Studies in the History of Gardens & Designed Landscapes: An International Quarterly

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/tgah20

Exquisite odor: the Colosseum, a garden of serendipitous procreation

Miranda Mote[a]

[a] Graduate School of Design, Harvard University

Published online: 02 Mar 2015.

Exquisite odor: the Colosseum, a garden of serendipitous procreation

MIRANDA MOTE

> But soil that exhales thin mists and winding vapours,
> That drinks up moisture, lets it out again with ease,
> That ever decks itself in its own herbal green,
> That galls not the iron with rot or salty rust —
> Such soil will wreathe in exuberant vines your elms,
> Will stream with olive oil, and as you'll find in tilling
> Will go easy on oxen and comply with the crooked share.
>
> (Virgil, *The Georgics*)[1]

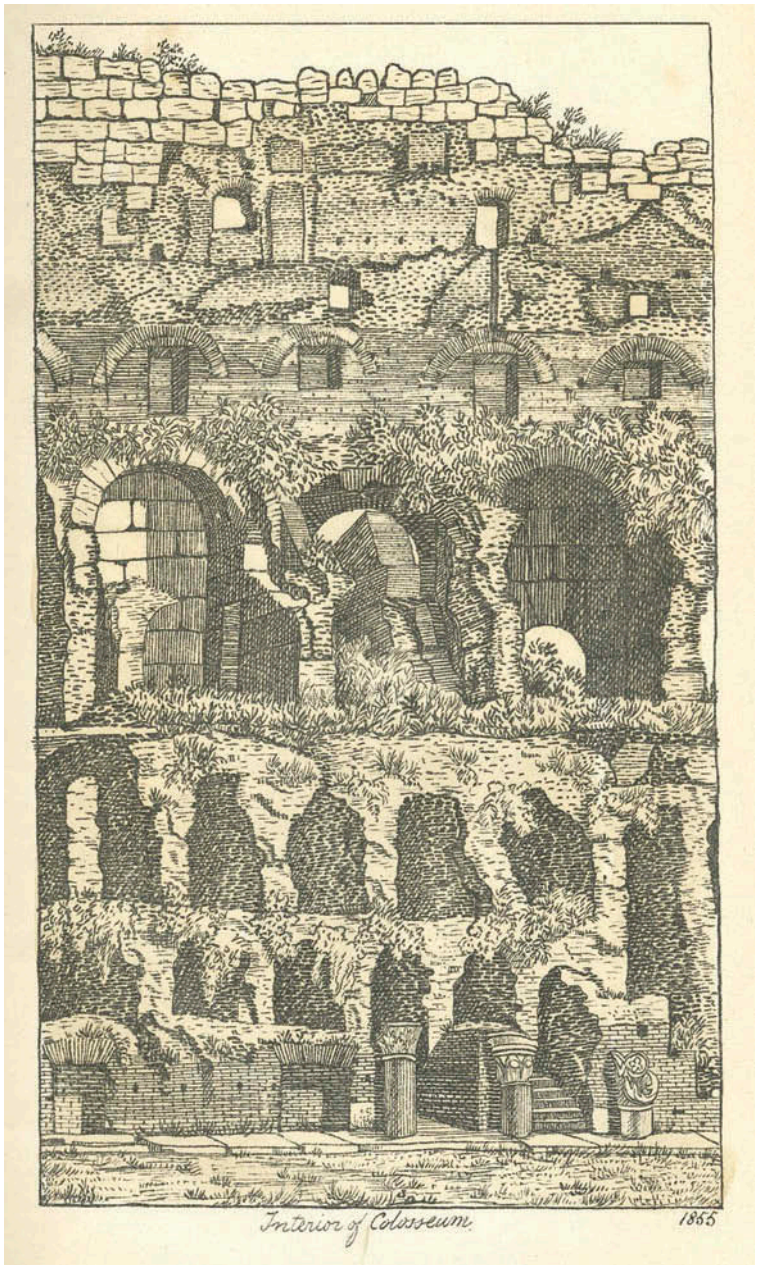
At once living and dying. Exquisite odor describes a garden defined by exceptional conditions and phenomenal memories.

These conditions and memories have been made visible in art, letters, and botanical studies. In 1411, before botanists actively studied the Colosseum's inflorescence, Manuel Chrysoloras, an emissary traveling to Rome as a guest of Pope John XXIII,[2] wrote a lengthy letter to the Roman emperor, seated in Constantinople, and compared new Rome with old Rome. Although addressed to the emperor, the letter was intended for a wide Byzantine readership in and outside Italy. Chrysoloras' descriptions of old Rome were based on direct observation and seem to celebrate some of the very processes discussed in this article. Chrysoloras called attention to weathered ruins and plants growing among dismembered and eroded monuments; even that 'they seem beautiful even in their dismembered state'. 'Like our own city Rome uses itself as a mine and quarry, and (as we say to be true of everything) it both nourishes and consumes itself.' He later notes plants: 'Most [stones & building foundations], however, have been split into pieces and broken up, as I said. Others [stones] are no longer visible, having been hidden by the thistles and thorns or bushes that have grown over and around them.'[3] The six botanical studies since Chrysoloras' are also historiographies, writing a record of the Colosseum as a wild garden contained within its ordered construction. Beyond these dedicated botanical studies, there are imaginary histories: poetry, etching, painting, and photographs.

The Colosseum's flora has been studied by botanists since the seventeenth century. Richard Deakin, an English physician and botanist, called attention to the Colosseum as an exceptional garden in his 1855 book, *Flora of the Colosseum* (see figure 1 and appendix 1). Giacomo Boni, an architect and director of nineteenth- and early twentieth-century excavations of the *Forum Romanum,* wrote *Flora Dei Monumenti* in 1896. This brief article petitioned authorities to consider Roman flora as integral to the conservation of Roman sites and their history, and therefore it should be considered and cultivated. It seems he is suggesting that the ruins are garden sites. Boni cited Virgil as evidence of the importance of plants to Roman history: 'Nettles and blackberry bushes replaced roses and violets, the Romans' favorite.' Then Boni suggested planting species depicted in the wall paintings of Villa Livia:

> Other flowers could be added too: Greek and Etruscan poppy, anemone, daisy, iris, narcissus, hyacinth, orchid, crocus and other wild plants, such as artemisia, spikenard, teucrio, clematis, heather, citisio, broom, asphodels, verbaschi, ferrules, palms, viburnun, mastic, buckthorn, storace, marine ceraso, aloe and acanthus; stimulating the growth of the chrysocarpa ivy, of the dog rose, and

ISSN 1460-1176 © 2015 TAYLOR & FRANCIS VOL. 35, NO. 2
http://dx.doi.org/10.1080/14601176.2014.979582



> of the honeysuckle on the ruins, and planting those brushes that were drawn — with a realistic, powerful impact — at Villa Livia nineteen centuries ago.[4]

Both Deakin and Boni considered the plants of Rome a record of history and memory tied to human imagination, in their wild and cultivated conditions (see appendices 1 and 2)

First, it is important to consider Hellenistic concepts of nature that predated the construction of the Colosseum and modern principals of preservation and conservation that dominate current practice alongside Deakin and Boni. This will contextualize and legitimize Boni and Deakin's pleas to preserve Roman monuments, Roman botany and gardening, and the forces of nature that consume them as a Roman historiography and memory, not static artifacts. A garden growing wild within the Colosseum animates history through its sensual capacities (figure 2).

