees show an exceptional vitality confirmed by the presence of young daughter plants, although they are located slightly above 300 m a.s.l., far less than their usual altitude of +900 m. This is due to the phenomenon known as "thermal inversion," typical of ravines and narrow valleys.

The park's highest part features a lower slope and an exposure toward the east. Two branches of the driveway border it. One leads toward east from the lower entrance and the other points to the western, upper entrance and the monumental gate of the ancient town, the *Arco Borghese*.

Here, the wood mainly consists of sparse specimens of Turkey oak and European nettle trees with the presence of allochthonous conifers, such as maritime pine and cypress. The greater exposure to sunlight and the almost horizontal ground determine a lower availability of water and an overall less luxuriant appearance. The presence of laurel highlights the greater acclivity of the upper and western borders, accompanied by shading and evidence of higher soil moisture.

Such an enhanced wilderness is surprising in a woodland located near a town and subject to recurring anthropic interventions like maintenance, cleaning, and pruning, not to mention public visitors. This is most possibly due to the private management that the Borghese family has been able to exercise since at least the end of the 16th century, when it bought the area.

So far, no historical source has clarified previous centuries' use of the park. However, its current features support the following considerations.

The most characteristic tree species have been potentially present in our territory in their original condition, before the upheavals caused by agricultural exploitation in historical times.

The current specimens show a remarkable degree of maturity with numerous, long-standing, and majestically beautiful individuals. This is consistent with centuries of natural and spontaneous development.

There are no clear indications of any intense exploitation of the woods for timber. Lacking evidence includes the following: the selection of the most profitable species; typical forms, such as sprout specimens (trees generated from new stems or root sprouts along the circumference of the old, cut trunk) of the actual various species of *Fagaceae* (oak, chestnut), and *Betulaceae* (hornbeam), as well as signs of coppice, even in distant eras.

Figures 9 and 10. The Author near an elder specimen of field maple that shows peculiar vertical ribs (Photographs by Stefano Serafini, February 2020).

The non-native plants can be explained by interventions carried out through different periods to increase the park's aesthetic value.

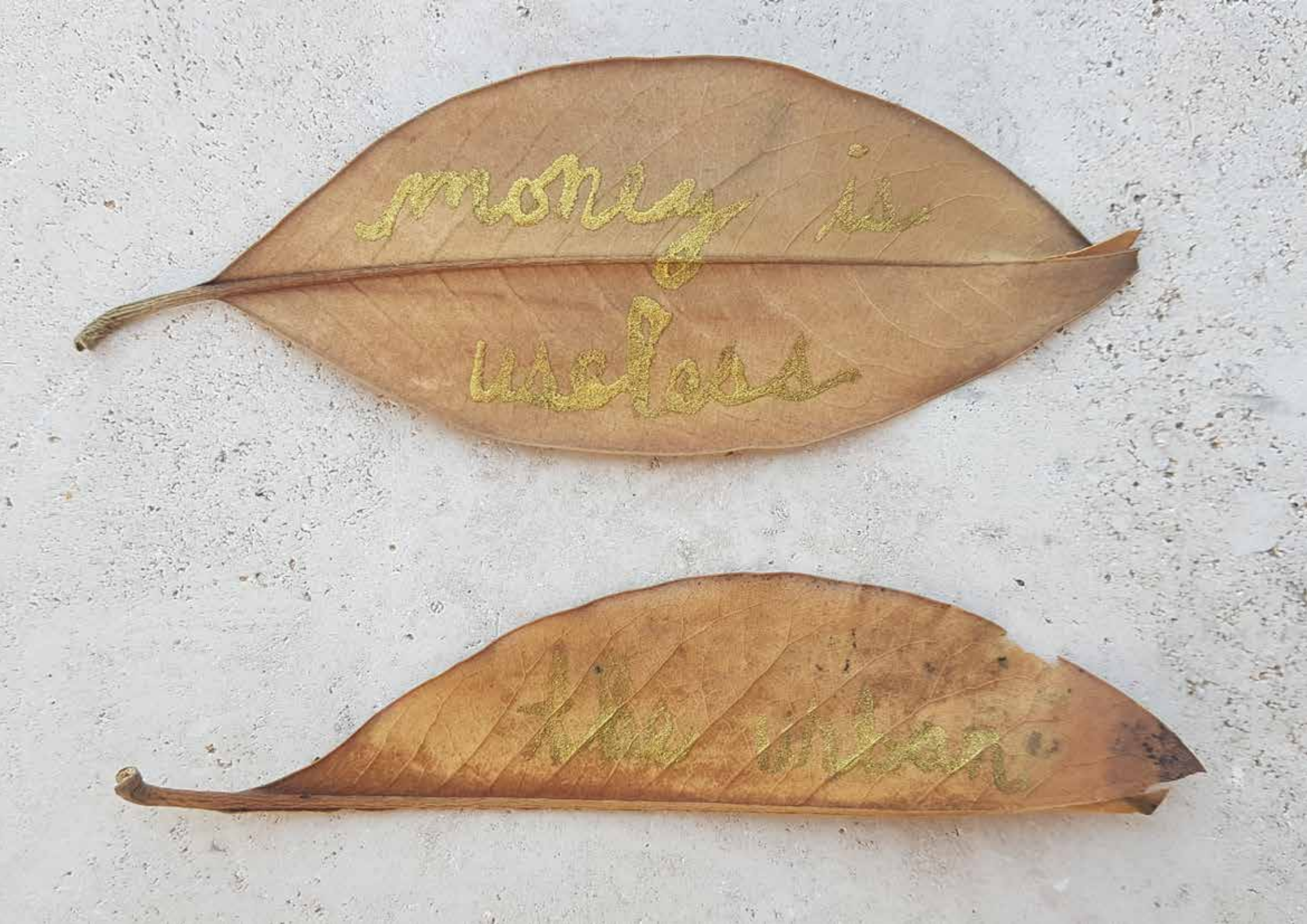
Besides any historical consideration, the characteristic presence of the park now has great relevance for the Artenese community. The Villa offers visitors a healthy escape and the opportunity to walk their pet and fully enjoy the variations of nature over the seasons with splendid blooms that vary month after month. It is also a naturalistic, functional scene for many outdoor events.

Let me conclude with a small methodological note. The *Parco della Villa Borghese* offers many features to those who enjoy it in the most varied ways. Yet, these features may go unnoticed without an accustomed glance. I was trained in the Department of Natural Sciences at the Sapienza University

of Rome. However, even before my academic education, I had absorbed the most intimate content of the discipline through my peasant and lumberjack grandparents, excursions, and by being around passionate adults who enjoyed sharing knowledge and emotions with a curious child. Villa Borghese can be the place where this experience of wonder is possible in any way that one wants to enjoy, organize, or share, and plays a fundamental role in the health of Artena's biourban body.

Figure 11. A *Ranunculus bulbosus* plant emerges from dead beech (oval-shaped) and Turkey oak (lobed) leaves (Photograph by Stefano Serafini, February 2020).

Figure 12. A wonderful early-season flowering of silvery crocus (*Crocus biflorus*) (Photograph by the Author, February 2020).


money is
useless
Marriage

The Structure of Piazza della Vittoria in Artena

Matteo Riccelli
Riccelli Engineering, Artena, Italy

ABSTRACT

Scipione Caffarelli Borghese (1577–1633) provided the stronghold of Montefortino (now Artena) with vital productive and logistical infrastructures through an impressive architectural intervention between 1615 and 1624. The work created a new access to the ancient town by means of a street and a square whose sustaining underground structures had multi-functional purposes. This paper presents a description of the subterranean building complex.

***Keywords*:** Artena, Montefortino, Scipione Caffarelli Borghese, Jan Van Santen

Montefortino is the ancient name of a town clinging to the last offshoot of the Lepini Mountains and turning its gaze towards Rome (the current city had its name changed into "Artena" by Royal Decree No. 1271/1873). Positioned on high ground to guard Via Latina and the Sacco Valley, Montefortino controlled access to Velletri and the Pontine Marshes while enjoying a wide view of the Prenestini Mountains and the nearby city of Palestrina.

The cost of this strategic value was high. It included three destructions between 1241 and 1557. The latter, ordered by Pope Paul IV Carafa, was especially devastating. The Pope even imposed the macabre ritual of plowing and shedding the court square of Montefortino with salt after slaughtering the inhabitants and ruining and burning the town (Cadderi, 1973).

We must, therefore, imagine a city in ruins, poor, and almost uninhabited to understand the greatness of the urban restructuring work carried out by Cardinal Scipione Borghese. He purchased three quarters of Montefortino (the entire fiefdom) and of Olevano, plus half of the estate of Torre and Pantano dei Griffi in the upper Sacco Valley from the Colonna and Massimo families on June 9, 1614 (Scardamaglia, 2009).

Scipione Caffarelli was a typical member of the Papal curia of Paul V, who was his maternal uncle. Created Cardinal at the age of 29, he took the Borghese surname.

Cardinal Borghese went down in history as one of the greatest art collectors of the 17th century and a discoverer of artists such as, among the greatest, Gian Lorenzo Bernini. He was called the "delight of Rome" for his art literacy and generous patronage activities.

> *Scipione Caffarelli Borghese rappresentò magnificamente la sua parte di Cardinal Nepote; di finissimo gusto, amante del bello e delle raffinatezze, simpatico, cortese si accattivò le simpatie di tutti (…) si dedicò quasi esclusivamente alle più piacevoli cure dell'arte.* [Scipione Caffarelli Borghese beautifully played his role of Cardinal Nephew. He had the finest taste and was a lover of beauty and refinements. Pleasant and courteous, he won over everyone (…) he devoted himself almost exclusively to the most pleasant care of art.] (Muñoz 1919, pp. 51–52).

It seems unlikely that such an important figure—a close relative of the Pope, engaged in international politics, and busy with sales of real estate, refined works of art, and archaeological finds to be exhibited in his beautiful villa near the Pincian Hill—could intertwine his own fate with a town like Montefortino.

Nevertheless, right where destruction had triumphed, the Cardinal and his workers found the perfect conditions to show off their architectural and artistic skills. The purchase of Montefortino increased the family patrimony in spite of the rival Roman houses. Further, the town represented a fertile place for Scipione to embody his urban vision.

Here, he financed various interventions, including the building of a modern quarter, a new square, a convent, a new government building, and an inn with stables, as well as "public" infrastructures that did not exist in neighboring towns at the time, such as its first sewage system (Serangeli, 2000).

However, the intervention on the site of the current Via Garibaldi and Piazza della Vittoria certainly is the most remarkable for its grandness and ingenuity. In fact, it brought urban, social, and economic revival to the fiefdom. The urban regeneration was centered precisely on the place that had been a backdrop to the symbolic seal of the city's destruction less than 60 years earlier.

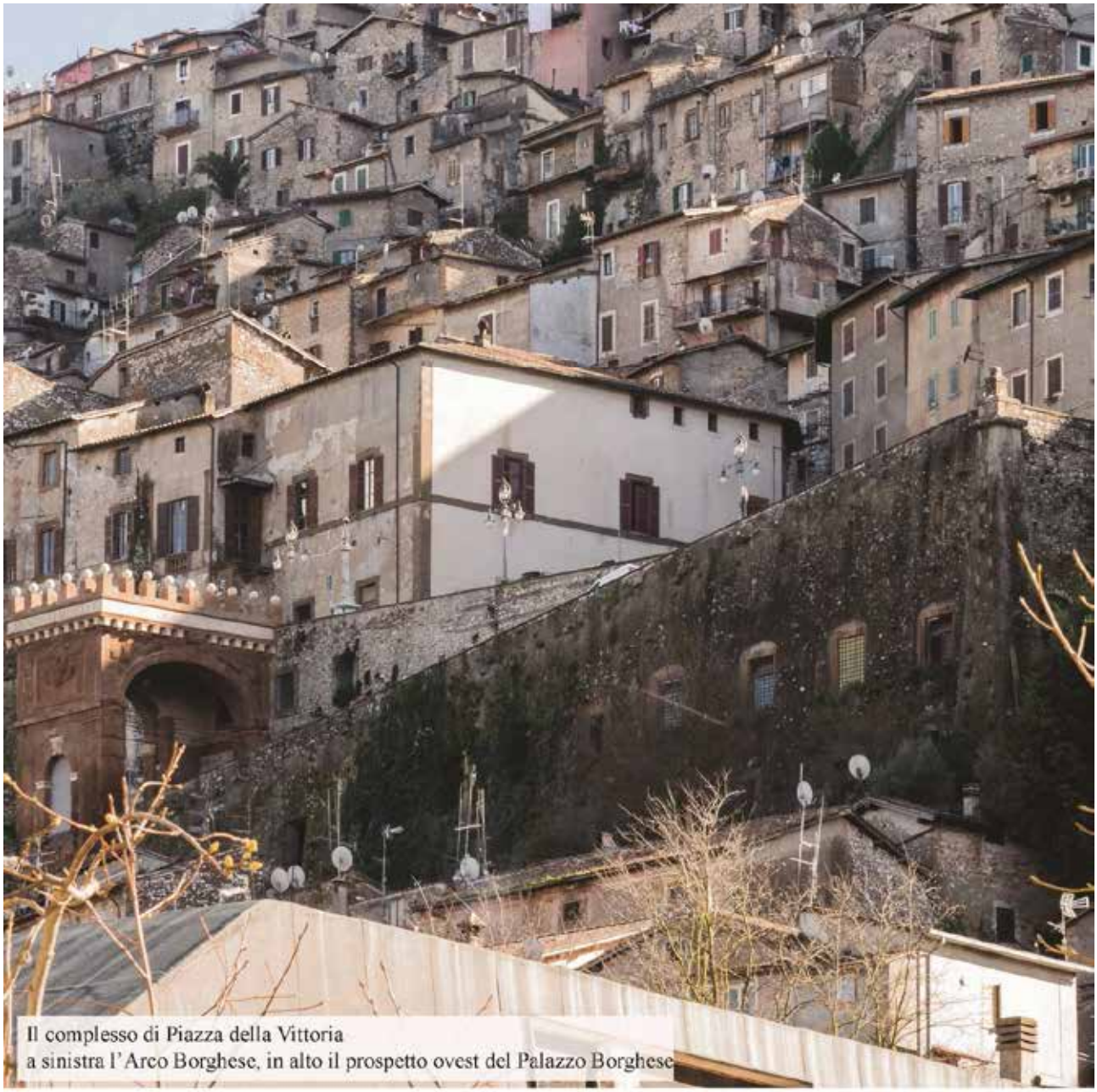


Figure 1. The structure of Piazza della Vittoria in Artena (formerly Montefortino). Left, the Borghese Arch. Center, the west façade of the Borghese Palace (Photograph by the Author, 2015).

A large expansion of the ancient court square and a new access road to the town were built at once. The reorganization of the Baronial Palace, the construction of the Governor's Palace, and the manufacturing of a modern and magnificent monumental gate, the Borghese Arch, followed.

All these developments were conceived as a single intervention. The aim was to give new life to the entire village, right from the emblematic place of its suffering, while solving one of the settlement's biggest problems, namely accessibility.

Substantially, Montefortino featured only two access points between 1614 and 1615. One urban gate was located downhill and another uphill, as clearly shown in the map of Montefortino preserved in the Vatican Apostolic Archives (Borghese Archives B581, f. 80 f 010v). On the contrary, the 1615

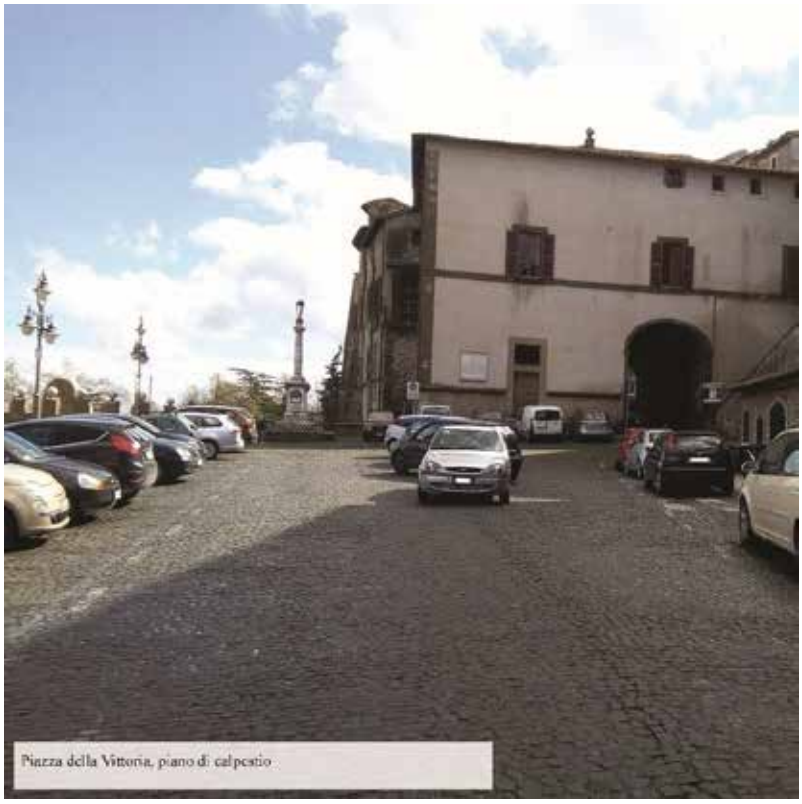


Figure 2. Piazza della Vittoria, ground surface (Photograph by the Author, 2015).

Figure 3. Piazza della Vittoria, ground surface of the Borghese Arch's loggia (Photograph by the Author, 2015).

map included in the *Relatione delle strade che si faceano per andare da Frascati a Montefortino* (Borghese Archives B582, record No. 80, f. 010V) shows only the gate below.

Two paths climbed up the mountain slope from the valley, leaving the Via Latina path. They joined near the Baronial Palace, which had been partly raised during the Middle Ages. The 12th century underground walls of the west wing still witness the work by the Conti di Segni house, while the current façade on Piazza della Vittoria is the result of the expansion wanted by the Colonna house from 1510 and then by the Massimo house. Finally, flanking an overhang, the paths led to an embankment that faced the ancient downstream gate of the city.

Of these two routes, the more steep and craggy one directly connected the urban gate with the intersection of the roads leading to Valmontone, Velletri, and Giulianello where the hospital of the Confraternities of the Gonfalone and of the Blessed Sacrament stood. Nowadays, this is identifiable with the current Via Giuseppe Garibaldi. This building still exists today. It was built at the expense and care of the Confraternities of Gonfalone and Sacramento, probably after the *desolazione* of 1557. Today, it is property of the Municipality of Artena.

The second branch ran circa one kilometer from the aforementioned intersection along the route of Via Latina toward Colleferro. It crossed Contrada Maddalena, skirted the karst cliff of the Asinari, and rose more gently and comfortably toward the city gate, meeting the other road near the current Casa dell'Aquila, the ancient "body shop" of the Palazzo. This building is located at the curve of the current Via Garibaldi and, today, is a private residence of the Borghese family.

Although less straight, this road was no less beaten than the first. The Gregorian Cadastre identifies it as "Via di Porta Vecchia," still indicating after 300 years that for the local historical memory it was meant to reach the ancient city gate (Gregorian Cadastre 1818–1821, Municipality of Artena, Section I, loc. Maiorana Oppi, sheet V, at the State Archives of Rome).

Further, the convent and leper colony dedicated to Saint Mary Magdalene, the patron saint of Artena, stood along its route. This hospital has been remembered since the 13th century. A papal bull dated November 5, 1290, granted indulgence to those who would help the brothers of the leper hospital of Saint Mary Magdalene in Montefortino with their work. This institution worked at full capacity throughout at least the 13th century. It was then replaced by a monastery of nuns of the Holy Spirit who remained there until the 15th century. The priest dom. Giovanni Battista perpetuated the worship to the penitent saint by erecting and devoting a rural church to her there in 1471 (Serangeli 2005).

The difficult access to the village was one of the first problems the Cardinal needed to solve after purchasing the fiefdom. In fact, the small size of both the old urban gate and the front entry to the Palace hindered even the papal procession coming from Villa Mondragone when the Pope visited Montefortino in 1615. The chronicler of the time, in a detailed report accompanied by drawings and maps of the city, tells us how the papal carriages could not comfortably climb it due to the slope and uneven roadbeds, and that the size of the door would not have allowed the carriages to enter the building courtyard anyway.

In the 1615 report, we read,

> *…si arriva al portone di detta terra, vi potrebbe rivar la carozza se avesse dove svoltare.* [...we arrive at the gate of this land. A carriage could have passed through it, if it had a place to turn.] (Vatican Apostolic Archives, Borghese Archives B 582, record No. 80, f. 011V).

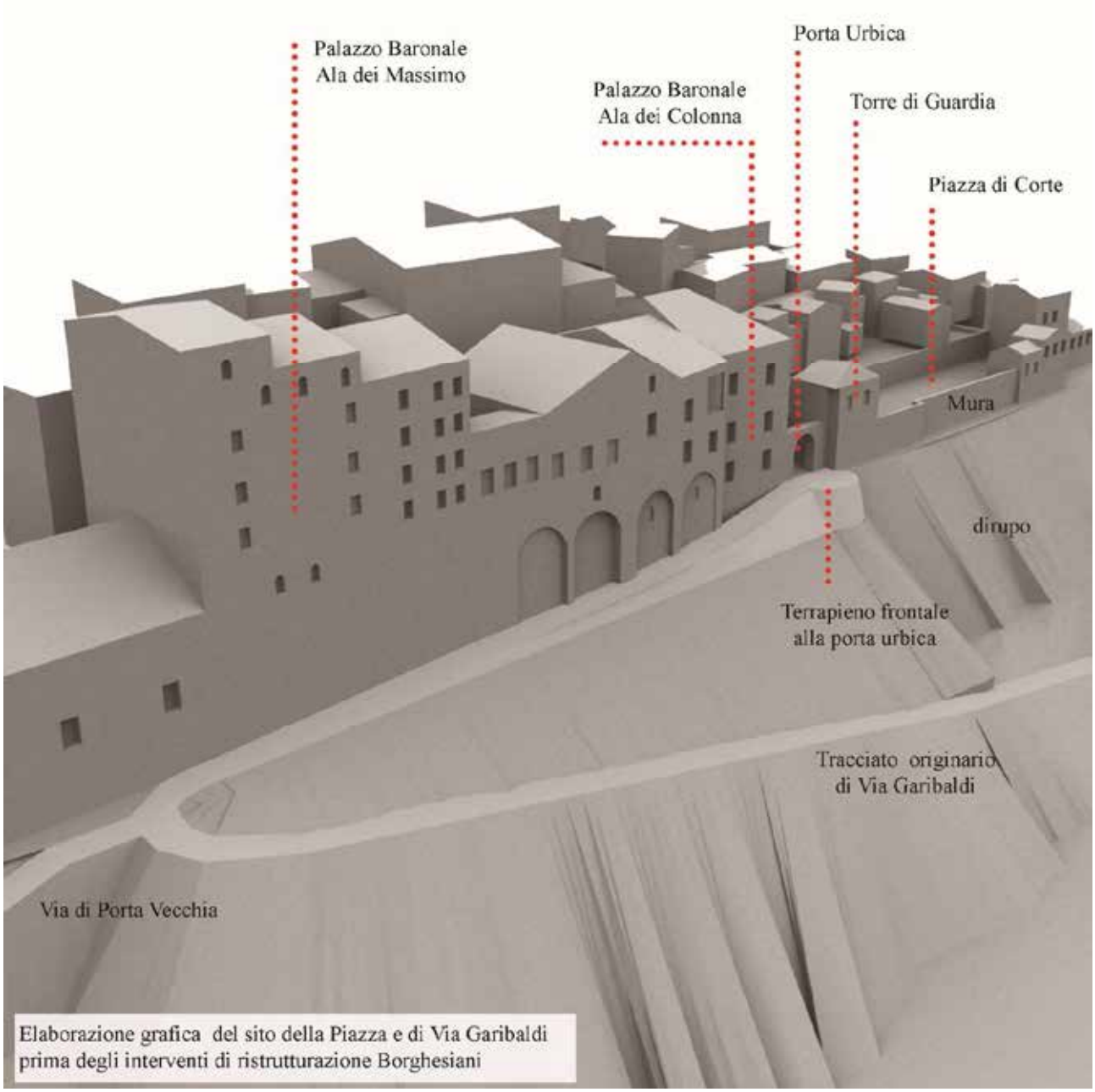


Figure 4. Rendering of the Piazza della Vittoria and Via Garibaldi area that was yet to come before Borghese's intervention (Image by the Author, 2016).

The Cardinal proceeded to design a grandiose engineering and architectural project. He aimed at ensuring a more adequate access road to the city, and that the Palace and the city had a large representation space with a new monumental entrance door to the countryside.

In order to do this, it was necessary to deal with the natural impervious characteristics of the place. Carrying out large excavations and building demolitions was needed. Most importantly, this involved building a large quantity of pillars, vaults, and walls to support the new road and the expansion of the square.

Of interest is a document kept in the Archives of Montefortino in the Notary Archives of Velletri, dated December 23, 1624 (b. 7). The Cardinal signed it to authorize an indemnity of 70 *scudi* to

Palmeria de Santis for the demolition of his house to make way for the square (Serangeli & Agostini, 2006).

The notary, Stefano Serangeli, lived in Montefortino between 1671 and 1720. He left us a great deal of historical documents and testimonies, including the "Notizie istoriche della Terra di Montefortino" ("Historical News of the Land of Montefortino"). Here, letter VI reads,

> Segue al Palazzo la Piazza fatta fare tutta di pianta con grossissima spesa dal signor Cardinale sopra un sito scosceso e riportata in piano sopra più ordini di volte, o fornici, alzata con pianificazioni fondamenti. [A square comes after the Palace. The Cardinal built it from scratch over a rugged place with huge expense, and it features several vaulted or arched stories over designed foundations.] (Serangeli, 1701–1800, letter VI)

The works began around 1615 and the last expropriations and the paving continued until 1624, while the underground haylofts and stables were finished. The whole complex was completed in the Holy Year 1625, according to Borghese Archives in the Vatican Apostolic Archives, b. 6043 (Serangeli 2000, p. 244), and as stated in the inscription on the side of the Borghese Arch.

The Flemish Jan Van Santen (1550–1621) from Utrecht led the project. Initially, he had come to Rome to work as an inlayer and cabinet maker. A pupil of Flaminio Ponzio, Van Santen, also known as Giovanni Vasanzio, succeeded him as Papal Architect in 1613. This was the highest public assignment after that of Architect of Saint Peter's Basilica, entrusted to Maderno during those years (Baglione, 1642).

Vasanzio's signature appears in all the Borghese family great building endeavors of the period. The Montefortino documents recorded his name from 1615 to 1618. Architects Sergio Venturi, Giovanni Battista Bolini, and Antonio de Battisti took the lead in the construction site after his death (Scardamiglia, 2009).

The whole structure of Piazza della Vittoria and Via Garibaldi must be imagined as a large "structural block" consisting of three floors of arches, vaults, and pillars. It leans against the rocky wall on which the small site of the ancient courtyard square stood and along which the access road to the city gate climbed.

The block was created precisely to have a base for expanding the square. However, it gave room to numerous environments that we could define as multifunctional "basements" home to artisanal and productive activities. It was as if an "underground palace" faced the buildings overlooking the new square.

This "underground palace" hosted part of the productive and commercial activities with which the Borghese family brought wellbeing and new life to the fiefdom.

From a purely architectural perspective, the complex is formed by three levels that project downwards from the current floor of Piazza della Vittoria. The lower level rests on rock. It is configured as a series of barrel-vaulted rooms of variable height in order to support the sloping road. The maximum height is about 15 meters, and it descends east until a height of about 3 meters. The west section supports the second floor of the building.

The imposing dry stone walls are covered in limestone and filled with mortar and mixed rocks. They are thick up to about 60 cm and support vaults built in concretion. These can be observed in their

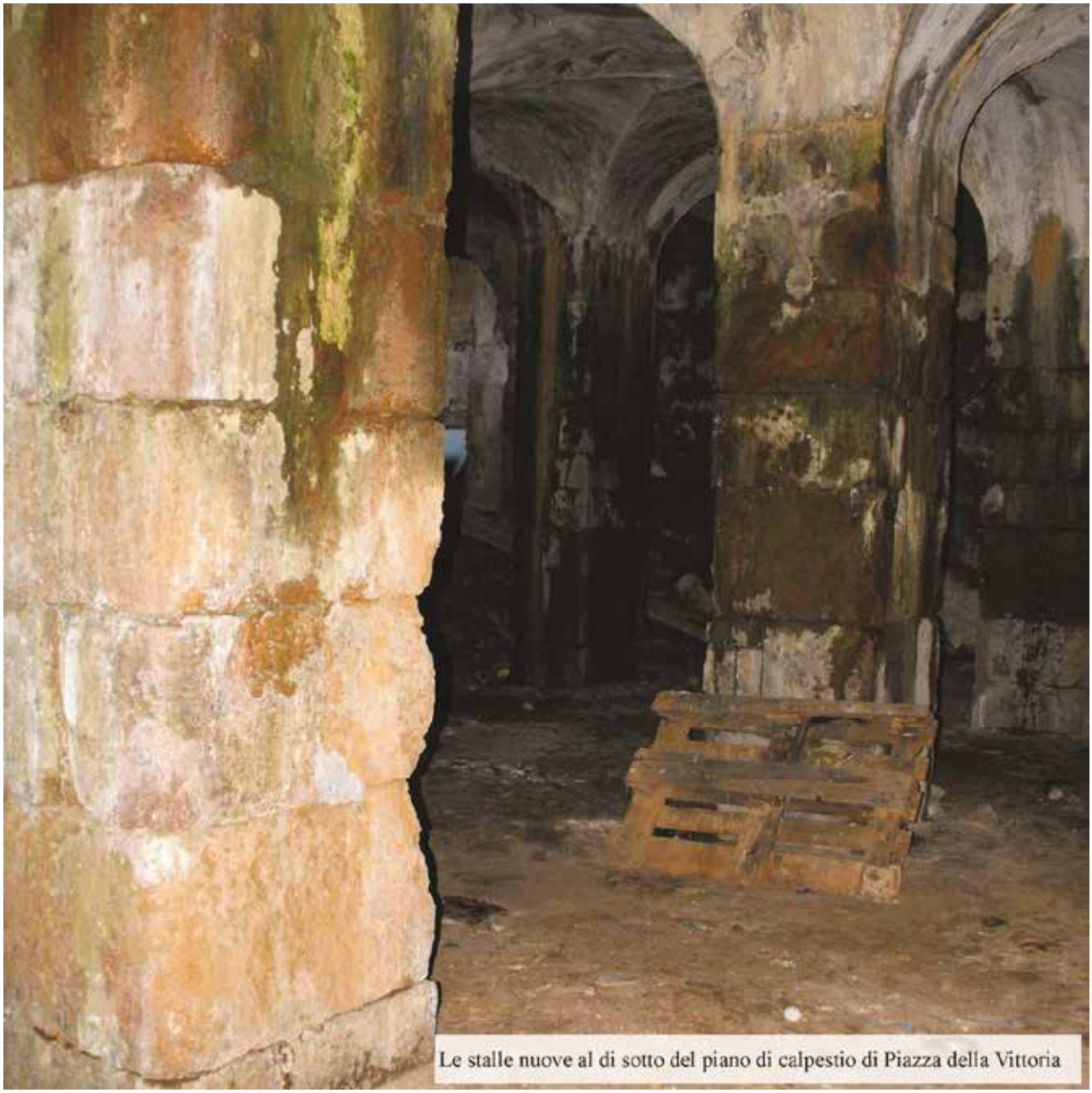


Figure 5. The new stables under Piazza della Vittoria
(Photograph by the Author, 2017).

integrity in these environments of great architectural charm, especially in the less explored part, which is below the first stretch of Via Garibaldi.