Clarence Glacken, in his distinguished book, *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century*, addressed concepts of Nature as central to interpreting Roman history. He examined Hellenistic concepts of nature in both urban and rural realms. He concluded that large Hellenistic cities designed the presence of nature within their urban fabrics, largely because of their increased awareness of the difference between urban and rural nature. 'The enlarged size of many Hellenistic cities may well have increased awareness of this distinction, the presence of gardens and tree-lined promenades suggesting a desire to create a small realm of nature within the city.'[5]

FIGURE 1. Interior of Colosseum, *Richard Deakin*.

> *They [flowers] form a link in the memory, and teach us hopeful and soothing lessons, amid the sadness of bygone ages: and cold indeed must be the heart that does not respond to their silent appeal; for, though without speech, they tell of that regenerating power which reanimates the dust of mouldering greatness, and clothes their sad and fallen grandeur with graceful forms and curiously constructed leaves and flowers, resplendent with their gay and various colours, and perfume the air with their exquisite odours (Richard Deakin, preface, 1855).*

Source: Illustration from Flora of the Colosseum, *1855, Richard Deakin, preface, plate between pages 56 and 57.*

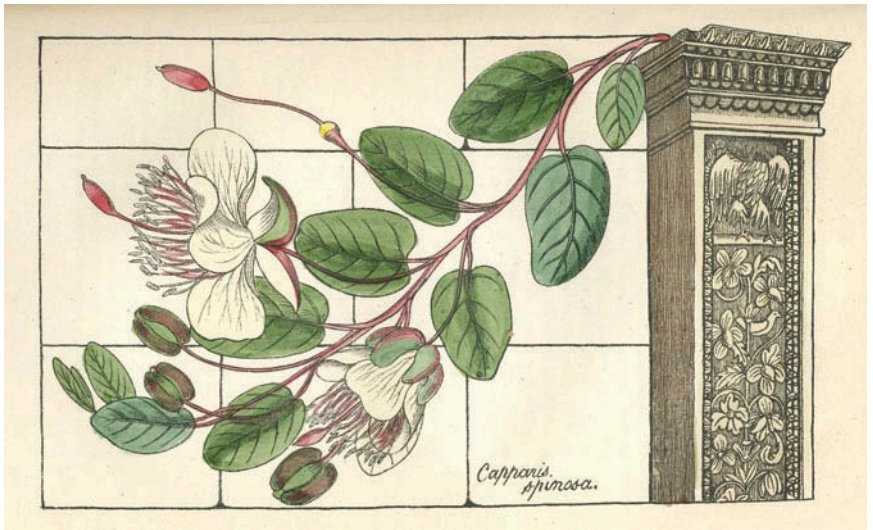


FIGURE 2. Capparis spinosa, *Richard Deakin. Source: Illustration from* Flora of the Colosseum, *1855, Richard Deakin, preface, plate between pages iv and v. © The Harvard University Herbaria and the Botany Libraries. Reproduced by permission of The Harvard University Herbaria and the Botany Libraries. Permission to reuse must be obtained from the rightsholder.*

Glacken also called attention to Horace and Lucretius, who both acknowledged nature as a force, a system of inter-relationships, not a designed, fixed condition. First, Glacken summarizes Lucretius' Nature as forces defined by an infinite system found in earth (soil), water, and air. Lucretius also addressed light, but described light as particles not integral to its adjacent systems.[6]

Horace, a Roman poet, gardener and farmer, reminded his city friend, Aristius Fuscus, a citizen in Rome, that the forces of nature can persist even within imposed order and construction, suggesting that even Rome's urban grandeur cannot evade Nature:

> Why amid your varied columns you are nursing trees, and you praise the mansion which looks out on distant fields. You may drive out Nature with a pitchfork, yet she will ever hurry back, and ere you know it, will burst through your foolish contempt in triumph.[7]

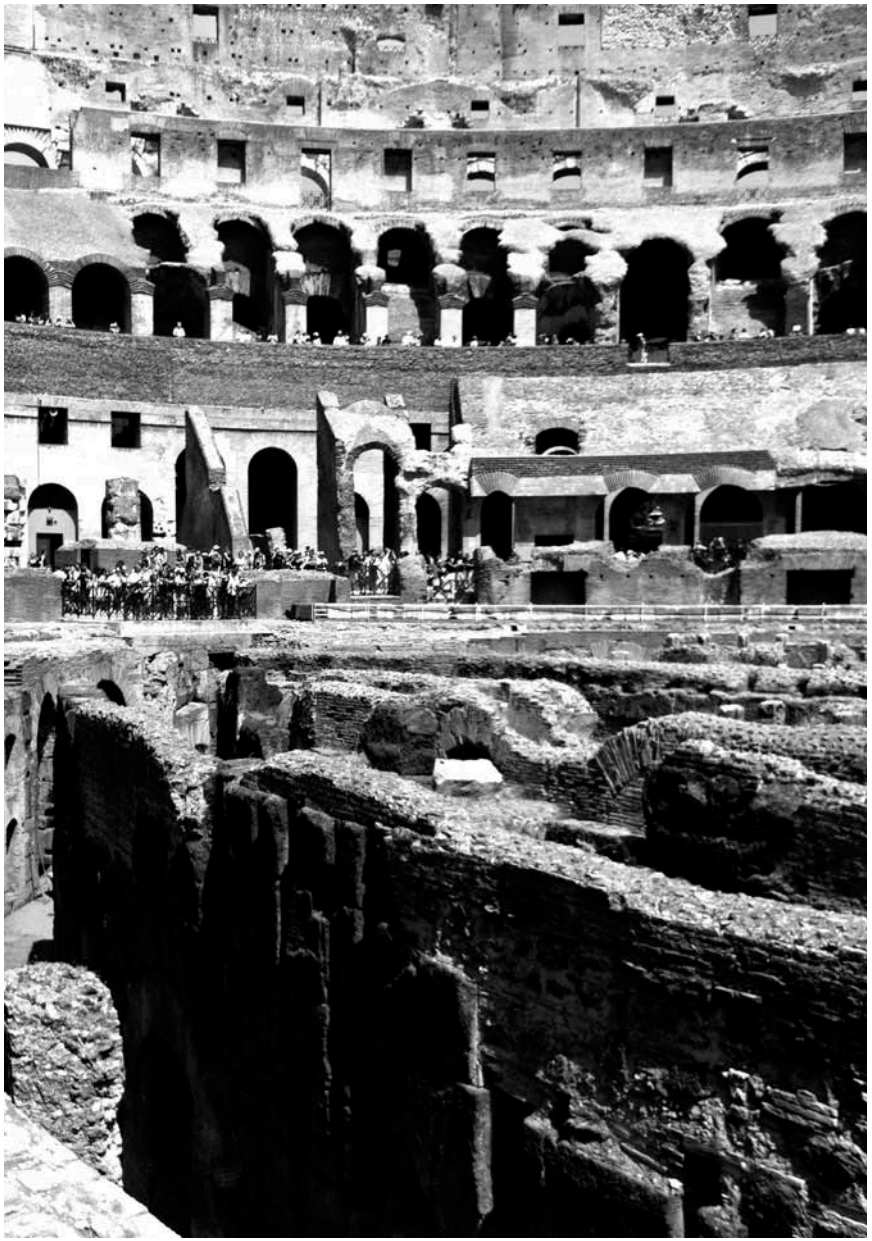
Persistence, the force that Horace speaks of, is a relational, dynamic, and often minute phenomenon; it is not static in time or space. It is an ecological term that describes a species' capacity to persist, exist over time and is often realized through duplicitous reproductive and adaptive habits of plants and animals. Persistence is a consequence of ecological sub-systems found in soil, air, and water. It is why plants can endure and sometimes thrive in ruderal habitats. Plant ecology is largely dependent on seeds to reproduce, which, as units of reproduction and independent from their parent plant, have the capacity to persist in a wide range of favorable, stressed, and disturbed environmental conditions in states of physical and physiological dormancy: lying invisible for sometimes hundreds of years.