The large amount of surfacing rocks, both on the bottom of the rooms and on the walls leaning against the mountain, as well as the soil made humid by the drain of rainwater, together with the darkness, project the visitor into a kind of speleological experience.

The main sewer is visible from the rooms directly below the Borghese Arch. This sewage system was created together with the structure to dispose of the rainwater that ran through the village's steep alleys to the level of the Piazza. Stefano Serangeli writes about the sewage system:

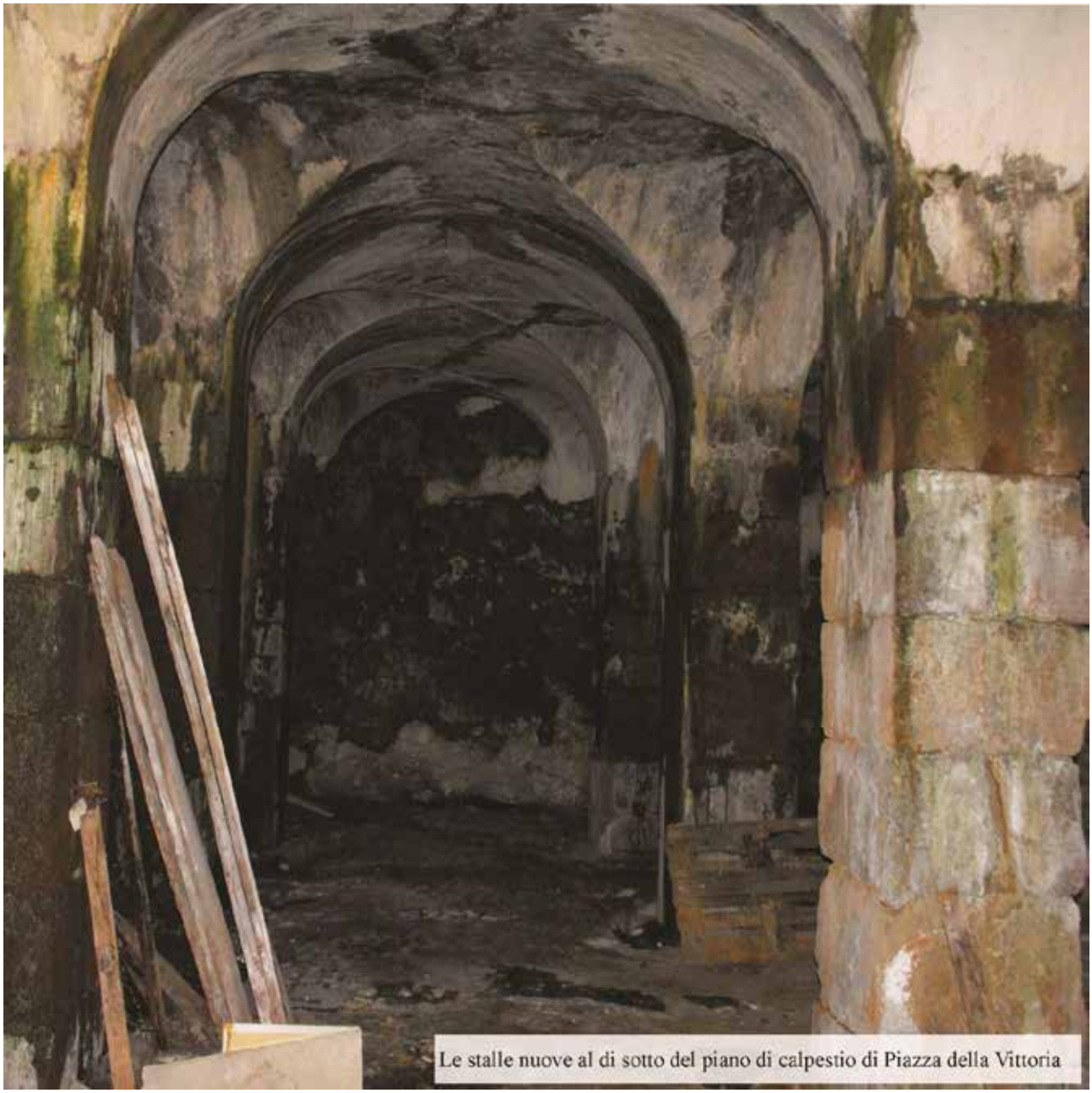


Figure 6. The new stables under Piazza della Vittoria
(Photograph by the Author, 2017).

(…) si esce poi dalla porta principale quale però può dirsi pensile perché sotto di essa passa una cloaca grande che riceve la maggior acqua dalle piogge che discendono dalla terra, cadendo dalla piazza nella imboccatura che la riceve e passando sotto la piazza sbocca attraverso la porta maggiore. [(...) then the exit is through the main door which, however, can be thought of as suspended because a large sewage system passes under it. This receives the most water from the rains that descend from the earth, falling from the square into the mouth that receives it. Passing under the square, then, the water runs through the main door.] (Serangeli, 1701–1800, letter VI)

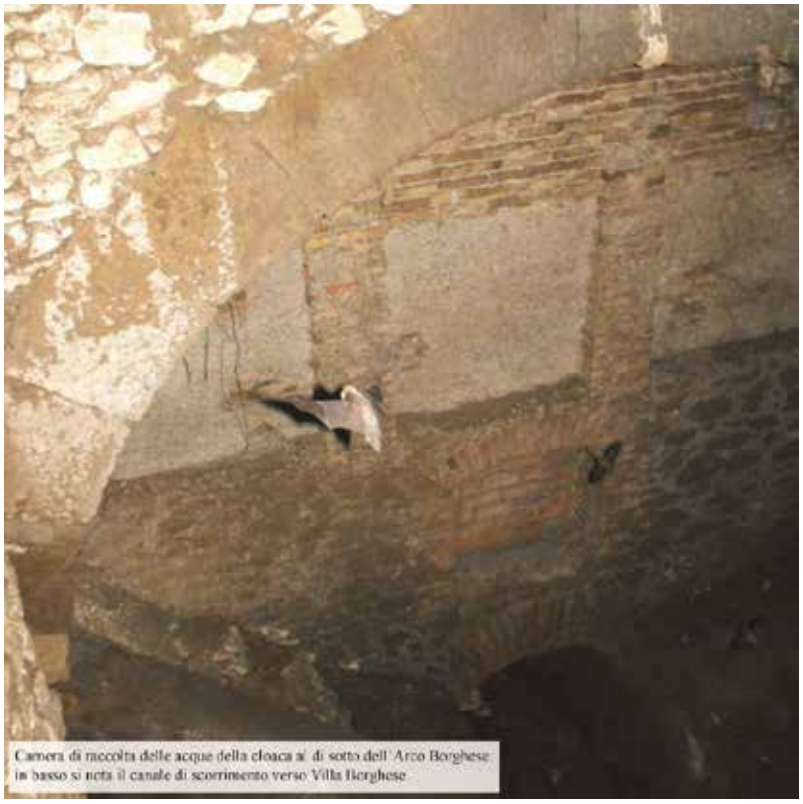


Figure 7. The sewage collection room under the Borghese Arch. Water flows toward Villa Borghese in the culvert visible at the bottom (Photograph by the Author, 2017).

Figure 8. The culvert of the sewage system running under Piazza della Vittoria (Photograph by the Author, 2017).

Figure 9. Substruction of the first part of Via Garibaldi (Photograph by the Author, 2017).

Figure 10. Substruction of the first part of Via Garibaldi (Photograph by the Author, 2017).

The culvert is about 1.5 meters wide and has variable heights. It runs below the square and the garden near Palazzo Borghese to pour its water into a large collection room immediately under the arch. A second conduit starts from this space. By crossing Via Garibaldi and the Villa Borghese, it leads the waters toward the ditch of Via Latina.

As reported by Serangeli, the whole series of rooms of the second floor had the function of a granary before the current Borghese granary was built in the valley in the 18th century.

> *In ultimo seguendo in giù si trova un'altra porta per un lungo corridoro che torna a destra sotto la stalla conduce ai granari che sono sotto al menzionato fienile a capo della strada (…) sostenuta da grandissimi pilastri in archi e sotto quel granaro sono altre volte e fornici.* [Finally, by continuing downward, we find another door on a long corridor that turns right below the stable. It goes to the granary, which is below the aforementioned hayloft at the end of the road (…) It is supported by a huge arched pillar, while other vaults and arches are under that granary.] (Serangeli, 1701–1800, letter VI)

The door to access these rooms is located near the Borghese Arch. From here, a long, slightly sloping corridor leads to a hallway, which opens into three rooms that most likely served as a warehouse.

After the three rooms, a magnificent large environment opens up to the view, consisting of four barrel-vaulted naves connected by large arches embedded in the dividing walls. Six large windows give light and air.

The structure's upper level, immediately below the level of the square, houses shops, a hayloft, and the Palace's new stables.

The hayloft partly unfolds under the square and partly under the final curve of Via Garibaldi. Of interest is the presence of two large ventilation openings on the back walls toward the mountain. They offer us the opportunity to imagine what the place may have looked like before the great Borghesian interventions.

In fact, looking out over the two windows, it is possible to observe the rocky wall and a large cavity that separates the mountain from the structure. Further, we notice some medieval walls above the rocky wall that were used to support the new square floor. Possibly, these are the walls that surrounded the ancient square, which was located above the rocky wall and the cliff. They have not been completely demolished. Rather, they have been reused as a support by burying that part toward the town to allow for the rise of the elevation plan.

The "new stables" of the Palace are also located on the level immediately below the square. Previously, the only Palace's stables were housed inside the ground floor of the wing resulting from the Colonna extension. The environment still exists and features 12 horse stalls. Its large door opened to the courtyard located immediately after the urban gate.

The courtyard was covered by raising eight tufa pillars surmounted by cross vaults to reach the higher level of the new square. Therefore, with such a remodeling, new premises were added to the stables on the ground floor of the building. Although known as "new stables," this space probably served as a grooming room for the animals before taking them to the real stables. The presence of drains in the pavement, shaped like a donkey's back to dispose of the water, supports this hypothesis.

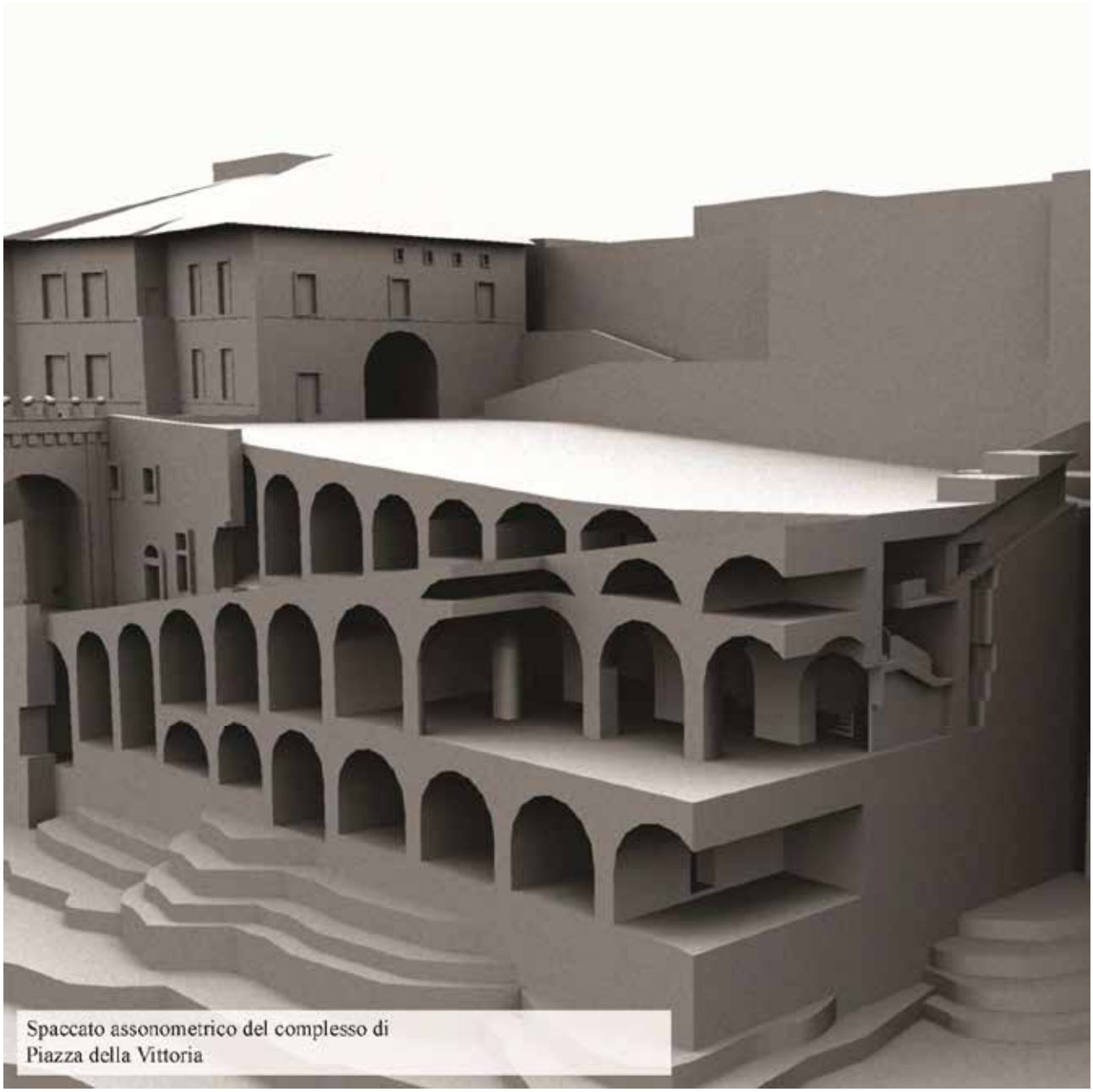


Figure 11. Axonometric view of Piazza della Vittoria's structure (Image by the Author, 2016).

Figure 12. The massive northern wall under Via Garibaldi (Photograph by the Author, 2015).

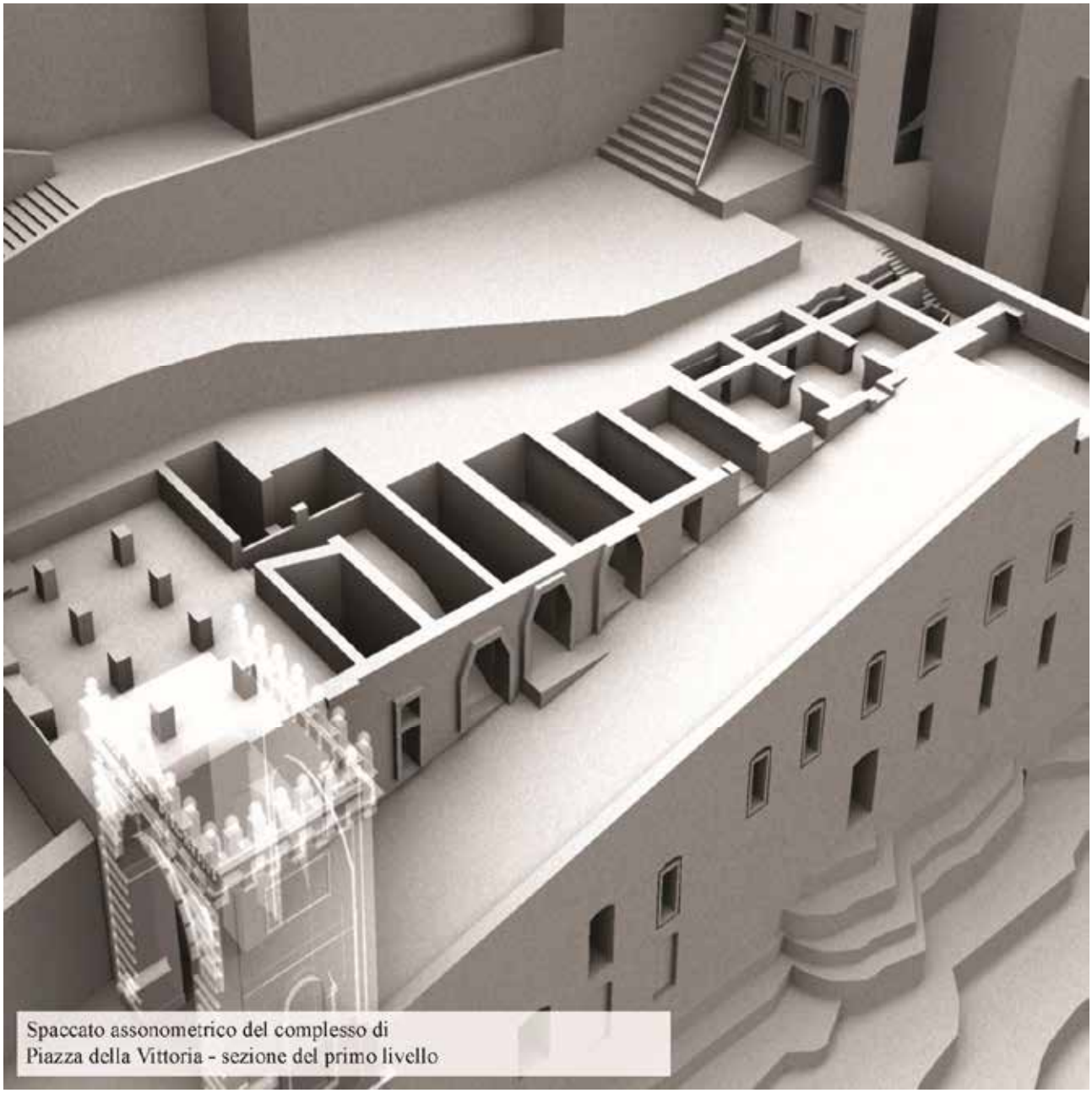


Figure 13. Axonometric view of Piazza della Vittoria's complex, first floor section (Image by the Author, 2016).

This environment includes a space whose underground exhibits walls that are more ancient. Possibly, it derived from a medieval watchtower adjacent to the urban gate. Accordingly, the builders remodeled it to guard the Palace entry from the old and new stables.

The new magnificent entrance gate to the fiefdom, the Borghese Arch, crowns the whole complex. It is surmounted by a loggia that overlooks the Sacco Valley, whose perspective is a continuation of the square's plan.

REFERENCES

Baglione, G. (1642). *Le vite de' pittori, scultori et architetti. Dal Pontificato di Gregorio XIII del 1572 in fino a' tempi di Papa Urbano Ottauo nel 1642.* [The lives of the painters, sculptors, and architects from the Pontificate of Gregory XIII in 1572 until the times of Pope Urban VIII in 1642]. Rome: Andrea Fei. Retrieved from https://digi.ub.uni-heidelberg.de/diglit/baglione1642/0002

Bucci, G. (1970). *Il mio paese ha cambiato volto* [My town changed its face]. Colleferro: PCI sezione di Artena.

Cessato catasto rustico di Roma e provincia – versamento U.T.E. (1988). Comune di Artena già Montefortino (n. s. 041). [Former rural land registry of Rome and province recollected by the property evaluation office (1988): Municipality of Artena, former Montefortino (n.s. 041)]. Rome State Archives, Rome. Retrieved from http://www.cflr.beniculturali.it/UTE/ute.php?lar=1366&alt=768

Cadderi, A. (1973). *Artena (già Montefortino) dalle origini alla fine del secolo XIX* [Artena (former Montefortino) from the origins to the end of the 19th century]. Rome: Centro Studi Francescani del Lazio.

Calenne, L. (2004–2005). Muratori e scalpellini lombardi a Montefortino (oggi Artena) tra l'ultimo quarto del XVI secolo e il primo del XVII: da gente meccaniche a committenti di Giovanni Baglione [Lombard bricklayers and stonemasons in Montefortino (now Artena) between the last quarter of the 16th century and the first quarter of the 17th century: From manual workers to patrons of Giovanni Baglione]. *Latium. Rivista di Studi Storici. 2004/2005*(21–22), 123–188.

Cola, M. C., & Borghese, D. (1996). La famiglia Borghese a Montefortino. Un episodio di committenza poco noto [The Borghese family in Montefortino: A little-known episode of patronage]. *Bollettino d'Arte del Ministero dei Beni Culturali e Ambientali, 6*(98), 43–58.

Giovannone, C., & Montuori, F. (2016). *L'arco trionfale voluto dal Cardinale Scipione Borghese nel feudo di Montefortino.* [Cardinal Scipione Borghese's triumphal arch in the Montefortino feud]. Rome: GRAU.2.

Muñoz, A. (1919). *Roma barocca* [Baroque Rome]. Rome–Milan: Casa Editrice d'Arte Bestetti e Tumminelli.

Relatione delle strade che si faceano per andare da Frascati a Montefortino [Report on the routes from Frascati to Montefortino]. Bound File No. 582, Record No. 80. Borghese Archives at the Vatican Apostolic Archives, Vatican City.

Mappa di Montefortino [Map of Montefortino]. Bound File No. 581, Record No. 61. Borghese Archives at the Vatican Apostolic Archives, Vatican City.

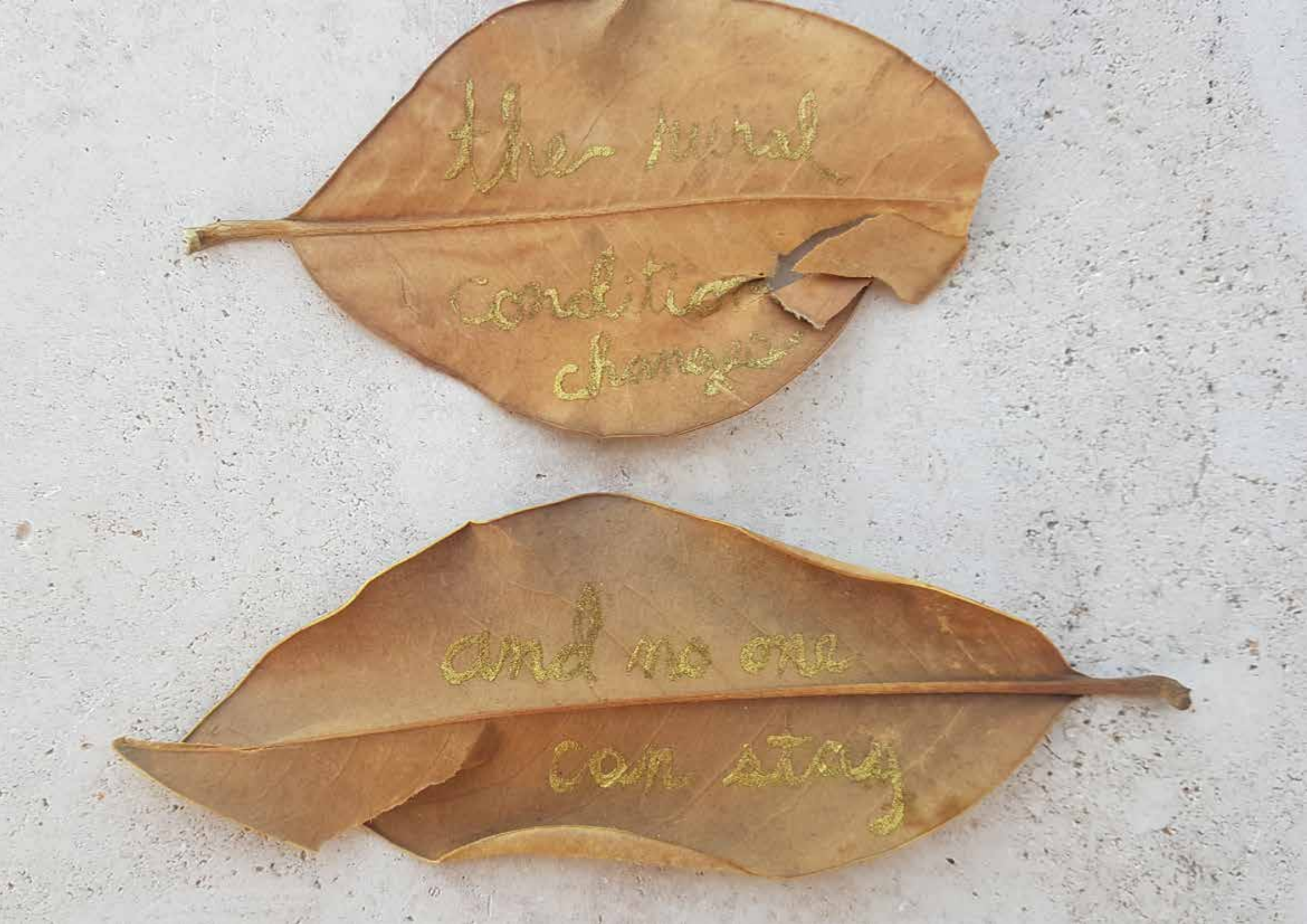
Scardamaglia, F. (2009). Il Palazzo Borghese di Artena: nuove datazioni per la fabbrica di Montefortino [Borghese palace in Artena: New evidence for dating its construction site]. *Quaderni dell'Istituto di Storia dell'Architettura, 2009*(52), 75–84.

Serangeli, A. (ed.) (2000). *Della terra di Montefortino feudo dell'Ecc.ma Casa Borghese. Il "Notaro publico" Stefano Serangeli storico e letterato (1654–1730)* [On the land of Montefortino, feud of the Most Excellent Borghese House: The "public notary" Stefano Serangeli, historian and man of letters (1654–1730)] Artena: Comune di Artena.

Serangeli, A. (2005). S. Maria Maddalena Patrona di Artena [St. Mary Magdalene, Patroness of Artena]. *Il Cuore della Diocesi*, 7.

Serangeli, A., & Agostini, R. (2006). *L'Archivio notarile di Montefortino (Artena). Notai e società prima e dopo la sua istituzione alla fine del sec. XVI. Inventario* [The Notarial Archives of Montefortino (Artena): Notaries and Society Before and After its Institution at the End of the 16th Century – Inventory]. Velletri: Biblioteca Comunale.

Serangeli, S. (1701–1800). *Notizie istoriche della Terra di Montefortino nella Campagna e Distretto di Roma* [Historical Notes about Montefortino in the Countryside and District of Rome]. Copy of the manuscript preserved in Archivio Storico Diocesano Innocenzo III in Segni (Rome).


Her mind
condition
changes
and no one
can stay

Façade typologies in the ancient towns of Segni (above) and Artena (right).

Sketches by Arch. Uğur Sağlam (July 2019)


SAUNA
Uğur 2019


born
and around
progression
of words

Agro-Tourism as an Instrument for Rural Transformation in Nigeria

Salaudeen A. Bayonle[1] and Uthman Bello[2]
[1]Sustainable Forest Management Department, Ibadan and [2]Federal College of Forestry Mechanization, Kaduna, Forestry Research Institute of Nigeria, Ibadan, Nigeria

ABSTRACT

Neglect of rural areas in favor of cities is a common denominator in developing countries like Nigeria. Nevertheless, rural areas in most of the world's developed nations have undergone substantial transformations during the last two decades. Various studies confirmed that, nowadays, over one third of the population in these areas are engaged in non-agricultural activities, such as tourism. Here, agro-tourism emerges as a promising alternative for increasing local employment and income levels and, at the same time, driving the improvement of infrastructure and services. This paper argues that agro-tourism is a possible alternative for improving Nigerian rural areas without making them mere copies of urban environments. Accordingly, it advocates for actions to foster the participation of rural people as the main managers of tourism in the rural milieu.

***Keywords*:** agro-tourism, rural areas, development, Nigeria

INTRODUCTION

Identifying rural as "agricultural" has gradually lost its meaning as many typical urban activities have developed in the rural milieu. The non-agricultural economically active population (EAP) in most of Nigeria's rural areas is increasing by 2.5% every year, while the agricultural EAP is experiencing an annual decrease of 2.2% (Central Intelligence Agency, 2005). The most important activities within the non-agricultural sector, in decreasing order by number of people involved, are consumer services, manufacturing, commerce of goods, social services, and the civil construction industry. The main non-agricultural occupations, in decreasing order by number of people involved, are domestic services, construction work, personnel services, school teachers, and shop clerks. In brief, non-agricultural activities are increasingly alternative or complementary sources of income in the rural milieu. Within them, the activities related to leisure and tourism are outstanding (Central Intelligence Agency, 2005).

Tourism in rural areas may be a vector of local development if stakeholders can control and manage it autonomously, that is, if driven by local initiatives, local management, local impact, local landscape, and valorization of local culture (Ayodele, 2005). From this perspective, traditional tourism based on the importation of programs and resources is not an appropriate strategy to promote development and initiatives in rural areas.

Indeed, tourism in the rural zone began to consider local potential, as well as its geographical, cultural, and environmental diversity based on the interaction and integration of its different actors—state, private institutions, and local community. It is on this background that this paper stresses the need to encourage and facilitate the managerial involvement of small-scale agricultural producers in tourism.

FORMS OF RURAL TOURISM

Literature presents a wide range of concepts on tourism in the rural milieu which, to some extent, brings out its varying possibilities. For example, there is some confusion regarding the term "green tourism," which has been used interchangeably with the terms "rural tourism" and "eco-tourism" (Eagles, McCool, & Haynes, 2002). Others do not differentiate between "rural tourism" and "tourism in the rural area." Erroneously, tourism in the rural milieu has been considered synonymous with "agro-tourism," which refers to non-agricultural services practiced within agricultural properties. For conceptual clarity, this paper adopts the expression, "tourism in the rural area," because it better reflects the breadth of opportunities present in the rural environment.

Tourism in the rural milieu involves leisure activities carried out through varying forms defined on the supply side, such as rural tourism, ecological tourism or eco-tourism, adventure tourism, and sports tourism (Lindberg, 1991). The concept includes the following activities: meetings, incentives, conferences and exhibitions (MICE) in rural convention centers and places for executive training; sports in natural resorts; trekking; visits to relatives and friends; visits to museums, landmarks, historical buildings, scenic landscapes, and the natural environment. Others include camping sites, vacation camps, country hotels, ranch resorts, and outdoor sports, such as canoeing, mountain climbing, fishing, and hunting. In brief, tourism in the rural milieu involves leisure activities not necessarily related to the productive agricultural properties of a region.

On the other hand, Ceballos-Lascuráin (1996) defined "agro-touristic" as activities that generate occupation and complement daily rural property activities. These activities should be understood as part of a process that adds services to the agricultural products and non-material values existing on rural properties (landscape, fresh air, et cetera), using the free time of farm families and sometimes

even their work time. Some examples of activities associated with agro-tourism include ranch resorts, leisure fishing, hunting grounds, country lodging and restaurants, the farmer's market, local handicrafts, home industries, and other leisure activities devoted to the revival of the local lifestyle.

Presently, the Nigerian urban population enjoys eco-tourism as a relief from the daily routine of big cities. This resulted in one of the most dynamic emerging markets of the country, especially in places like Obudu, Cross River, and Arugungu, Adamawa. In most cases, though, mass eco-tourism tends to generate little income for the local rural population. In fact, tours are generally planned by urban travel agencies. These barely employ local staff (Falade, 2000). Moreover, visits frequently last just a few hours, while meals and overnight stays take place in the cities. Therefore, this kind of tourism only takes advantage of the rural surroundings, but the income is destined to the urban employees and companies from where visitors originate.

No.	Eco-tourist attractions	State of location
1	Chas Basin Natural Park	Yobe
2	Cross River Natural Park	Cross River
3	Erin-Ijesha Waterfall	Osun
4	Gashaka Gumti Natural Park	Taraba
5	Ikogosi Warm Springs	Ondo
6	Jos Plateau	Plateau
7	Kainji Lake Natural Park	Niger
8	Kamuku Natural Park	Kaduna
9	Kura Falls	Plateau
10	Obudu Cattle Ranch	Cross River
11	Ogbunike Caves	Anambra
12	Oguta Lake Resort	Imo
13	Okomu Natural Park	Edo
14	Old Oyo Natural Park	Oyo
15	Olumo Rock	Ogun
16	Oshun Shrine (grove)	Ogun
17	Yankari Game Reserve	Bauchi

Table 1. Main Nigerian eco-tourism attractions
(after Idumali, Onyeanusi, Akingyemi, & Adesope, 2006).