If we integrate scientific phenomenon, history, written and visual art, the Colosseum can be described as a garden for the present that correlates memory, plants, and site (see appendices 2 and 3). The odor of this memory is at the same time invisible, sensible, and yet observable to scrutiny. Deakin and Boni questioned conventions of historic preservation and of stabilizing and cleaning a ruin of all its accumulated dust to preserve an image of history. Chrysoloras, Deakin, and Boni, suggest the potential for a ruin to be a site of memory and history that is worth preserving. Deakin said it best in his preface:

> To preserve a further falling of any portion is most desirable; but to carry the restorations, and the brushing and cleaning, to the extent to which it has been subjected, instead of leaving it in its wild and solemn grandeur, is to destroy the impression and solitary lesson which so magnificent a ruin is calculated to make upon the mind.[8]

A conventional history catalogues a building's history, occupation. Instead, this article will invent a memory of the Colosseum as a garden, an amalgam of human, literary, and procreative occupation.

Mr Deakin catalogued 420 species of plants growing in the Colosseum in Rome in 1855. His is one of six botanical studies of the Colosseum since 1643. He suggested that the Colosseum in its ruined condition is an ideal conservatory. Its form, construction, soil characteristics were a consequence of occupation and erosion, ambient and moisture conditions, all of which have proved conducive to the conservation and growth of plants since its construction. The Colosseum was abandoned as a site of spectacle in the sixth century, it quickly assumed a status of a wonder and has been described in literature, correspondence, engravings, paintings, and photography as a ruin occupied by imagination, industry, people, and plants. Lord Byron famously described the Colosseum in its ruin sometime around



1815. 'The garland forest, which the gray walls wear/Like laurels on the bald first Caesar's head.'[9] Records of history tell us that the Colosseum postdates the bald Caesar of Rome by more than one hundred years. Lord Byron reminds us that the Colosseum was built to incite a collective memory of republican Rome for the present. Living and stone garlands ornamented almost all public buildings and spaces in Imperial Rome and symbolized the infallibility of Roman domination and memory. The public and private gardens of Rome were carefully planted with attention to pleasure, political and mythical power. There are several plants that have persisted in the Colosseum since the sixth century, that were carved on the walls of the Ara Pacis (the Augustan altar dedicated in 13 BC to remind Romans of its return to a Golden Age of peace), were painted into Livia's subterranean wall paintings at the Augustian Imperial Villa at Prima Porta, and cultivated in Pompeian pleasure and productive gardens (see appendices 1 and 3 for specific plants). All four sites are significant for their artistry, political messages, and historical narrative. The plants noted in the appendices existed in most cases at all four sites, were both real and considered to have mythical power; planted, carved, and painted they resided in the imagination of a Roman conscience. Illusion, memory, imagination; we cannot remember Rome without acknowledging gardening in its physical conservation (figure 3).

Elements of the garden memory: the nature of garden

Adjacencies of earth, sky, sea, and atoms

First, do wild weeds destroy history? Archaeology and horticulture share a concern for weeds, a plant growing where it is not wanted; but not wanted by whom? Plants can be a pro-creative force of history, not a destructive force. When considered as integral to history, they serve as records natural forces and human occupation.

FIGURE 3. *Colosseum's Material Construction: Sectional photograph that describes the Colosseum's construction; the building's form and stratification of space and material that are conducive to plant life. Source: Photograph by Tennessee Wallick, 2012 © Tennessee Wallick. Reproduced by permission of Tennessee Wallick. Permission to reuse must be obtained from the rightsholder.*

Science has dedicated resources and collected datasets in an attempt to determine which plants inflict the most damage on ancient Roman ruins and have suggested that roots are responsible for chemical and mechanical deterioration of ruins. Scientists, Celesti-Grapow and Blasi, presented detailed findings at a symposium dedicated to weed technology in 2004. 'Plants growing on ancient buildings and archaeological remains pose a severe threat to their [ruins] conservation.'[10] In this study, scientists accounted for sources of weeds growing at ancient Roman sites:

1. Romans imported species from Imperial and distant geographies (in the case of the Colosseum likely unknowingly on animals). Romans actively imported and acclimatized plants from the East, Africa, and Europe as booty and to commercialize them for luxury and practical purposes. It is likely that seeds found their way into gardens and sites like the Colosseum and patiently waited for ideal conditions to sprout.
2. As Rome declined in the sixth century, sites in the city walls were occupied for domestic and industrial purposes, orchards, vineyards, and vegetable gardens (these types of occupations were prevalent in and around the Colosseum). Rome became a rural landscape within its urban infrastructure.
3. As sites are excavated and prepared for tourists, authorities often plant trees and flowers to make the sites look nice.[11] In the sixteenth century the Colosseum was occupied by a ruling family. They lived in apartments built into the North perimeter. In addition, there were likely vegetable gardens near the apartments. The Pope had to evict a resident hermit in the seventeenth century. The spectacle (the center oval) was used as a Christian cemetery; decomposing bodies, stones, and plants.

The memory deepens: spectacle with animals from Africa and India; kitchen gardens; cemetery rites; domestic and agricultural occupation. There is more than the particulates of plants; industrial, sacred, and domestic occupation encouraged growth of plants and decay.

An imaginative nature can persist by way of the senses as a memory or an assemblage of memories across time. Lucretius' *De Rerum Natura* opposed the conception of a divine, a designed nature. Lucretius' nature suggested an awareness of something minute, invisible, and immeasurable. Atomism, a conception addressed by Lucretius, envisioned a nature defined by invisible and perpetual cycles and defined a process that supported persistence not as a divine intervention but as an open, infinite system of inter-relationships. Lucretius states that if nature was a product of the divine, time would not be needed:

> Nor furthermore would time be needed for the growth of things, for seeds to collect, if they could grow from nothing; for youths would be made on a sudden from small infants, and trees would leap forth suddenly arising out of the earth. But manifestly one of these things takes place, since all things grow little by little, as is proper, from a fixed seed, and in growing preserve their kind.[12]

The Colosseum garden imagined in this article is an assemblage of plants cultivated by the labors of time adjacent to its earth, air, water, and minutia of plants.

Earth: decomposition of material and occupation

Plenitude in ruin

Any garden requires decomposition to thrive; there is fertility and plenitude in ruin. Rock, litter, oxygen, and water make fertile soil. Water, erosion, and disturbance release minerals from rocks into soil — the largest sources of essential minerals for plants are air and rainwater, the remaining ones come from rock material. Science catalogues soil fertility with its essential minerals as either macro or micro. The golden soil and fertility of the Colosseum accumulated slowly, almost invisible to the eye, and can be attributed to the ruin's material and to the configuration of its construction, exposure, erosion, and occupation.

Macro: in large quantities

Macro-nutrients are those essential nutrients used in the largest quantities by plants. Their presence is best explained in order of magnitude. The first three are needed in large quantities and are acquired from air and rainwater, all of which the Colosseum received and collected graciously: carbon, hydrogen, and oxygen. Nitrogen the fourth, promotes vigorous green growth, too much compromises as plant's ability to reproduce, encouraging the plant to grow at the expense of producing seeds. Occupation can explain the presence of nitrogen in the Colosseum. It is an essential element of all life and is produced as a bi-product of decomposing organic matter; plants, animals, and waste. Phosphorous is also a bi-product of decomposing organic matter, especially

plants, animals, waste, fire, and ash. The continuous occupation of the Colosseum as shelter for plants, animals, and humans explains the presence of nitrogen and phosphorous.