Instead, authentic agro-tourism can supply a relatively small quantity of tourism products that are genuine and territorially dispersed, avoiding the destructive effects of mass tourism and offering a pattern that reconciles two potentially conflictive objectives: rural economic development and the

preservation of natural resources. The local economy can improve without shock, creating dynamism in upstream and downstream interfaced sectors and activities (Hall, 2000, pp. 6–42).

ECO-TOURIST RESOURCES IN NIGERIA

Nigeria is blessed with abundant and diverse natural resources that provide a good platform for the promotion and development of eco-tourism. The country can boast beautiful tourism destinations, such as historical sites and protected areas (PAS), natural parks, wildlife and game reserves, and animal and coastal sanctuaries. Examples of such areas are shown in Table 1.

PROSPECTS FROM TOURISM IN RURAL AREAS FOR SMALL FARMERS

There are some evident obstacles to the full-fledged development of agro-tourism (Wearing & Neil, 1999). The first is the lack or precariousness of all types of infrastructure, such as lodging/inns, roads, water and plumbing, communication infrastructure, electricity, waste management, safety and security networks, hospital and emergency care facilities, as well as businesses such as pharmacies, restaurants, supermarkets, and convenience stores. Easing these difficulties requires public investment. A second obstacle is the lack of trained personnel at all levels of activity. Tourists of different backgrounds have varying demands and expectations with regard to the kinds of activities being practiced and the services offered in the rural area. Receptionists, hosts, and guides should be trained to understand the behavioral and cultural differences of tourists from different regions of the country. The third problem is the lack of institutional support and staff for the development and promotion of tourism policies, planning, regulation, organization, and tourism-related products in the rural milieu (Eagles, McCool, & Haynes, 2002).

Further, due to a matter of scale, single farmers are often not equipped to meet the demand of agro-tourism products and services. Therefore, a viable alternative is organizing farmers through associations or cooperatives to broaden their supply capacity and enable them to diversify their offer. Organization may also empower farmers in negotiating with public and private institutions. Productive farms can provide one or more of the following agro-tourism activities: home processing of foods, traditional restaurants, diners, inns, direct sales to consumers, fruit picking in orchards, and site or agricultural tours, including visits to production units (Odunlami, 2005).

Another remarkable limitation of tourism in the rural milieu is the lack of marketing strategies and actions. For tourism in the rural milieu to be successful, the establishment of local tourist agencies and operations is desirable. These, in turn, should bring more attention to all of the available products, establish closer relationships with farmers, be sensitive to local potential and problems, and explore different markets.

Barkin (1996) listed the following problems that are likely to arise from agro-tourism:

1. environmental destruction derived from garbage and litter, noise, degeneration of natural patrimony, fauna, and flora;
2. degeneration of the local culture following the interaction with tourists of different origins;
3. increased transit of people and population mobility;
4. decreased demand for public services competing with local community services;
5. “inclusion” and “exclusion” of areas and regions leading to rural exodus in the excluded areas;
6. increased criminality and drug use influenced by the urban population;

7. abandonment of agricultural activities and adoption of agro-tourism as the only source of family income;
8. increased cost of living for resident communities due to the increased cost of goods and services and rising land value resulting from real estate speculation;
9. lack of training for small farmers;
10. agricultural traditions that discourage from engaging in new forms of business;
11. low affordability in taking entrepreneurial risks;
12. difficult access to governmental programs, such as credit guarantees;
13. little tradition of self-organization by means of association and cooperatives;
14. difficult access to information and markets; and
15. little interchange with travel agencies and tour operators.

Despite these problems, tourism in rural areas tends to affect local dynamics, allowing the local community to usufruct the benefits generated.

Briefly, agro-tourism should not be taken as a panacea for rural development. Given its complexity and diversity, actions aimed at promoting agro-tourism seldom respond efficiently to one sector intervention and management. It demands a multi-centered approach that contemplates integration, articulation, and coordination of actions in various and complementary domains in order to intensify, promote, and valorize every region's own resources. Accordingly, the state should prioritize the local community's participation in the process, protecting its citizenship, and preserving natural resources.

CONCLUSION

In order to orient agro-tourism toward small farmers, the following five basic actions should be implemented:

1. support the creation of new vocational training programs, such as tourist agent, tour guide, and provider of other tourist services in rural areas;
2. update the current legislation on tourism to stimulate its development on agricultural properties;
3. create a minimum administrative infrastructure at the municipality level, which should include a reserve bureau to manage the demand, identify preferences and, above all, assist small farmers.

On a final note, the great challenge of any measure to stimulate agro-tourism is to find ways for transforming farm families into small entrepreneurs while, at the same time, incorporating these measures into a larger plan of integrated rural development in Nigeria.

REFERENCES

Ayodele, E. I. (2002). *Essentials of tourism management.* Ibadan: Elshaddi Global Ventures Ltd.

Barkin, D. (1996). Ecotourism: A Tool for Sustainable Development in an Era of International Integration? In E. Malek-Zadeh (Ed.). *The ecotourism equation: Measuring the impacts. Yale School of Forestry & Environmental Studies Bulletin Series, 99*(101), 263–272.

Ceballos-Lascuráin, H. (1996). *Tourism, ecotourism, and protected areas: The state of nature-based tourism around the world and guidelines for its development*. Gland: IUCN.

Central Intelligence Agency. (2005). Nigeria. In *The world factbook*. Retrieved from https://www.cia.gov/library/publications/download/download-2005/index.html

Eagles, P. F. J., McCool, S. F., & Haynes, C. D. A. (2002). *Sustainable tourism in protected areas: Guidelines for planning and management.* Gland: IUCN.

Falade, O. (2000). *Understanding tourism in Nigeria*. Ibadan: JIS Printing Press.

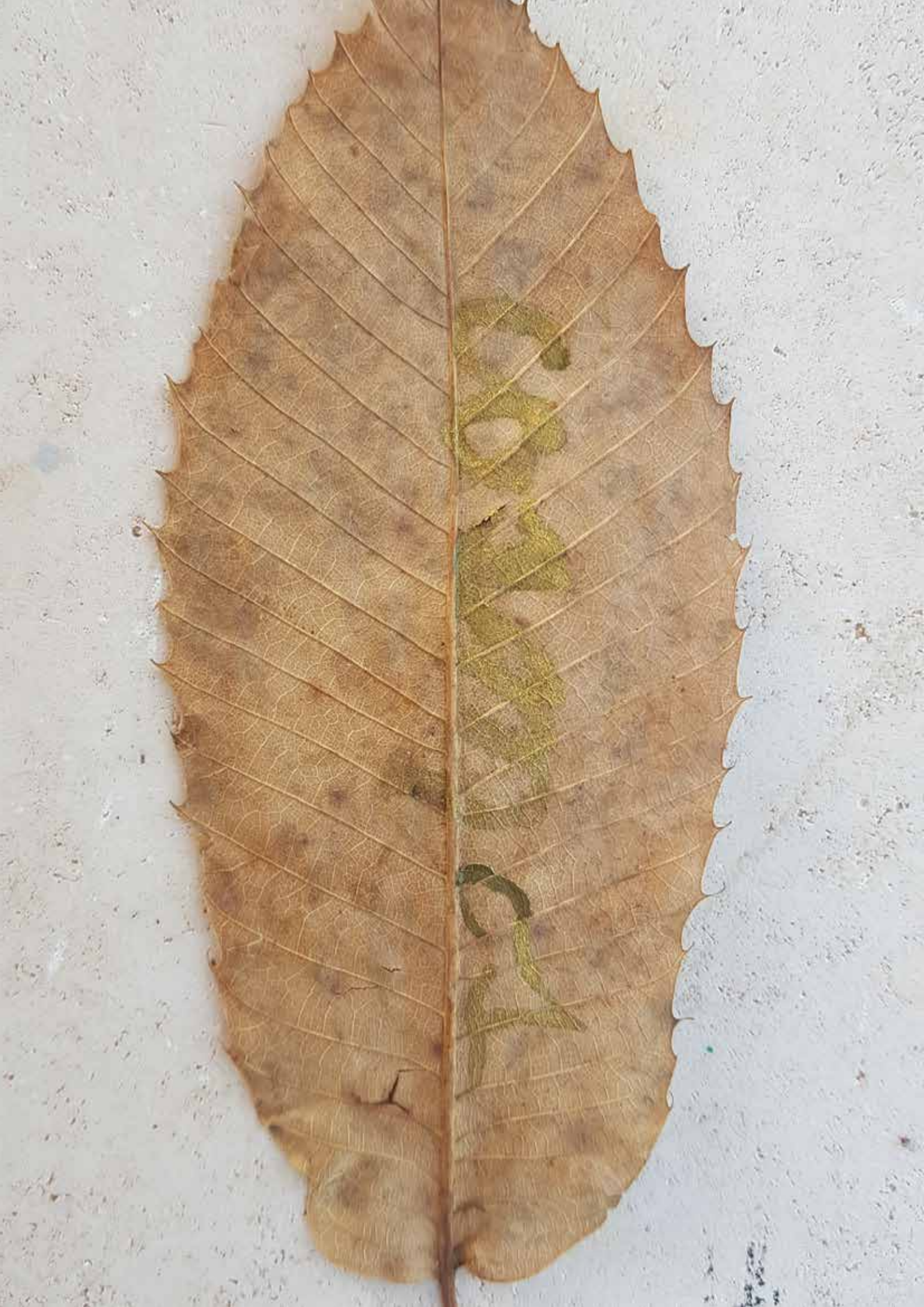
Idumali, F. O. Onyeanusi, A, E., Akingyemi, O. D., & Adesope, A. A. A. (2006). Eco-tourism and sustainable economic development in Nigeria: Problems and panacea. In L. Popoola (Ed.). *Forestry at crossroads in Nigeria: Proceedings of the 31st annual conference of the Forestry Association of Nigeria, held in Makurdi, Benue State, Nigeria, 20th–25th November 2006*. Ibadan: Forestry Association of Nigeria.

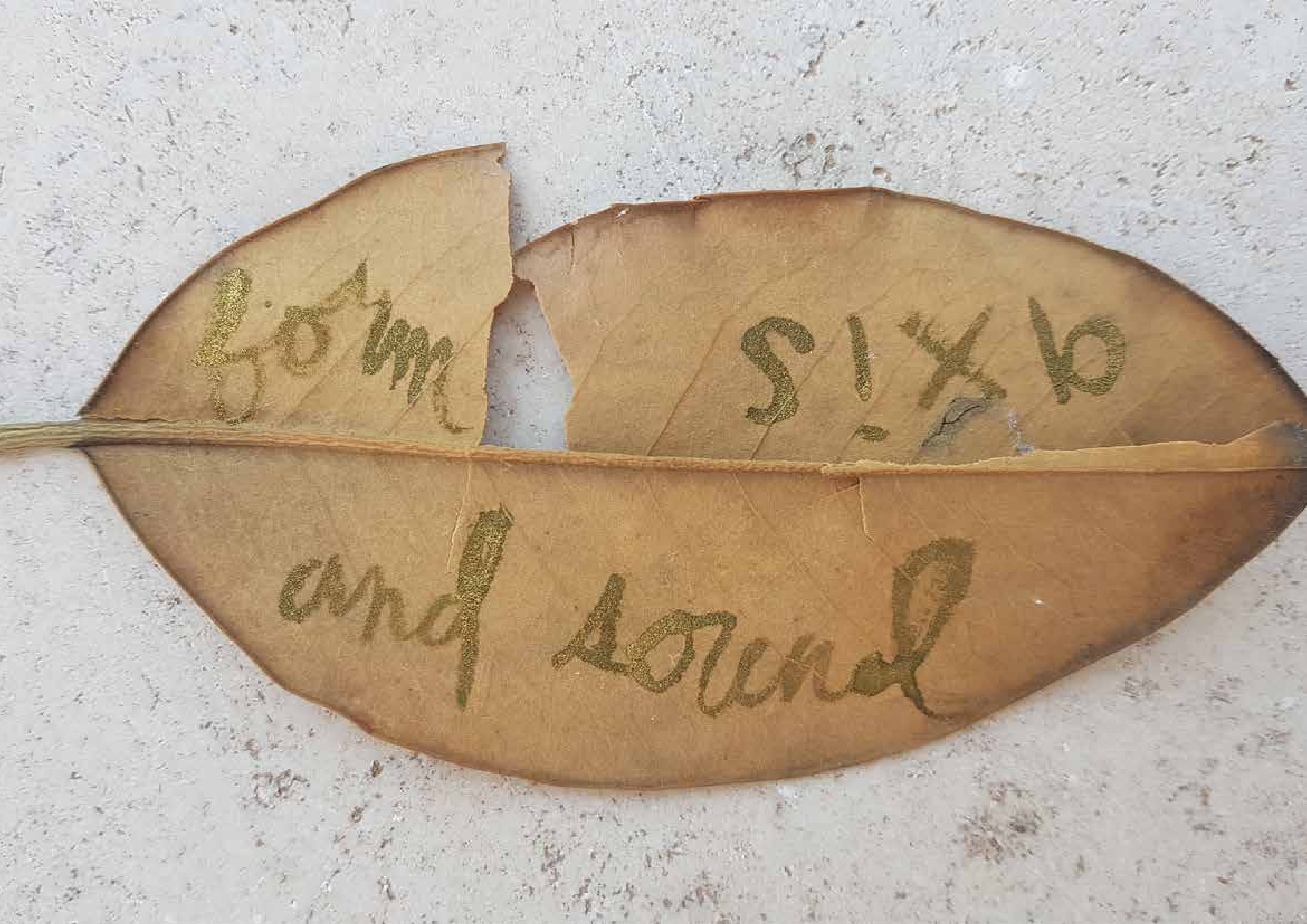
Lindberg, K. (1991). *Policies for maximizing nature tourism's ecological and economic benefits.* Washington, D.C.: World Resources Institute.

Hall, C. M. (2000). *Tourism planning: Policies, processes and relationship*. Harlow: Pearson.

Odunlami, S. S. (2005). *Impact of eco-tourism development on the communities bordering Yankari National Park Nigeria.* PhD thesis submitted to the department of wildlife and fisheries management. University of Ibadan.

Wearing, S., & Neil, J. (1999). *Ecotourism: Impacts, potentials and possibilities.* Oxford: Butterworth-Heinemann.




form
and sound

Environmental Management through the Forest Landscape Restoration Mechanism (FLRM) in Nigeria

Abdulwaheed Bayonle Salaudeen & Joseph Oludayo Gbadebo
Sustainable Forest Management Department, Forestry Research Institute of Nigeria, Ibadan

ABSTRACT

Land environmental degradation, that is, the weakening of the structure, stability, and productive potential of soil is a major problem in many agricultural communities of the world, which also face drought, desertification, deforestation, and even landslides. This paper explores the emerging concept of the Forest Landscape Restoration Mechanism (FLRM) as a pre-emptive and corrective measure to restore land productivity, conserve biodiversity, increase the resilience of agro-ecosystems, alleviate poverty, and contribute to food security. The mechanism does not involve just techniques but also the participation of stakeholders in playing roles, exercising rights, and taking responsibilities.

***Keywords*:** environmental management, Forest Landscape Restoration Mechanism (FLRM), Nigeria

INTRODUCTION

The Food and Agriculture Organization of the United Nations (FAO) defined land degradation as the loss of lands' natural productivity due to human activity that affects the capacity of ecosystems to provide social and environmental goods and services (FAO, 1989, chapter 3). Such a degradation may include the decline of soil fertility, nutrient imbalance, erosion, compaction, acidification, and salinization, resulting in excessive water runoff, low soil moisture, and a reduced capacity of soil to regulate water flows. Inappropriate land use and management can also influence biodiversity and the microclimate to the point of facilitating desertification and exacerbating climate change through increased greenhouse gas emissions (CGIAR, 2013). In particular, this phenomenon affects the rural poor. Decreased quality in the water supply, food security, and nutrition mean increased vulnerability to biological and environmental hazards, as well as climate change consequences.

Reports (Stewart, 2015; Martínez, Cajas, León, & Osorio, 2014) indicate that 25% of the world's land (some 12 million hectares) are either undergoing degradation or are already highly degraded. The result is a drop in productivity, while population and food demand rapidly increase. This phenomenon affects 65% of arable land, 30% of grazing land, and 20% of forests in Africa.

Deforestation and other environmental degradation aspects have altered many of the world's tropical forest landscapes to such a degree that, at the very most, only 42% of remaining forest cover (or 18% of original forest cover), especially in the tropics, is still found in large contiguous tracts (World Resources Institute, 2017). Here, plant and animal life show remarkable adaptability, which is similar to the resilience of humans in obtaining food from it. Land, as seen by Martínez, Cajas, León, & Osorio (2014), is not only the farmers' most important asset but also an indispensable common good, since agriculture and livestock production require land.

FAO (Buttoud, 2013) noted that Africa's lands (croplands, savanna, bush, and forests) are mostly threatened by poor management. Sadly, this scenario is proceeding so fast that only a few African countries can hope to achieve a restored landscape in the foreseeable future. This undoubtedly presents a gloomy picture for the black nations whose survival is rooted in agricultural production, including forestry.

In response to the problem of land degradation on a global scale, the Bonn Challenge of 2011 and the New York Declaration on Forests in 2014 established the global targets of 150 million hectares and 350 million hectares by 2020 and 2030, respectively (Buttoud, 2013). Landscape restoration according to the World Resources Institute (2017) contributes to the achievement of the Sustainable Development Goals (SDGs), especially SDG15, which is to protect, restore, and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, and combat desertification. Restoration mechanisms through agroforestry is a valuable tool to address climate change, as well as reduce biodiversity loss. In 2016, the United Nations Convention to Combat Desertification (UNCCD) established the Land Degradation Neutrality Fund, meant to enable private sectors to support policies and make investments for a land-degradation-neutral world by 2030.

CONCEPTUAL BACKGROUND OF FLRM

The Forest Landscape Restoration Mechanism (FLRM) is meant to halt and reverse land degradation. The area of land potentially available to undergo this process is estimated at 2.2 billion hectares with about 1.5 billion suited for agroforestry. A further 1 billion hectares of croplands and densely populated rural areas on former forestlands would benefit from the establishment of trees in strategic places to protect and enhance agricultural productivity and other ecosystem functions.

The Forest Landscape Restoration Mechanism (FLRM) was coined in 2001 by a group of forest restoration experts in Spain as a process that aims at regaining ecological integrity and enhanced human wellbeing in degraded forest environments. While the overall concept of FLRM is young, virtually all the principles and techniques have been around for some time and are familiar to many practitioners in the forestry sector. In essence, FLRM is an approach to managing the dynamic and often complex interactions among the people, natural resources, and land uses that comprise a landscape. The concept makes use of the collaborative approaches to harmonize the many land use decisions of stakeholders. Geidam, Redzuan, & Abu-Samah (2012) emphasized that FLRM differs from conventional restoration approaches of the past in the following ways:

1. It accommodates a landscape-level view and objectives along the line of site-level restoration decisions.
2. It uses a double filter approach in restoration efforts resulting in improved ecological integrity and enhanced human wellbeing at the landscape-level.
3. It is a collaborative process involving a wide range of stakeholders with collective decisions on the most technologically appropriate and socio-economically acceptable options for restoration.
4. It is a forward-looking concept that aims at strengthening the resilience of forest landscapes and keeping future options open for optimization of forest-related goods and services at the landscape-level.
5. It is applicable to primary and secondary forests, degraded, and deforested lands.

THE STATE OF NIGERIAN LANDS IN BRIEF

Different degrees of land degradation are being experienced in various parts of Nigeria. For instance, land degradation in the form of desert encroachment is of great concern in the states of Sokoto/Kebbi, Katsina, Kano/Jigawa, and Borno/Yobe. Soil erosion occurs in the states of Abia, Anambra, Ebonyi, Ekiti, Enugu, Benue, Imo, and Ondo. Coastal erosion affects rivers in the states of Delta, Bayelsa, and Rivers. Accordingly, even the World Bank insisted on a fully developed and properly managed land use and agroforestry plan in all the agricultural development programs active in most parts of the country.

FORESTRY RESEARCH INSTITUTE OF NIGERIA (FRIN) AFFORESTATION EFFORTS TOWARD ENVIRONMENTAL MANAGEMENT IN NIGERIA

Many environmental issues derived from deforestation have been ravaging Nigeria. Oloyede (2008) notes how afforestation and reforestation efforts can compensate these damages. Based on this, Kalu, Edet, & Chukwuenye (2014) posited the urgency of planting and growing more trees. Indeed, sustainable afforestation and tree planting programs are imperative in the mandates of the Forestry Research Institute of Nigeria (FRIN), which is the only research institute in the country saddled with such a relevant responsibility (Figures 1 and 2). In fact, Nigeria's forest estate depends largely on the afforestation and reforestation efforts of FRIN. The Institute realized that promoting forestry requires a widespread public support to influence the actions of politicians and inspire many similar initiatives by communities and citizen groups nationwide. This concept of inclusion brought in place the acquisitions of community lands through collaboration with traditional rulers and community members (Figures 5, 6, 7, and 8) in various communities across the country for afforestation, reforestation, and plantation projects (Table 1).

S/N	SITE LOCATION	LGA	STATE	SPECIES	AREA COVERED (HECTARES)
1	Mangu, Du Miango Jere Montane	Mangu Jos/East Jos/North Jos/North	Plateau	*Tectona grandis, Gmelina, Eucalyptus*	42.5
2	Aponmu Owena Ore	Odigbo Akure South	Ondo	*Moringa oleifera, Khaya senegalensis* *Garcinia kola, Nuaclea, Terminalia superba, Khaya senegalensis, Irvingia, Triplochiton, Mansonia*	39
3	Onigambari, Ibadan Iwofin Elere-Ido	Ibadan/East Ibadn North Ogbomoso Ido	Oyo	*Pakia biglobosa, vitallaria paradoxa, ceiba petendra, Khaya senegalensis*	34
4	Damasak		Borno	*Khaya senegalensis, Acacia Senegal, Albizia lebeck, Adansonia digitata, Eucalptus spp, Azacharata indica, Jatropha curcus*	28
5	FRIN Headquarters (Arboretum)	Ibadan North-west	Oyo	*Pakia biglobosa, Vitallaria paradoxa, Mansonia altissima,* *Garcinia kola, Pterocarpus erinaceous, Adansonia digitata* *Moringa oleifera, Jatropha carcus, Acasia Senegal, Thevetia peruviana, Terminalia surperba, Shorea roxburghii, Tectona grandis, Gmelina arborea*	17
6	Mokwa	Mokwa	Niger	*Tectona grandis, Gmelina, Eucalyptus spp*	16
7	Igan okoto	Yewa North	Ogun	*Pakai biglobosa*	14
8	Sakpoba	Orhimwon	Edo	*Garcinia kola, Nauclea, Pterocapus, Brachy stegia, Terminalia Ivorensis*	13
9	Akpata		Kogi	*Jatropha, Nuaclea, Terminalia superba*	12
10			Gombe	*Jatropha*	10
11	Ikija	Ijebu East	Ogun	*Garcinia kola*	2
12	Omo Bioshpere reserve	Ijebu East	Ogun	*Garcinia kola*	1

Table 1. Distribution of selected FRIN afforestation projects across Nigeria (Source: FRIN fieldwork, 2011–2018).

Figures 1 and 2. FRIN plantation establishment in the Sokojiji area of Mokwa, Niger State (Images sourced by the Authors).

Figure 3 and 4. FRIN model schools in Mokwa LGA, Niger State (Images sourced by the Authors).


Figures 5 and 6. FRIN land acquisition meeting with Ndalile of Mokwa for plantation establishment, and cross-fertilizing ideas with farmers at the Sokojiji agroforestry farm site, Mokwa, Niger State (Images sourced by the Authors).


Figures 7 and 8. A meeting with village leaders in the Eppa district, Mokwa, Niger State and tree planting campaigns with traditional rulers, Ore, Ondo State (Images sourced by the Authors).

Cooperation among different institutes, social bodies, and local resource users produced an integrated, participatory approach to forest conservation and development with a clear discontinuity from the past. Such an approach is characterized by the following:

1. awareness of the relevance of projects' economic viability;
2. economic support of active groups capable of successfully accomplishing set objectives;
3. encouragement to integrate indigenous knowledge (Figure 6) in certain areas to involve rural people in agroforestry;
4. all-inclusive strong partnership with stakeholders in sustainable processes via continuous consultation and dialogue (Figure 7);
5. continuous monitoring and assessment of plantation projects across the country.

The institute has continuously embarked on the free distribution of seedlings. This activity was further complemented by establishing the Young Foresters' Clubs and Green Clubs across secondary schools and higher education institutions in several states (Figures 3 and 4). Students are invited to serve as foot soldiers and advocacy outfits to spread the need for afforestation and reforestation in the county. Further, FRIN tries to attract young people into forestry through its Tree Planting Campaign. Finally, the institute has adopted many villages in the states of Ogun, Oyo, and Niger to display success stories of autonomous agroforestry plantations.

FLRM AND PLANTATION FORESTRY: THE MISSING LINK

Conventional responses to forest fragmentation and degradation seldom achieve their goal. For instance, plantation forestry definitely has a place in FLRM. However, industrially oriented plantations will rarely replace all the forest functions that have been lost or comprised through landscape-level deforestation, fragmentation, and degradation (Climate Summit 2014, 2017). Therefore, considering this fact, there is a need to leave room within the landscape for the deployment of other, complementary restoration strategies. As emphasized by the World Resources Institute (2017), mainstream methodologies represent a perfectly legitimate approach to site-level activities, ecological corridors, and stepping stones. Secondary forests and agroforestry systems regeneration provides the foundation for multiple functionality (Table 2).

BIOPHYSICAL	SOCIAL
• forest patches type, condition, and location; • non-forest land type and location; • presence or absence of degrading influences; • trends in forest condition, such as: - forest increase or decrease; - drainage pattern and slope characteristics; - land tenure patterns (legal and de facto); - geological and soil patterns	• location of settlements; • dependence of local people on forest resources; • livelihood support; • existence of local social institutions (like NGOs); • conflicts over the use of land or other resources; • stakeholder groups that have an interest in the FLRM Initiative

Table 2. Context of FLRM Initiatives (Source: World Resources Institute, 2017).

THE ACTION LEARNING CYCLE OF FLRM

Step 1: Plan
The action learning cycle starts with planning to take action on some pre-defined issue or problematic situation. The plan is built on the experience and ideas of all partners, based on the heuristic, key value of day-to-day work and experience.

Step 2: Act
The plan is put into motion following the time frames agreed upon during the planning sessions.

Step 3: Observe and reflect
This involves observing the results of the action and reflecting on their impact. This feedback needs to be carried out explicitly and is best done as a group, ideally facilitated by an outsider in the early stages. This reflection is very important because it enables the next steps to benefit from the knowledge that has resulted from the previous action.

Step 4: Draw lessons
Lessons are drawn from the previous steps of action and reflection. Experience to date is linked back to the concepts and ideas that were used in the initial planning. This leads to re-planning for the next cycle, building on what has been learned from previous cycles. In this way, planning and action can proceed incrementally with everyone participating in and contributing to all facets of the process.

Taking landscape-level perspectives into account in site-level management results not only in potentially healthier landscapes but also in improved stand-level management. In consonance with the above, Sanusi, Apampa, & Sotinrin (2013) highlight two key principles, critical to building a landscape perspective into decision-making:

- Meaningful public participation: practitioners need to realize that landscape, especially if modified or degraded, has many different stakeholders with their own peculiar needs and priorities. In this case, however, FLRM seeks not only to take local people's needs into account but also to involve them actively in the process of decision-making and implementation.
- Balancing land use trade-offs as FLRM brings about ecological and economic benefits, complementing other approaches to economic development at the landscape scale.

Despite these benefits, many of the challenges to making forest landscape restoration work are social, legal, and political in nature. It is evident that most of these problems had made it almost impossible to persuade farmers to invest in tree planting, despite any agronomic advantage. Practitioners, therefore, need to engage in a search for the opportunity to include landscape perspectives in local decisions.

PECULIARITIES OF FLRM AND THE NEED FOR ADOPTION

Most restoration techniques simply aim at maximizing forest cover. FLRM is different. In fact, it focuses on restoring the forest functionality that best suits the forest-related provision of goods and services, as well as human and natural processes. Practitioners base their decisions on local reality, ensuring to preserve the quality and quantity of forest-related functions at a landscape-level. The idea is to address local needs while balancing them with nationwide priorities and requirements for restoration. This happens through the involvement of local stakeholders in planning and management decisions. Participation is, therefore, an essential component. The FLRM approach recognizes the

relevance of side-level specialization. This local knowledge allows for discerning when certain actions would results in human wellbeing trade-offs against ecological integrity. It is a concept built on adaptive management.

FLRM BROAD POLICY RECOMMENDATIONS

The UNCCD (2016) identified the constraints to the adoption of land use systems in landscape restoration initiatives. FRIN encountered such constraints in some communities who are still weary of adoption based on different reasons. Accordingly, the UNCCD recommended a series of policies to scale up agroforestry practices. First, it stressed the need for disseminating agroforestry systems as a practicle and valuable option for restoring degraded landscapes. This option includes a wide range of ecosystem services in the areas of biodiversity conservation and carbon sequestration.

Further, the UNCCD recommended enforcing environmental policies for developing and scaling up both traditional and innovative agroforestry systems in landscape restoration projects. Regulations should adapt dynamically in order to fit rural communities in an inclusive way. This will enhance effective coordination among stakeholders, which in turn will provide for clarity of objectives and care for the most vulnerable when securing land.

Incentive schemes like upfront finance for start-up costs and the role of trees in the supply of ecosystem services, such as erosion control, biodiversity protection, and enhancement of water quality and carbon sequestration need to be provided to enable farmers and landowners to see agroforestry as a valuable option. Accordingly, it is essential to facilitate the development of local technical skills for the collection, production, and distribution of crop and tree varieties, as well as livestock breeds that can tolerate extreme environmental conditions, especially in drylands. Also, access to agriculture information and scientific farm training should be granted to rural advisors and farmers, including women and youth, to trigger interest in enforcing agroforestry practice.

Finally, policies should envisage the production of multipurpose trees with advanced vegetative propagation methods for domestication. This practice has already been enforced at FRIN offices across the country.

CONCLUSION

Key is that FLRM cannot be driven solely by good technical interventions. Rather, it requires supportive local and national policy frameworks. In many situations, it is likely that policy change will follow good innovative practice. Therefore, if FLRM is to succeed, practitioners need to familiarize themselves with the impact of land use policies on forest restoration and management. Finally, both policy makers and local communities need to understand the benefits of FLRM and how they actually materialize. This calls for relevant work in education and dissemination.

REFERENCES

Buttoud, G. (2013). *Advancing agroforestry on the policy agenda: A guide for decision-makers*. Agroforestry Working Paper No. 1. Food and Agriculture Organization of the United Nations. Retrieved from http://www.fao.org/3/a-i3182e.pdf

CGIAR. (2013). *Dryland Agricultural Production Systems: New Research Approaches to Improve Drylands Agriculture to Deliver a More Prosperous Future*. Addis Ababa: International Center for Agricultural Research in the Dry Areas (ICARDA). Retrieved from http://drylandsystems.cgiar.org/sites/default/files/New%20research%20approaches%20to%20improve%20drylands%20agriculture.pdf

Climate Summit 2014 (2017). *New York Declaration on Forests: Declaration and Action Agenda. (List of Endorsers Updated in July 2017)*. United Nations. Retrieved from http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Forests/New%20York%20Declaration%20on%20Forests_DAA.pdf

Food and Agriculture Organization of the United Nations. (1989). Forestry and food security. FAO Forestry Paper 90. Retrieved from http://www.fao.org/3/T0178E/T0178E00.htm#Contents

Geidam, A. A., Redzuan, M., & Abu-Samah, A. (2012). Assessment of participation in afforestation programme and relationship to empowerment. *International Journal of Academic Research in Business and Social Sciences 2*(8), 310–315. Retrieved from http://hrmars.com/admin/pics/1060.pdf

Kalu, C., Edet, D. I., & Chukwuenye, C. E. (2014). Assessment of afforestation and reforestation efforts by Forestry Department, Ministry of Environment, Imo State. *Journal of Research in Forestry, Wildlife and Environmental 6*(2), 54–65.