Fire, ash, and soil are examples of destructive forces that, in more than one sense, fertilize and make soil. Fire was ever-present in Rome almost continuously, despite the presence of water in the city. There were eight substantial fires in the city of Rome after AD 64, including the great six-day fire observed by Nero. These fires destroyed more than one district within the city walls. The fire of AD 64 cleared an entire district on which Nero built his *Domus Aurea* (Golden House) and gardens. The Colosseum was built in a valley at the base of the Palentine, directly on top of Nero's great sea (lake). The Colosseum was struck by lightning in AD 217 and burnt, the top-most tiers and partial roof were built of wood. The building sat fallow until AD 240. Botanists, Jon E. Keele and C. J. Fotheringham, explain the logic and benefit of fire to ecosystems and plants:

> Fire is a disturbance factor in ecosystems worldwide and affects the reproduction of many plant species. For some species, it is just one of several disturbances that trigger seed germination and subsequent seedling recruitment, whereas in other 'fire-dependent' species, fire may be required for seedling recruitment.[13]

Post-fire environments encourage seed germination and enhance soil quality: fire removes vegetation competing for light and water and accelerates the mineralization of organic matter. It has been observed that post-fire (and post-bombed) environments see the emergence of species not found at the site previously; seeds were likely dormant, waiting for opportune conditions. The presence of fire in and near the Colosseum would have benefited its soil quality and accumulation.

Potassium is a necessary macro-nutrient and an essential mineral derived from the physical and chemical degradation of clay material. Its presence in the Colosseum can also be attributed to the fact that the site was used as a military storage site for nitrates, an essential element of gunpowder. There are two more macro-nutrients. Sulfur is distributed with rainwater. Calcium is derived from lime, ground limestone or dolomite. Both of these elements can be found in the tufa limestone that dressed the building with ornament and finish and the Roman pozzolana (volcanic ash element) cement used in its mortar and concrete mixes.

Micro: in minute quantities

Micronutrients are essential minerals used by plants in small amounts, they are critical and their absence usually results in lack of vitality, seed production, or death. Iron is critical for chlorophyll synthesis and is important for plant growth. The remaining micro-nutrients are either important in the production of plant enzymes, essential to photosynthesis, or yet to be established by science. What is important is that their presence is minute but essential. The essential micro-nutrients are: magnesium, iron, copper, zinc, manganese, molybdenum, boron, chlorine, and nickel.

Sky: orientation to the sun, myth, particulate, and air

Plenitude in ruin

The sky can be described as flowing space that contains clouds, stars, the moon, the horizon, and at times view. A garden can, with consideration, order the amorphous space of the sky. The Colosseum was built to order a view of spectacle, but in its subsequent use, ordered an ecology, contained wild and cultivated plants, and framed a view of the sky. Spectacle is something unusual, notable, or entertaining framed for view, an exhibition. Roman gladiator games were public spectacles, they have been recorded in written histories as part of Roman funerary rites since 264 BC. Evidence of amphitheater-like buildings are found throughout the Roman empire and details of their ideal configuration were described by Vitruvius. Vitruvius described the early structures as 'spectacular'. This translates to 'looking place'. The Roman amphitheaters, before the Colosseum, were large, temporary, wooden structures, built on the *Campus Martius* or inside the Forum. The spectacle was always a public occasion, and slowly became an elaborate ritual about death but not necessarily a funeral rite. The ruins of the Forum and the Colosseum reveal an underground infrastructure (hypogea) that supported the events: subterranean galleries, elevators, and lifts that would propel animals and people up into the spectacula (the center oval). It was Caesar (Lord Byron's bald Caesar) who hosted the first *venatio* (an animal hunt). 'The earliest recorded instance of animals performing in the Forum Romanum occurred during Caesar's quadruple triumph of 46 BC'.[14] When the Colosseum was built (dedicated AD 79) Rome's population inside its walls was upwards of 900 000, outside its walls the population was upwards of 16 million. The

Colosseum was abandoned as a site of spectacle in the sixth century, when the city's population was recorded as a meager 500. After this point, its configuration offered, in a sense, refuge and enclosure. Gladiatorial spectacle was quickly forgotten and the looking place was occupied by a mystic persona. A Medieval pilgrimage guide, *The Wonders of Rome*, written in AD 1000 described it as the Temple of the Sun with a large statue of Jupiter or Apollo in its center.[15] The memory of Augustus may have been a bit blurred but Apollo was at the center, residual of the golden age. 'The Colosseum was the temple of the Sun, of marvellous greatness and beauty … and glittering fires were made, and where rain was shed through silver tubes'.[16] The Colosseum remains a site of pilgrimage, revered for its ruin. Many of the images and narratives noted in this article were drawn, painted, and written by travelers; like Thomas Cole, Lord Byron, and Percy Bysshe Shelley. In 1839, physicist Francois Arago lobbied the French government to support Daguerre's invention of photography to document Roman and Egyptian ruins. Photography quickly became a medium that not only documented archaeological sites but also distributed images of ruins for curious travelers from Europe and the USA. 'By the mid-1850s several photographers — both foreign and Italian — had established flourishing studios that produced views of the city.'[17] The Daguerreotype and early photographs required a long exposure. The images were likely taken early in the morning light, tend to capture a billowing broad sky, movement of living beings were blurred, not unlike the diffuse mediums of the site's ecology. Contemporary Italian photographer Giorgio Cutini captures this diffuse, flowing quality in his photographs of Roman landscapes; ruins become sky, become people, become stone pines, become a picture (figure 4).

The configuration of the Colosseum harbored a process of decay and erosion, warmth for people, and plants, not unlike the ideal garden, *hortus conclusus*, that emerged in medieval Christian conceptions of a garden. It is a garden that frames the sky with walls. The sky is the medium through which seeds, insects and birds traverse the garden in plan and section. The building is a picture of the sky, another essential medium of gardens. The wind broadcasts seeds, pollen, oxygen, rainwater, odor, and sometimes bits of the imagination through the sky. As Shelley's young character describes it, 'The blue sky is above — the wide, bright, blue sky — it flows through the great rents on high'.[18] Shelley captured a picture of sky from the spectacula of the Colosseum as a flowing medium.

Soil and the atmosphere are reciprocal conditions with regard to oxygen and carbon dioxide. Well-structured garden soil, that with organic matter, clay, rock and mineral particulates, has air pockets. If these pockets are water logged, most seeds will not germinate and likely die in this anoxic condition. Soil that is well drained leaves open the pockets, differentials in temperature and the atmosphere pull oxygen into the soil. This process is called diffusion. Technically diffusion is the process by which particulates of liquid, gas, and solids move and intermingle because of thermal differentials. Without a bit of the sky in the soil, plants and seeds either die or lie dormant. It is the terraced frame (the tiered construction of the Colosseum) that encouraged the flow of both air and water as the soil accumulated in pockets on the perimeter. There are the small pockets within the soil itself and then there are the larger pockets contained within the ruin, the subterranean *hypogea* and *vomitorium*. All these factors contributed to the pull of both water and oxygen through the soil, encouraging a continuous flow. The Colosseum's configuration, a tiered oval, orients the garden to the sky and encourages the diffusion of water, air, and imagination.

It is thus likely that the Colosseum was a site with a diverse ecology of flora and fauna. Given the natural shelters found in its configuration, birds, insects, and small animals likely thrived. There is the possibility that the ruin was a site with concentrated fauna populations that increased plant pollination by insects (entomophily). This would have benefited the garden, enhancing plant pollination and seed dispersal. Science has studied patterns of anemochory, the wind dispersal of seeds, and determined that increased vegetation (dense planting conditions) actually increases distances of seed distribution because vertical plants and objects actually increase wind turbulence. 'Any structure that increases air resistance of the dispersule [part of the plant that disperses the seed] is likely to improve dispersal by wind.'[19] The high perimeter walls of the Colosseum (especially the north wall that has survived) have at the same time contained and encouraged a procreative micro-environment.

One last thought about the sky concerning temperature and humidity. The orientation and configuration of the structure created small micro-climates within the the Colosseum. Prior to the seventeenth century, the building was slowly being dismantled for materials, tufa, statuary and travertine. The north wall that remains orients the building somewhat to the south. It is the inside face of the northern perimeter that receives the most exposure and is likely drier and warmer as a result. The southern perimeter faces north and is likely cooler with milder soil

conditions. It is likely the lower tiers of both the northern and southern perimeter (the Imperial seats) were the moistest. We can begin to see the consequence of these micro-climates as the vertical location of plants in the Colosseum in the most recent accounting of plants in a 2001 study. Caneva's study documented more species in the lower, moister tiers (orders). Deakin's study suggests the same but does not document plant location in the Colosseum. The base of the structure flooded while being excavated in the eighteenth and nineteenth centuries. Nero's sea is creeping slowly back into our imagination. Given the varied orientation, the Colosseum had the capacity to support a large variety of plants, some likely even from tropical climates at times.

Sea: flowing water

Plenitude in ruin

Thus far, this article has described this garden's persistence and plentitude in terms of its slow, at times invisible, flow of nutrients, particulates, oxygen. It is this site's extraordinary capacity to capture and drain water that has created a

FIGURE 4.
In water — my absence in aridità. A flower.
A flower that defines the air.
In the deepest well, your body is fuse.

***

The bark is not enough. It furls Redundant shards, will barter Rock for sap, blood for veering sluice,
While the leaf is pecked, brindled
With air, and how much more, furrowed
Or wrapped, between dog and wolf,
How much longer will it stake
The axe to its gloating advantage?

(Paul Auster, excerpt from Spokes, 2, 1972).
Referenced by Giorgio Cutini in the context of an exhibition of his photographs, Memorie Di Frammenti, *2001, and* Memografie & altre storie, *Gabriele Perretta (ed.), Edizioni Gribaudo, 2008. Source: Photograph by Giorgio Cutini,* Villa medici, *Ombre, 2012* © *Giorgio Cutini. Reproduced by permission of Giorgio Cutini. Permission to reuse must be obtained from the rightsholder.*

garden of moist, dry, and temperate micro-climates. Mary Beard and Keith Hopkins, scholars of classical knowledge and ancient history, summarized the life of the Colosseum in their book, *The Colosseum*, and called attention to the building's most extraordinary engineering achievement: drainage.

> Recent archaeological work on the water system has revealed an intricate network of underground drains, around and through the center of the monument. The ring drain in fact runs 8 meters [26 feet] below the valley floor and takes the water off to flow into the Tiber.[20]

The merit of this achievement is extraordinary.

The Colosseum was built on the site of Nero's great sea and *Domus Aurea*. After the fire of AD 64, Nero decreed approximately 175 acres to build his golden house and garden. The garden hosted elaborate spectacles. Historians have confirmed that the valley floor was raised at least 4 meters (13 feet) after AD 64; with debris from the great fire. Not much remains of the gardens for archaeologists to excavate but Suetonius described the garden and sea in his history of Nero:

> There was an artificial lake to represent the sea, and on its shores were buildings laid out as cities; and there were stretches of countryside, with fields and vineyards, pastures and woodlands, and among them were herds of domestic animals and all sorts of beasts.[21]

The Colosseum sits in the valley that was Nero's sea.

The hydraulics of the site includes a ring drain, 8 meters (26 feet) below ground that directs water to the Tiber. This ring drain is connected to a network of underground infrastructure that has kept the site flowing, with some exception. Hopkins and Beard call attention to the fact that the site was a valley that would naturally collect water and that the building configuration is essentially a large water basin. They estimate that the site has the capacity to collect approximately 175 liters (46 gallons) of water a second during a heavy rainstorm. The Colosseum was built as a part of the city's urban infrastructure and is explicably connected to the Tiber. This site, even in its ruined condition, collected and effectively drained water, percolating moisture, minerals, and oxygen through its accumulating soil; this with fertile soil and orientation are ideal conditions for plants. This mechanism remained essentially invisible until twentieth-century excavations.

Atoms: invisible mediums

Persistence in ruin

The indivisible beings of the Colosseum garden are its seeds, spores, bi-products of occupancy, decaying material, and atmospheric conditions that have persisted through time. The concept of plentitude relates to the flow of the elements of plant ecology and decay. Clarence Glacken summarizes plenitude as part of a larger framework of ancient cultural thought; that 'of a designed earth, of the influence of the environment on man, and of man as a modifier of the environment'.[22] He suggests that a cultural awareness of plenitude in nature is grounded in Greek philosophy, Plato and Aristotle:

> The principle of plentitude thus presupposes a richness, an expansiveness of life, a tendency to fill up, so to speak, the empty niches of nature; implicit in it is the recognition of the great variety of life and perhaps the tendency to multiply.[23]

The Roman preoccupation with pro-creation and fertility fed their interest in gardens and gardening as a cultural authority. Seeds are yet another minutia with authority; invisible but sensible, flowing but stable, and still survive at sites like the Colosseum.

Seeds are, in a sense, flowing and stable entities; many seeds have the capacity to lie dormant for many years and all seeds can tolerate or favor disturbance and harsh conditions like drought and cold. They are persistent, true to the definition of persistence. They can exist for a long or longer than usual time, continuously independent from their parent plant. The seed is a small but large world. 'A seed is an embryo plant wrapped in a protective covering of maternal tissue (the testa). It is generally provided with a supply of nutrients contained in a separate tissue (the endosperm)'.[24] The seed's primary function is reproduction but its response to its environment (soil) can be varied, relative to soil chemistry, temperature, and light availability. Seeds are agents of ecological persistence.

The Colosseum in its ruin was a persistent garden that harbored an ecology of plants arranged by the building's materials and configuration. This garden's persistence was both active and dormant. First, it is important to define three scientific terms used by botanists to elaborate on the ecological capacity of the site; soil seed banks, seed dormancy, and lastly disturbance. A seed bank is the soil surface where seeds from a parent plant have been shed. These seeds may germinate immediately or not. Botanists categorize seed banks based on seed

behavior; there are four types. A Type I seed bank is that of transient seeds that germinate in the fall, so the seeds are present in the summer. A Type II seed bank is that of transient seeds that germinate in the spring, so seeds are present in the winter. Transient seeds only persist for a short time and germinate in one year. Type III and IV seed banks are those of persistent seeds; these seeds can survive for a few years or several decades. Botanists also study and categorize seed behavior; dormancy and germination.[25] It is not necessarily the seed that induces germination but its interaction with the soil's chemical environment. It is the chemical make-up (gaseous and liquid substances) that encourages either dormancy or germination. In general, it is the soil: reduced levels of oxygen induce dormancy; carbon dioxide levels vary in soil depending on depth; nitrates have been shown to break seed dormancy; soil disturbance flushes nitrates through the soil; decomposing organic matter encourages seed germination; the presence of smoke and fire has been shown to encourage seed germination. 'The conclusion is that seed persistence is chiefly a species trait but can be modified by environmental conditions.'[26] All three of these factors are part of a relational ecology of a garden; conditions of seed banks, seed dormancy, and soil disturbance. It is important to note that all three ensure that the plant will reproduce successfully — will persist — 'ensuring that germination takes place in the right place at the right time'.[27]