Martínez, J., Cajas, Y. S., León, J. D., & Osorio, N. W. (2014). Silvopastoral systems enhance soil quality in grasslands of Colombia. *Applied and Environmental Soil Science, 2014*, 1–8. dx.doi.org/10.1155/2014/359736

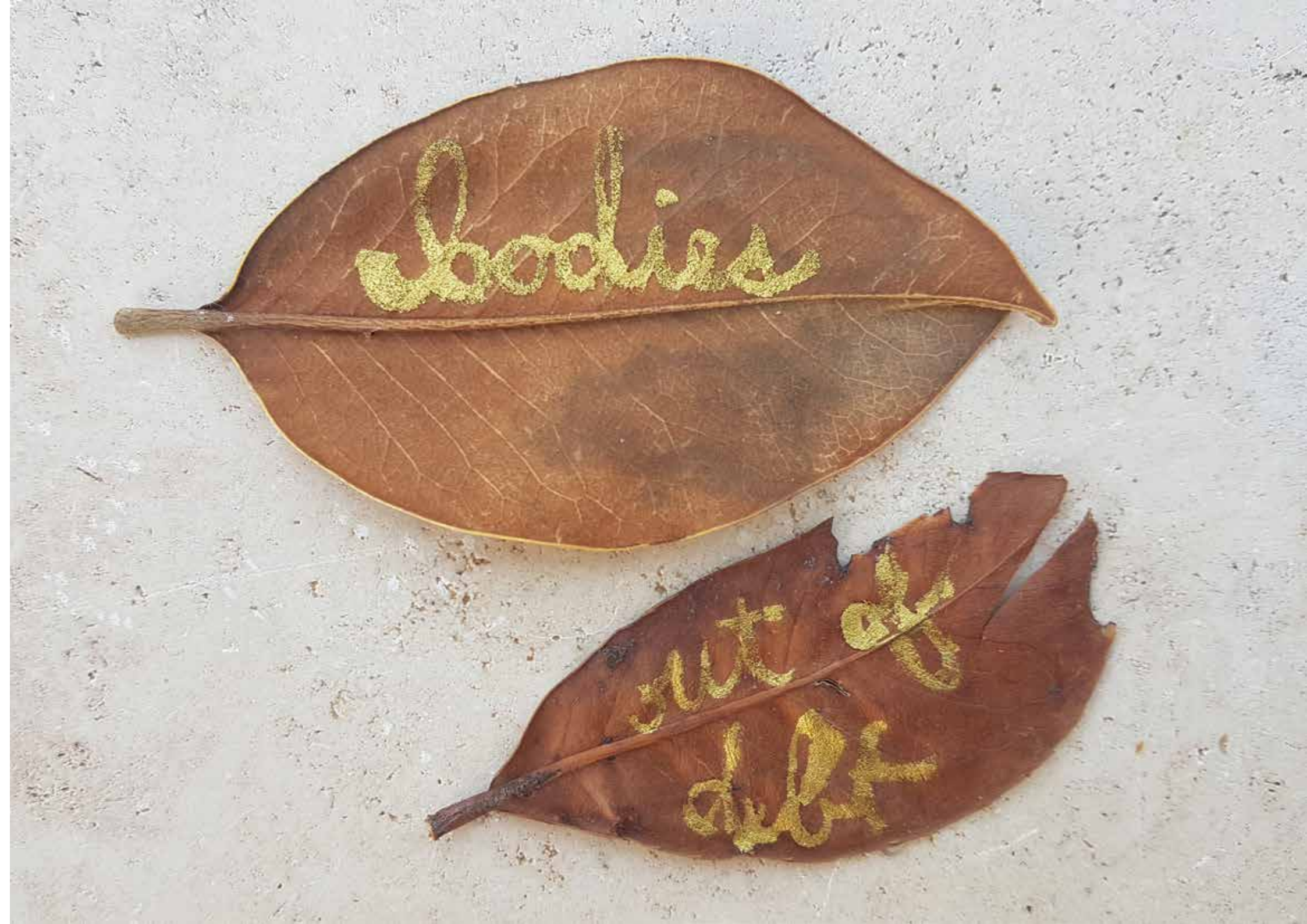
Oloyede, I. O. (2008, December). Afforestation and Reforestation: The Unilorin Experiment. Paper presented at the High Level Technical Workshop on Afforestation and Climate Change in Africa, December 15–17, 2008. Centre for Human Security of the Olusegun Obasanjo Presidential Library (OOPL) & Nigeria Tree Planters.

Sanusi, A. R., Apampa, S., & Sotinrin, A. (2013). *Socially inclusive sustainable development in a climate-stressed Northern Nigeria: A case study of Jigawa State*. [Technical Report]. Heinrich Böll Stiftung Abuja, Nigeria. Retrieved from https://ng.boell.org/sites/default/files/jigawa_report_hbs.pdf

Stewart, N. (Ed.) (2015). *The value of land: Prosperous lands and positive rewards through sustainable land management.* Economics of Land Degradation (ELD) Initiative. Retrieved from https://www.eld-initiative.org/fileadmin/pdf/ELD-main-report_05_web_72dpi.pdf

United Nations Convention to Combat Desertification. (2016, April). *A Natural Fix. A joined-up approach to delivering the global goals for sustainable development*. Sustainable Development Goals. United Nations. Retrieved from https://www.unccd.int/publications/natural-fix-joined-approach-delivering-global-goals-sustainable-development

World Resources Institute. (2017). What is degraded land? [Webpage]. Retrieved from www.wri.org/faq/what-degraded-land


Bodies
out of

Made in Italy is a Truth Told Badly: The Passing of an Italian *Sarto*

Sara Bissen
The Ruralist Body, United States of America

ABSTRACT

Participants of the 2019 Biourbanism Summer School, *Designing a Home of Language*, visited *Sartoria Bucci* during the 94th anniversary of its establishment. They discussed the relationship between tailoring and architecture with Giuliano, Francesco, and Alessandra. The master tailors addressed issues that are common to both disciplines, such as the centrality of the human body and the transformation of its image; the difficulty in supplying quality material; the care for details, and the transition from project to delivery. These lines are in memory of Giuliano Bucci, who passed away on April 29, 2020.

***Keywords*:** Giuliano Bucci, tailor, made in Italy, rural, Artena

“Look at this,” Giuliano told me one summer day. I cracked open the large, brown leather book that stayed next to him as he sewed. “I’m as old as this book,” he said. “I got it in Milan when I was 32, 33 years old and have studied it ever since.”

Roman menswear drawings were on the first pages, then Byzantine. The fashion evolved up to the early 20th century. Giuliano told me to keep reading. Beyond the fashion, I found anatomy and geometry. “Geometry is the foundation of everything in life,” he said.

At 75, Giuliano, was running Sartoria Bucci. His father, Vittorio, started this tailor shop in Artena, about an hour south of Rome, in 1925. It sits below a tiny hilltop town built by peasants, like countless villages scattered across the Italian landscape. At one point, Giuliano used to work for McQueen (Eni S.p.A.) in Pomezia and told me about the time he dressed the Rolling Stones.

He embodied a cool elegance as his long, gray hair swept across his eyes either hunched over the sewing machine or on a smoke break. I had just been handed the black and white photograph of Vittorio as he displayed his craft in front of the Artenese houses of long ago. I asked Giuliano why he kept sewing. “Because I learned from my dad,” was his only reply.

I noticed a single leaf tucked between two pages of the book. “What’s this?” I inquired. He explained that it fell into the book years ago. “When this leaf goes, I go.”

We talked about how people migrate the world. He said that people should go where they are happy. He had lived where his dad was born in that tiny hilltop town. Following World War II, his father moved the sartorial business to the village’s modern, urbanized offshoot. I asked if he liked being there. “It is what it is,” he said, even though the hilltop’s old, abandoned houses saddened him.

Giuliano had grasped his father’s lessons. He had approached the trade in a practical spirit early on, before the arrival of a wealthier Italy. With the next generation, his son, Francesco, went on to study engineering and his daughter, Alessandra, art. Yet both came back to Sartoria Bucci to continue the work. They could have done anything else, pulled by the city. In that sense, Giuliano never actually had to come back to the trade, unlike his children. And when they did, they found something rare to hold on to through their father’s hands.

Now, Giuliano is gone. Francesco, who had worked alongside his dad for 20 years, and Alessandra nearly 15, stay.

Sartoria Bucci does not need the “made in Italy” label. Made in Italy, especially when it comes to fashion, is about the international conglomerates that now have little to do with the agricultural landscape or the communicative peasants that once sourced this high-quality, Italian sartorial taste. Rather, the hyper-business of fashion turned away from territorial dimensions toward an inner making of finance, global markets, and cultural dislocation.

Naturally, rooted qualities and language are at odds with dominating luxury fashion conglomerates like those of Kering, LVMH, or OTB. Since the 1980s, the Italian government has used the internationally recognized “made in Italy” label to certify that a traditionally made product is created and manufactured within the country. This label’s trail has been blazed by the listed company, Gucci, which is now part of the French multinational luxury goods corporation known as Kering. Countless “made in Italy” fashion firms like Gucci, Dolce & Gabbana, or Bottega Veneta base luxury on money and advertising. Far from the source, such goods need the “made in Italy” label so that the quality can be seen immediately.

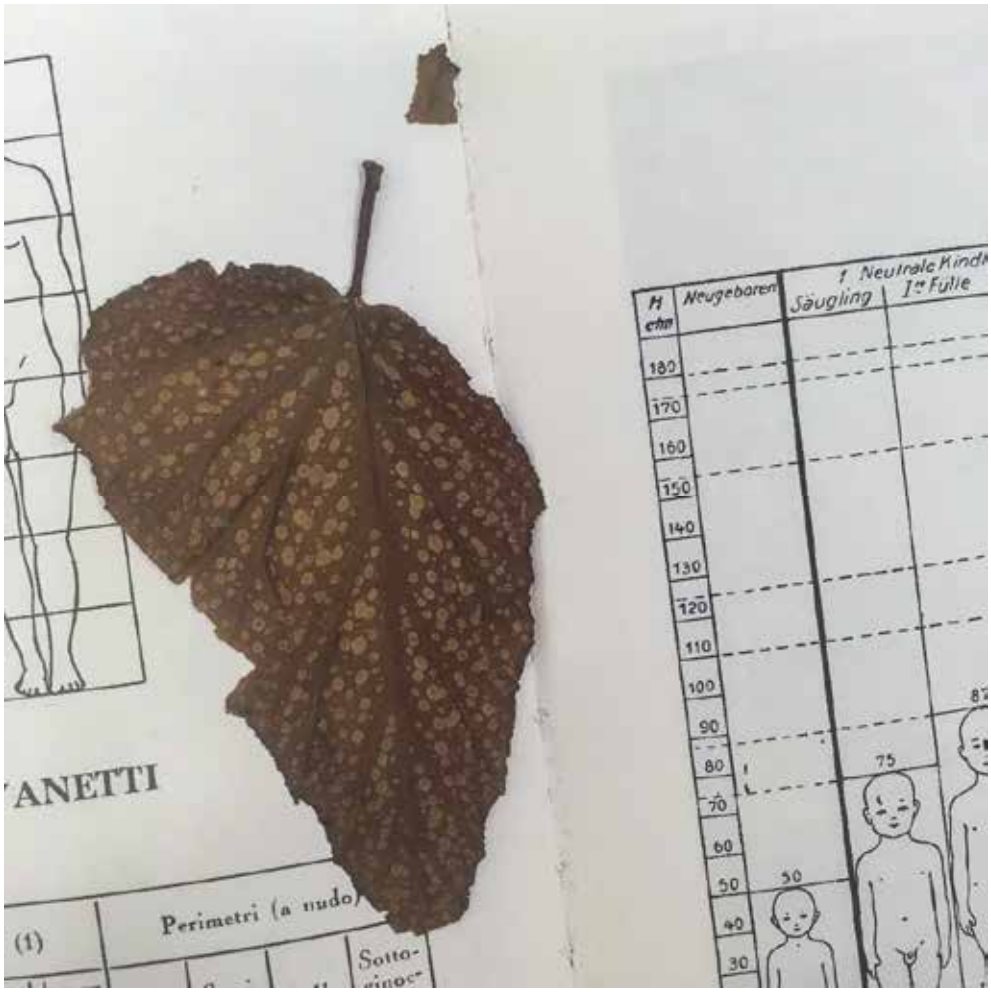


Figure 1. The leaf of Giuliano Bucci (Photograph by Sara Bissen).

Figure 2. Vittorio Bucci, founder of Sartoria Bucci, in 1956.
The rural houses of Artena are in the background (Photograph courtesy of the Bucci family).

Figure 3. Paper patterns at Sartoria Bucci, 2019 (Photograph by Sara Bissen).

Figure 4. Handmade buttonholes and details, Sartoria Bucci, 2019 (Photograph by Sara Bissen).

Notable Italian fashion stems from a fading rural quality rather than industrial or financial centers. In fact, tailors like Bucci are often called upon to mend the flaws of luxurious "made in Italy" garments. Even textile cannot escape a tailor's touch as well-known brands, relying on their name, drop quality yet raise the price.

"It's a lost war," said Giuliano. The luxury that "made in Italy" superficially seeks is a rural luxury that our new hyperreality cannot find. It is common knowledge that people tend toward global fast fashion manufactured in the so-called 'third worlds.' These clothes are then sold in 'first world' commercial centers over high-quality works which, by necessity, are local and lasting.

Figure 5. Giuliano and Francesco Bucci, 2019 (Photograph by Sara Bissen).

"I only know about 20 other tailors like me," said Francesco, as he pointed out the carefully sourced buttons and silk threads and taught me how to hand sew a buttonhole. According to his dad, it takes about seven years to become a decent tailor, meaning it is far too late for me.

Later that summer, I showed Giuliano a digital patternmaking photograph that I had taken seven years earlier in New York City's garment district. Sartoria Bucci is not against design technology, but Giuliano remained unimpressed. He had seen tailors learn digital patternmaking techniques over the years. But when the tool was stripped away, those same tailors become incapable of working at the marrow.

"I love paper," Francesco said. There is no surprise that he continues to work only with this tactile medium. Francesco showed me how the patterns work to become a true human architecture for the body. All the patterns stay there hooked on the wall like pages of a book, ready for someone to leaf through them.

"It takes time to learn a language," said Giuliano, sewing pants pockets as Francesco ironed. This implies a communication without words. "We should feel free to communicate," the son went on, "lots of people get lost in language and can't get in touch out of fear."

I noticed there were no sketches, not even a drawing nor an image. This made me ask how they know what the people they sew for actually want. *Tutto sta dentro*. "It's all inside," said Giuliano. He went

on to explain, “it’s like when you write, there’s an idea. When we create, all of us understand what to do. Like writing, it’s beautiful when it’s understood. If not, it’s ugly. It’s a lie—and a lie is a truth told badly. It’s a distorted reality.”

This happens both in words and in what we do. I told Giuliano that I wanted him to teach me how to sew, but that it is too difficult for me to really learn. “So, you want to do easy things?” he asked. “No,” I responded, “I just don’t want to make bad things.” Giuliano explained that “to learn means to do something. In fact, you’ll do bad things for long, but one day something good will come out.”

This skill, which does not make a spectacle but stays underground because it is a root, brings to mind the “thread of knowledge which nature doesn’t crush, like a thread of gold in the rock” (Berger, 1979, p. 56).