Memory defined by persistence and plentitude

Clarence Glacken explained the Greek conception of order in nature as a continuous interaction between man and nature — a flow. He credits Plato with describing a visible order of nature as that of plenitude:

> The principle of plenitude thus presupposes a richness, an expansiveness of life, a tendency to fill up, so to speak, the empty niches of nature; implicit in it is the recognition of the great variety of life and perhaps its tendency to multiply.[28]

He also acknowledged one defining characteristic of the Golden Age, a cultural state of harmony and plentitude referenced in Rome at the time of Imperial expansion and the Colosseum's construction; the essence of the Golden Age could be defined by fertility, especially of its soil. The soil of the Golden Age supported spontaneous and ample growth of food for all species without human intervention and cultivation. In the Colosseum garden, plenitude and persistence (being full, abundant and lacking restraint, for a long time) are intertwined and dependent on soil. The Colosseum was cultivated as a garden by way of continuous occupation by people and plants, the adjacencies and arrangements were wild, but the image was ordered by human imagination.

This article considers natural phenomenon as part of a poetic image, the Colosseum as a garden in the human imagination. The Colosseum garden was imagined by pre-modern and modern artists, photographers and writers inspired by a literary and visual memory of ruin in landscapes: van Heemskerck (sixteenth century); Brueghel the Elder (seventeenth century); Piranesi, Bartsch, Ducros (eighteenth century); Lord Byron, Shelly, Cole, Duc, Anderson (nineteenth century); and photographer, Gergio Cutini (twentieth century) (see appendix 2).[29] Giambattista Vico defined nature within his 'principles of humanity', published as *The New Science of Giambattista Vico Concerning the Common Nature of the Nations* in the eighteenth century. Deep in the appendix are three definitions of nature that bind nature to a human imaginative and rational existence. First nature is that of imagination: a creative wisdom that animates the insensate to negotiate the realities of mortality; a palliative nature. Second is a heroic nature: that which animates the human condition with divine power. Third nature is that of rational order.[30] The Colosseum and its building type made visible all three of these natures: one, the spectacle of games imagined a geographic and cultural empire and in its ruinous post-occupancy by myth, religion, and magic; two, its designed occupancy was organized by the building's structure to make visible an order in the human condition (deities, emperors, muses, aristocrats, slaves, and lastly the bestiary); and three, its construction was devised with rational geometry, ratios, and tectonics. It is the first nature, a garden of imaginative existence that I wish to evoke for the present, not unlike the etchings of the Colosseum conceived by Piranesi in the eighteenth century or the contemporary photography of Giorgio Cutini (see figure 4).[31] Lastly, there is a connection between the garden as a landscape, language, and memory; Vico defines metaphor in *Book II, Poetic Wisdom* as animating the inanimate and traced the use of metaphor in language as it relates to landscape. His examples of metaphor connect the landscape with the body, animate a sense, and therefore have the capacity to be remembered as part of the body:

> It is noteworthy that in all languages the greater part of the expressions relating to inanimate things are formed by metaphor from the human body and its parts and from the human senses and passions. Thus, … the flesh of fruits; … the

> blood of grapes for wine. … The farmers of Latnium used to say the fields were thirsty, bore fruit, were swollen with grain; and our rustics speak of plants making love, vines going mad, resinous trees weeping.[32]

Romans were preoccupied with fertility, and built a garden in the Colosseum for the present. 'With the soul we live, with the spirit we sense (*anima vivamus, animo sentiamus*).'[33] Vico later suggested for not to the Latins, the spirit, *animus*, perceived through the senses, is immortal. According to Vico, memory lived in the past and present; he wrote of memory and imagination as a consciousness that lived in the language of ancient Rome, Latin. Roman memory, imagination, and language are bound to sense impressions — memory as a phenomenological sensibility. 'For among the Latins memory is equal to imagination — Man cannot feign anything save what is given to him by nature.'[34] Perception through the senses is a human, shared experience and activates memory across time; therefore capable of capturing Thomas Cole's attention 1700 years later.

The eighteenth-century American landscape painter and father of the Hudson River School Thomas Cole traveled to Italy in 1832. He described Rome in a letter to his mother, 'I must devote an hour to "City of the soul", and save from oblivion the already fading records of memory'.[35]

Cole's observations in his letters and drawings of the Colosseum are imaginative images of nature clinging to ruins, a picturesque memory:

> From the broad arena within, it rises around you, arch above arch, broken and desolate, and mantled in many parts with the laurustinus, the acanthus, and numerous other plants and flowers, exquisite both for their colour and fragrance. It looks more like a work of nature than of man; for the regularity of art is lost, in great measure, in dilapidation, an luxuriant herbage clinging to its ruins as if to 'mouth its distress', completes the illusion.[36]

Illusion, memory, imagination are acquainted with the senses, evident Cole's use of metaphor and attention to plants (appendix 2).

Memories of the Colosseum are the plants living in the past and present. The Plants are sensible bonds that bind humans to the past *in* the present, whereas history devoid of sensation records the past as a static condition. Sensible conditions activate the past in the present. History, if treated only as a static condition without memory, lacks odor. French historian, Pierre Nora distinguishes between memory and history. 'Memory is a perpetually actual phenomenon, a bond tying us to the eternal present; history is a representation of the past.'[37] Nora's definition of memory can be considered with respect to the Colosseum garden. *Perpetually* is an adverb that directly references time, the Colosseum was built in AD 79, rebuilt in AD 220, and has been occupied with varied purpose since; blossoming continuously and deemed valid for all time. *Actual* is an adjective referencing the phenomenon in question, the reality of plants growing in the walls of an ancient ruin since the seventh century; actual is fact, reality. A *phenomenon* is an observable fact or event, the Colosseum is a ruin that cultivates plants; significant and known, remembered through the senses.

Conclusion

Percy Bysshe Shelley, spent time in Rome and wrote about its ruins in letters and an essay in 1832, *The Colosseum A Fragment*. He described Rome in a letter to Thomas Love Peacock dated 22 December 1818 as 'mines of inexhaustible contemplation'.[38] He described the Colosseum as a labyrinth of immeasurable galleries carpeted with blossoms. Immeasurable persistence populated the garden of the Colosseum. In the essay, Shelley situated thoughts on mortality and memory in the Colosseum as a ruin and garden. An elderly, blind man sits with his daughter in the center and asks her to describe what he can already perceive; odor, air, space, sound.

> 'It is open to the blue sky?' said the old man.
>
> 'Yes. We see the liquid death of heaven above through the rifts and the windows; and the flowers, and the weeds, and the grass and creeping moss are nourished by its unforbidden rain. The blue sky is above — the wide, bright, blue sky — it flows through the great rents on high, and through the bare boughs of the marble-rooted fig-tree, and through the leaves and flowers and the weeds, even to the dark arcades beneath.'
>
> The father replies, 'I hear the rustling of leaves, and the sound of waters — but it does not rain — like the fast drops of a fountain among woods.'[39]

He hears the water that has collected in pockets of soil and eroding concrete as it slowly percolates through the layers of soil, feeding the marble-rooted fig tree minerals that support blossoms and fruit. Water is one medium that distributes essential minerals to plants, it activates the exchange from the soil to the roots. The fig tree has been recorded by botanists growing in the Colosseum since 1643 (see appendix 1). Shelley's garden is a written memory constructed for the present, like the site in question, an exquisite corpse of

geometry, bricks, soil, minerals, and plants; serendipitous procreation enabled by ancient engineered conditions of the Colosseum's site and construction. This article looks to situate mundane realities in the garden as earth, sky, sea, and atoms; the minute juxtaposed with the vast geography of place and time, growing and dying at once according to nature.

A memory of the Colosseum as a garden and in the spirit of Nora's 'perpetually actual phenomenon' brings Roman gardens (and gardening) to the present and requires an imaginative consciousness not unlike the myth that Romans imagined in plants and temples. It is not a democratic garden; it favors invisible and seemingly unpredictable, vulgar, and ruinous habits. Historic preservation favors democratic, logical, and conscious decisions that for the most part counter persistence, especially that of ecological persistence.

The inexhaustibles of this garden are found in its configuration that contains and aerates, its materials of construction, its orientation to the sky and our imagination, its perpetual and varied occupancy, and its minute particulates that flow continuously through its soil and subterranean networks. The vivid and sensuous details have occupied the building and imaginations of artists, pilgrims, and Romans; activating a memory of the Colosseum as a garden. Plenitude and persistence cannot be suppressed, even by static conceptions of preservation. Eventually, a *wild* order will prevail.

Acknowledgements

My sincerest gratitude to my teacher, John Dixon Hunt, and for the opportunity to walk the gardens of Rome to Michael Maas and Richard Talbert.

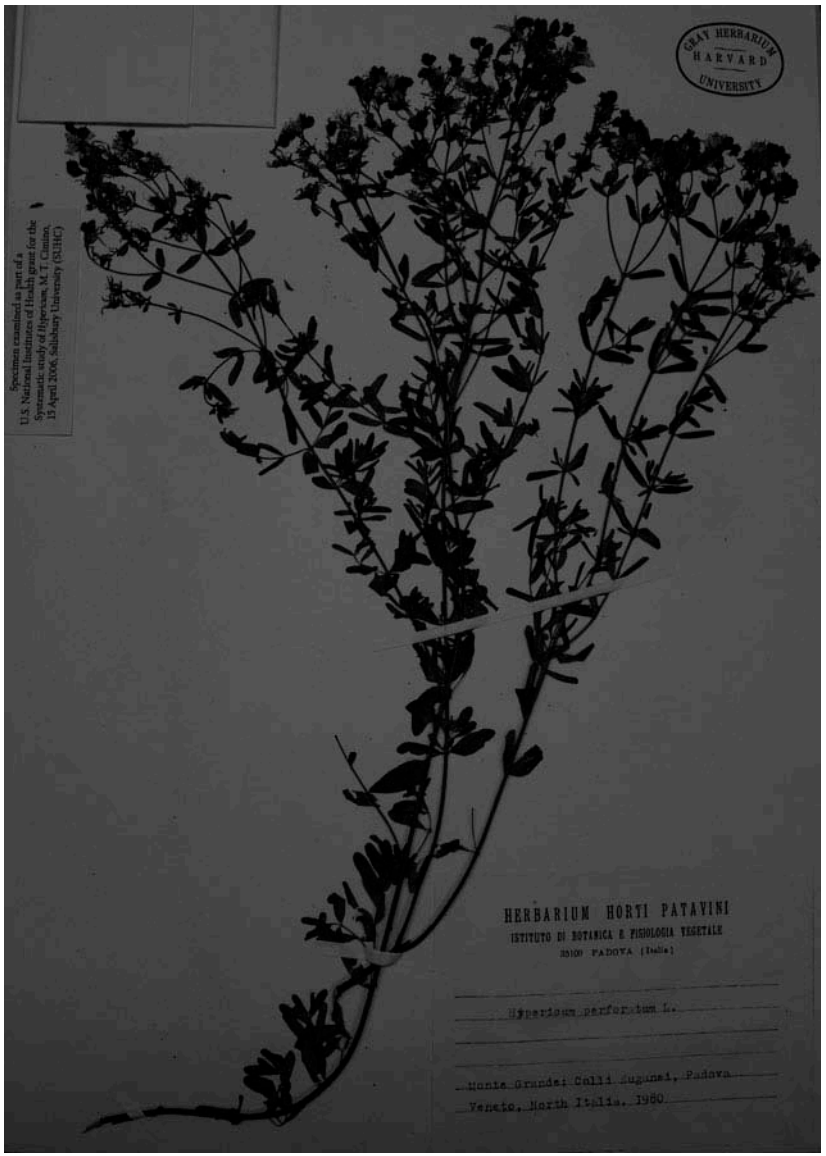
Graduate School of Design, Harvard University

NOTES

1. Virgil, *The Georgics: A Poem of the Land*, trans. and ed. Kimberly Johnson (Harmondsworth: Penguin Classics, 2010), Book II, pp. 217–223.
2. Christine Smith, *Architecture in the Culture of Early Humanism, Ethics, Aesthetics, and Eloquence 1400–1470* (New York and Oxford: Oxford University Press, 1992), p. 150. I would like to credit Smith's translation and analysis of Chrysoloras' letter and insight on the culture of Humanism.
3. Smith, p. 200.
4. Giacomo Boni, *Flora dei Monumenti*, trans. Stefano Andreani (Roma: AS. E. il Ministro dell' Istuzione Publica, 1896).
5. Clarence J. Glacken, *Traces on the Rhodian Shore, Nature and Culture in Western Thought From Ancient Times to the End of the Eighteenth Century* (Berkeley, Los Angeles, and London: University of California Press, 1967), p. 33.
6. Glacken, pp. 70–74.
7. Horace, *Horace Satires, Epistles, Ars Poetica*, Loeb Classical Library, trans. H. Rushton Fairclouch (Cambridge, MA: Harvard University Press, 1961), Bk. I, 10.
8. Richard Deakin, *Flora of the Colosseum of Rome* (London: Groombridge and Sons, 1855), Preface, p. vii. Substantial excavations of the Colosseum beginning in 1870, brushed and cleaned the site of 'weeds'. Deakin died in 1873.
9. Lord Byron, *Childe Harold's Pilgrimage*, ed. Thomas Moore (Philadelphia: Henry Carey Baird, 1856), Canto IV, CXLIV, pp. 233–234.
10. Laura Celesti-Grapow, 'The Role of Alien and Native Weeds in the Deterioration of Archaeological Remains in Italy', *Weed Technology*, 18, 2004, p. 1508. Invasive Weed Symposium, Weed Science Society of America and Allen Press.
11. Celesti-Grapow, p. 1509.
12. Lucretius, *On the Nature of Things*, trans. W. H. D Rouse, revised Martin F. Smith, Loeb Classical Library, ed. Jefferey Henderson (Cambridge, MA: Harvard University Press, 1992), pp. 18–19, lines 184–191.
13. Michael Fenner, ed., *Seeds, The Ecology of Regeneration in Plant Communities*, 2nd edition (Egham: CABI Publishing, 2000), p. 311.
14. Katherine Welch, *The Roman Amphitheatre, From Its Origins to the Colosseum* (Cambridge: Cambridge University Press, 2007), p. 44.
15. Keith Hopkins and Mary Beard, *The Colosseum* (Cambridge, MA: Harvard University Press, 2005), pp. 149–150.
16. Hopkins and Beard, pp. 149–150.
17. Andrew Szegedy-Maszak, 'A Perfect Ruin: Nineteenth-Century Views of the Colosseum', *Arion*, Third Series, 2, No. 1 (Winter 1992), Published by: Trustees of Boston University, p. 117.
18. Percy Bysshe Shelley, ed. Ernest Rhys, *Essays and Letters by Percy Bysshe Shelley* (London: Walter Scott, 1886), p. 57.
19. Michael and Ken Thompson Fenner, *The Ecology of Seeds* (Cambridge: Cambridge University Press, 2005), p. 47.