REFERENCE

Berger, J. (1979). *Pig earth*. New York: Pantheon.

Amazon in Colleferro: Highlighting Issues and Contradictions

Circolo ARCI Montefortino 93, Progetto Artena, International Society of Biourbanism, Scaffale Ambientalista – UGI, Comitato Rifiuti Zero Genazzano, Associazione Terramadre Montelanico, & Dopolavoro Ferroviario Velletri

Cultural and Civic Associations, Italy

ABSTRACT

Several local associations from the Sacco Valley, 30 km south of Rome, Italy, decided to line up the multiple critical issues regarding the arrival of Amazon in Colleferro. These social bodies stress that, during the last year and a half, local politicians have praised the arrival of the e-commerce giant, erasing any possibility of public discussion and participation in the operation happening on Via Palianese.

***Keywords*:** Amazon, Colleferro, associations, participatory urbanism

The arrival of Amazon in Colleferro will mark a turning point for the territory of the upper Sacco Valley from a political, economic, environmental, and social point of view (Flavi, 2019). Colleferro has represented a crucial node for the economic policies of Italy since its foundation. This is especially true for the Lazio region, where Colleferro's industrial core has led to the development of the economy's secondary sector since the second post-war period until the advent of the waste management business in the 1990s. On the other hand, Amazon represents the most advanced form of exploitation of territories and cities to the detriment of communities (Melloni, 2019). Its employees are often precarious, such as the 300 temporary workers at the Amazon Passo Corese center, who were fired in January 2019, just one year after its opening.

POLITICS AND ECONOMICS: COLLEFERRO

Vailog S.r.l. is the company that broke ground on the site of Via Palianese. Its owner is Eric Veron, who has close ties to the *Partito Democratico*. Veron has found fertile ground in the political milieu. In fact, Partito Democratico's Nicola Zingaretti leads the Lazio region, while the regional government and local authorities agree on the relaunch of the area after years of impasse. The reclamation program for the Sacco river basin, included in the list of reclamation areas of national relevance, has finally been signed. This means that this area straddling the provinces of Rome and Frosinone can kiss the social and environmental reconversion dreams of citizens and environmental organizations goodbye. Any idea of participated local development planning will fade in the face of a swift, top-down conversion. So the ruling class decided. This is the same class that has proposed itself as a horizontal government model.

Amazon and the COVID-19 variable

Amazon, a multinational e-commerce giant with a turnover of $232.9 billion as of 2018, is based in all continents and has 23 centers in Italy. Prevalently, it is expanding from north to south across the Italian territory. First, Amazon opened in Piacenza in 2010 then reached Naples, aiming to soon cover the Adriatic ridge and the main Italian islands (Netti, 2019). Jeff Bezos' global creature leveraged a political instrument par excellence all over the world—investment, which descends like a blessing onto depressed areas, deluding heterogeneous groups of population with the mirage of jobs and/or fast home consuming. This mechanism gains the consent of mayors and local administrators in search of solutions for the issue of local unemployment. Amazon likes to spread by means of auctions, demanding easy tax and bureaucratic terms from communities, which eventually pay the social cost of road infrastructure and urbanization charges. Since the COVID-19 health crisis began to massively affect the economy, some of the richest men on the planet have become even richer and more powerful. Indeed, the founders of Amazon, Facebook, Walmart, Microsoft, and other big companies managed to take advantage of the crisis and make their assets boom, while governments (especially those of Italy and Spain) tried to negotiate a substantial economic recovery plan. These fortunes have been built on almost zero taxation when compared to their assets, while the gap between workers and financial tycoons skyrocket. Jeff Bezos increased his assets by $25 billion as of April 15, 2020 as 38 million American workers lost their jobs.

Amazon's drive

According to the Association for the Development of Industry in Southern Italy (Svimez), the lockdown cost Italy €47 billion a month: 37 in the center-north and 10 in the south. A report by Svimez economists Salvatore Parlato, Carmelo Petraglia, and Stefano Prezioso, coordinated by research director Luca Bianchi, speculated that in case of a business recovery during the second half of the year, the 2020 GDP drop will be -8.4%. This will range from -8.5% in the center-north to -7.9% in the south. The report shows that: 1) the health emergency hit the north the hardest, but the

whole country is sharing its social and economic impacts; 2) the south will likely be weaker in recovering than the center-north, because it never managed to overcome the previous, long crisis characterized first by recession and then by stagnation; and 3) the economic care packages must be completed to compensate for the effects of the crisis on the weakest subjects who have not been protected. It is obvious that the Colleferro logistics center promise of 500 jobs sounds like a "godsend" at this stage. A political model is growing stronger: promising miracles in exchange for generous concessions to the powerful. The latter would continue to maximize profits, benefiting from public investments, urban planning support, bureaucratic simplifications, and full-fledged "gifts" like road network renovation and road section widening. Today, more than ever, politics needs to stand for highly progressive taxation, eliminate tax havens, and hit large estates for financing large public works campaigns with the aim of creating jobs and investing in the future. Accepting Amazon's drive today means accepting that politics cannot build a sustainable future.

ENVIRONMENT, CONTRADICTIONS, AND ISSUES

The logistics hub will affect an area already under considerable environmental stress. Lands, which in recent months have undergone excavation, lie close to the Colle Fagiolara landfill that was closed last January. The landfill post-mortem operations will last for decades. Therefore, future Amazon employees will work in contact with this unhealthy environment. Furthermore, one should not forget that the natural monument, Selva di Paliano, is just a few steps from the building site. How can the dream of revalorizing such a green lung be reconciled with the dramatic increase in road transportation? The current road network will be unable to withstand the future commercial traffic flows. How will it change, and at the expense of which areas? Why has a serious cost-benefit analysis of the project not been carried out and discussed publicly? What will happen to the Cesanese Wine Route? And what about the dream of reviving the landscape and tourism of Selva di Paliano? No doubt, the logistics hub warehouses have already disrupted the area's landscape. The aggressive, new development model along its perimeter will make these changes permanent.

Figure 1. Amazon construction site in Via Palianese, Colleferro as of June 14, 2020 (Photograph by Annalisa Ramundo).

The social issue

According to many national and international journalistic investigations, the Amazon worker routine is exhausting (Mastrandrea, 2019). Noteworthy is the physical and psychological aftermath that has emerged from the stories of former employees denouncing barely tolerable working conditions. The old Fordist assembly line comes up again with new, even more invasive features. Here, technological progress does not play a neutral role but rather helps company managers control and supervise the strict compliance with production rates (Del Vecchio & Carella, 2017).

The responsibilities of the municipal administration of Colleferro

The project of the new logistics center has been blessed several times by the municipal administration of Colleferro, led by Mayor Pierluigi Sanna. Laying the foundation stone took place on May 10, 2019. The press reported on the presence of the Mayor and members of the Colleferro city council, several mayors of the neighboring municipalities, the councilor for economic development of the Lazio region, Paolo Manzella, Senator Bruno Astorre, and Bishop Vincenzo Apicella. This showed the explicit transversal approval of the project. The Mayor has reiterated his position in recent months, when Amazon announced the start of the personnel selection phase. He should explain why he did not opt for a participatory debate on the subject. Our FOIA request for accessing the documents relating to the project (part of which was covered by industrial secrecy) was answered after one year—when the construction had been completed. This year, a press conference to illustrate the project was announced. It was then postponed due to a fatal accident in the Colle Fagiolara landfill, where a worker died on November 9, 2019 (Savelli, 2019). Thus far, the conference has never taken place. A presentation of the photovoltaic cover of the logistics center was held instead, meant for the students of the Parodi Delfino Industrial and Craft High School on December 16. Why such a lack of political willingness to disseminate and publicly discuss these extremely topical and social transformation issues? Why was the decision to sacrifice an area overlooking the natural monument of Selva di Paliano taken in total silence? Further, why did the decision makers consider it acceptable to forever damage one of the most original and characteristic landscapes of our valley? All of this contrasts with the full-fledged "good administration" rhetoric spent on the Castello Vecchio park project. The grand "Regenerating Colleferro" project (Colleferro si rigenera, 2019) to enhance the historical industrial heritage of this *città di fondazione* states, "2050 target: land consumption equal to ZERO." Now, how much land was consumed for the new logistics center? Why was the 2050 target not considered here? And how does the administration intend to achieve such a target—perhaps by consuming all available land within the municipal perimeter before 2050?

ANOTHER ROUTE

The triumphalism of local and regional administrators regarding the arrival of Amazon covers up the heavy price that the local communities (and the entire country with them) will pay for the strategic expansion of Jeff Bezos in Italy. This means pollution, physical and psychological diseases, exploitation, work culture decay, and the dramatic damage of local shops with a consequent drop in employment, quality of life, and civic freedom. The "at least we bring jobs" rhetoric, in fact, clumsily covers the main fault of politics during the last 50 years: its total absence. For decades, people have lacked even the physical spaces for reflecting about their lives and their territory, the future of their children, and the objectives and means to achieve them. We have not been able to discuss what job, what infrastructure, what economy, what sociality, and what kind of "development" we really want. The decisions, as always, are top-down. The war factories (Marangon, 2012), polluting industries (Cappelletti & Giorgi, 2020), and the stench of garbage (Coltré, 2020) have been imposed. Now it is the turn of a logistics center that will launch thousands of trucks on the road a day. Once elected,

administrators seem to be reduced to mere mediators of these decisions in order to make their electorate accept them. When will the administrators manage the decision-making processes together with the citizens through a broad and transparent debate?

Taking into consideration and deepening the ongoing conflicts in the world of Amazon is key for starting a discussion and public action devoted to the future, to work, and to society.

The invitation to counter the Amazon model and get informed about the current critical literature is an invitation to build the territorial economy that we want, in the name of livability, sustainability, and dignity in the workplace. Let us start by empowering and reimagining basics, such as education, manufacturing, research, agriculture, circular economy, short supply chains, culture and, especially, in light of the devastating coronavirus experience, the care for people and local communities. There is a great need for citizen meeting places and mapping local producers. Indeed, we think that our communities need:

1) meeting places and programs for citizens;

2) mapping local producers and their links with other territories;

3) mapping local skills;

4) mapping the social and health situation of the population;

5) investigating shared desires and aspirations;

6) dynamically planning the future of local communities within five, 10, and 20 years from now based on participation and public discussion;

7) education and training;

8) civic, economic, and political actions to restore the democratic and ecological power of work, the environment, education, and expression through local production and commercial networks, cooperatives, development plans, models of coexistence, consumption models, financing strategies, schools, lobbying, legislative proposals, publishing, et cetera.

Another economy and an alternative development model for our local communities are possible.

REFERENCES

Cappelletti, C., and Giorgi, G. (2020, July 16). Valle del Sacco, condannato per disastro ambientale l'ex direttore dello stabilimento Caffaro di Colleferro [The former director of the Caffaro Plant in Colleferro has been convicted of the Sacco Valley environmental disaster]. *Open*. Retrieved from https://www.open.online/2020/07/16/valle-sacco-sentenza-terra-fuochi-roma/

Colleferro si rigenera [Colleferro regenerates] (2019). *VII Rassegna Urbanistica Nazionale*. Istituto Nazionale di Urbanistica. Retrieved from https://rassegna.inu.it/gallery/colleferro-si-rigenera/

Coltré, A. (2020, January 20). Abbiamo spento i mostri di Colleferro [We shut the Colleferro monsters off]. *Jacobin Italia*. Retrieved from https://jacobinitalia.it/abbiamo-spento-i-mostri-di-colleferro/

De Gregorio, A. (2019, April 11). Europee, i candidati del Pd: in lista 39 donne e 37 uomini. Un terzo, non iscritti al partito [The European Parliament candidates for the Democratic Party include 39 women and 37 men: A third of them are not party members]. *Corriere della Sera*. Retrieved from https://www.corriere.it/politica/cards/europee-candidati-pd-lista-39-donne-37-uomini-terzo-non-iscritti-partito/eric-veron.shtml

Del Vecchio, G., & Carella, N. (2017, November 25). Germania, successo delle proteste contro Amazon [Successful protests gainst Amazon in Germany]. *Dinamo Press.* Retrieved from https://www.dinamopress.it/news/germania-successo-delle-proteste-amazon/

Flavi, D. (2019, May 10). Colleferro, ecco i numeri ed i segreti del nuovo Parco Logistico. Arrivano anche le prime polemiche [The new logistics hub in Colleferro: Figures, secrets, and early polemics]. *Frosinone Today*. Retrieved from http://valle-del-sacco.frosinonetoday.it/colleferro-parco-logistico-amazon-leroy-merlin.html

Marangon, M. (2012, October 26). Colleferro, 100 anni di armi e munizioni. I residenti dicono basta: non vogliamo altra Ilva [One hundred years of weapons and ammunitions: Inhabitants say, it's enough, we don't want another ILVA]. *Corriere della Sera*. Retrieved from https://roma.corriere.it/notizie/cronaca/12_ottobre_26/colleferro-cento-anni-industria-bellica-2112425792462.shtml

Mastrandrea, A. (2019, March 19). Storie e denunce di chi smista i pacchi Amazon a Passo Corese [Sorting Amazon parcels in Passo Corese: stories and reports]. *Internazionale.* Retrieved from *https://www.internazionale.it/reportage/angelo-mastrandrea/2019/03/18/lavoratori-*amazon-passo-corese

Melloni, N. (2019, March 19). Amazon contro le città [Amazon versus cities]. *Jacobin Italia*. Retrieved from https://jacobinitalia.it/amazon-contro-le-citta/

Netti, E. (2019, April 14). La rete Amazon in Italia: 5.600 addetti in 23 centri. Nel 2020 altri Quattro siti [The Amazon network in Italy has 23 centers and 5,600 workers: Four new sites will join in 2020]. *Il Sole 24 Ore*. Retrieved from https://www.ilsole24ore.com/art/la-rete-amazon-italia-5600-addetti-23-centri-2020-altri-quattro-siti--ABeaMlnB

Savelli, F. (2019, November 9). Operaio muore travolto da un mezzo nella discarica di Colleferro [Worker dies run over by a truck in the Colleferro landfill] *La Repubblica*. Retrieved from https://roma.repubblica.it/cronaca/2019/11/09/news/operaio_muore_in_una_discarica_a_colleferro-240702235/

A Forest of Words

Sara Bissen
The Ruralist Body, United States of America

The society[1] of the spectacle[2] is a lie[3].[4]

---

[1] The I in the ruins$_{i}$ knows the collapse. The remains$_{ii}$ of the rural are within$_{iii}$ our passing$_{iv}$ urban. Modernity$_{v}$ is a ruthless break$_{vi}$. Modernity breathes$_{vii}$ never-ending ruptures$_{viii}$ of its own making. The urban reproduces$_{ix}$ and no one can stay$_{x}$. The urban needs$_{xi}$ bodies$_{xii}$ from the rural$_{xiii}$. The urban rots$_{xiv}$ the wood$_{xv}$. The urban$_{xvi}$ is made to collapse$_{xvii}$. The rural$_{xviii}$ condition changes but the urban fails to stay$_{xx}$.

[2] Scattered, rurality seeps into the earth. It moves from an underworld of debt to a forest of words.

[3] the power lives

out of debt

except for war

earth like me

sükûnet

from the rural

the wood

farmasik

sacrifice

void

sacred space

take root

andromeda

in the desert

sky

[4] A procession of words comes out from this branch with golden leaves. Grasping it and pulling the branch from the earth allows for entering beneath the surface and moving safely through the underworld. Drawing into the silence of soil forms a murmur. Leaves shake as the murmur flows like water from a spring. The rural borders the city and the wild. Looking toward the forest rather than the urban is one way to survive, like a murmur borders the silence and the sound. The golden leaves from this branch sprang from *A Forest of Words* held during *Biourbanism: Designing a Home of Language*, July 13–20, 2019 in Artena, Italy. Here, people were invited to find and communally gather golden leaves.

Pinax of Persephone and Hades on the throne, from the holy shrine of Persephone in Locri, Italy (Source: https://commons.wikimedia.org/wiki/File:Locri_Pinax_Of_Persephone_And_Hades.jpg).