20. Hopkins and Beard, p. 142.
21. Welch, Suet, *Nero 31*, p. 149.
22. Glacken, p. 5.
23. Glacken, p. 6.
24. Fenner, *Ecology of Seeds*, p. 1.
25. One last detail regarding seed dormancy, science has documented plants species that have remained viable for hundreds of years as dormant seeds: a sacred lotus (*Nelumbo nucifera*) has been radio carbon dated as over 1200 years old and verified viable, botanists are monitoring a seed bank that was established in 1879 and verified a species of a mallow plant (*Malva pusilla*), among others, as viable for over 120 years. *Malva sylvestris* L., a wild relative of *Malva pusilla* has persisted in the Colosseum since before 1643. *Malva sylvestris* L. to a Roman was food for Apollo, a wild plant that could endure drought and had the capacity to quench thirst — a plant of the golden age.
26. Fenner, p. 85.
27. Fenner, p. 97.
28. Glacken, p. 6.
29. Giorgio Cutini, ed. Gabriele Perretta, *Memografie & altre storie* (Edizioni Gribaudo, 2008) Michael Fenner and Ken Thompson, The Ecology of Seeds (Cambridge University Press, 2005) p. 80.
30. Giambattista Vico, tr. Thomas Goddard Bergin and intro. Max Harold Fisch, *The New Science of Giambattista Vico* (Ithaca and New York: Cornell University Press, 1968), p. 336.
31. Giorgio Cutini, ed Gabriele Perretta, *Memografie & altre storie* (Edizioni Gribaudo, 2008) and http://www.giorgiocutini.it.
32. Vico, p. 129.
33. Giambattista Vico, tr. and intro. L. M. Palmer, *On the Most Ancient Wisdom of the Italians, Unearthed from the Origins of the Latin Language* (Ithaca and London: Cornell University Press,1988), p. 85.
34. Vico, *On the Most Ancient Wisdom of the Italians*, p. 95.
35. Louis Legrand Noble, *The Life and Works of Thomas Cole* (Cambridge, MA: The Belknap Press of Harvard University Press,1964), p. 115.
36. Noble, p. 115.
37. Pierre Nora, 'Between Memory and History: Les Lieux de Memoire', *Representations*, 26, University of California Press, Special Issue: Memory and Counter-Memory (Spring 1989), p. 8.
38. Shelley, pp. 250–251.
39. Shelley, p. 57.

Appendix 1: garden of the Colosseum



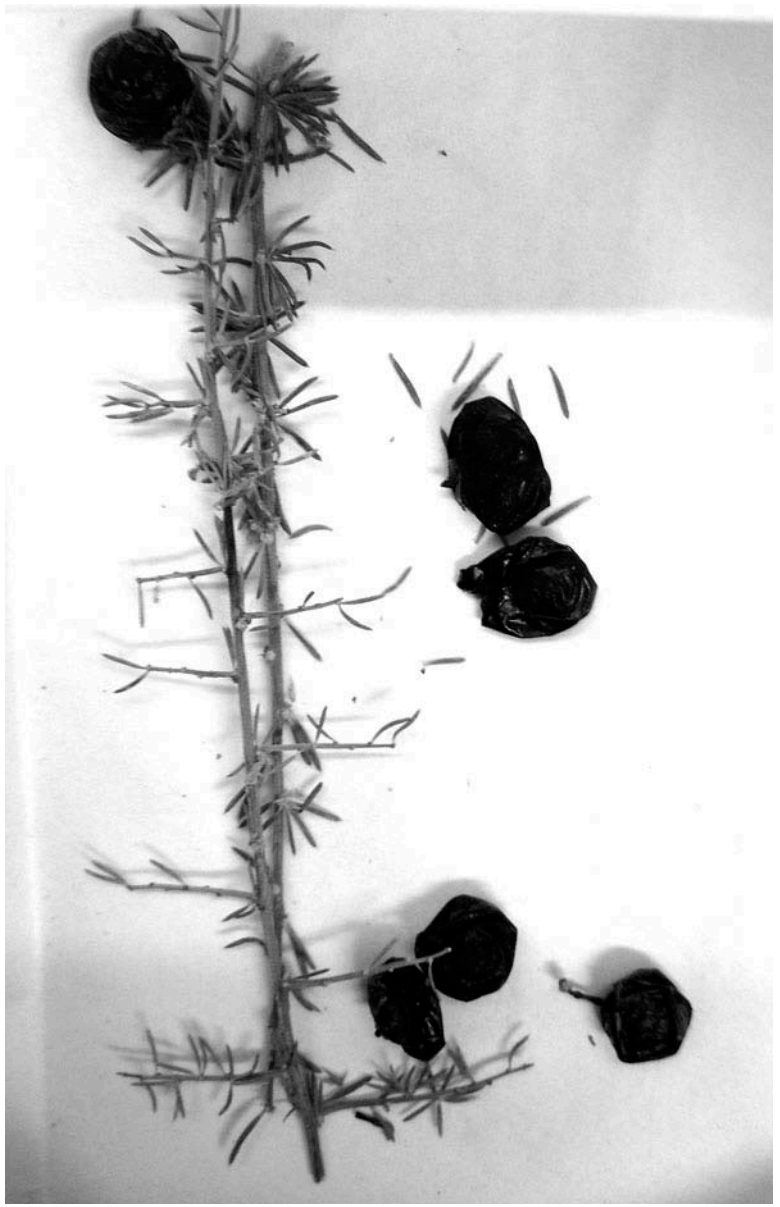
***Hypericum perforatum* L.**
St. John's wort, perennial
Protection from lightening, medicinal
Noted in Colosseum: 1643, 1815, 1855, 1874, 1951, & 2001 (Caneva, pp. 23–39).

St. John's wort is a herbaceous plant noted for a blood colored liquid that can be extracted from its stem. Romans thought it offered protection from lightening, which was a primary cause of fire in the city. They also valued the plant for its medicinal benefits: specifically depression. It is native to North Africa, Europe and western Asia and favors temperate environments and seems to favor pastures, slopes and roadside and other disturbed areas.

> This plant is still retained in the Italian *Materiâ Medicâ* … Ancient superstition attributed to this plant the power of defending persons from enchantments, phantoms, and spectres; and still more, of being adapted to drive away devils. (Richard Deakin, *Flora of the Colosseum*, p. 54)

***

FIGURE 5. Hypericum perforatum L — *Collection: Gray Herbarium; Description: Herbarium Horti Patavini, Istituto Di Botanica E Fisiologia Vegetale; collected Veneto, Italia, 1980. Source: Photograph by Miranda Mote © Harvard University. Reproduced by permission of Harvard University. Permission to reuse must be obtained from the rightsholder.*



***Asparagus acutifolius* L.**
Asparagus, evergreen perennial
Favors a humid forest, medicinal, symbol of male power and fertility
Noted in Colosseum: 1643, 1855, & 1874 (Caneva, pp. 23–39).

Asparagus was used to make wine, medicine, and food. Images of the plant are found in wall paintings at Pompeii and in the panels ornamenting the Ara Pacis. The plant has no proper leaves. It has instead a cladode, which is a flattened stem performing the function of a leaf (photosynthesis). It would likely favor the moist, somewhat shady areas of the Colosseum, the lower edges along southern perimeter (facing north).

> [T]he young tender shoots of all the wild species growing in the hedges and bushy places in most parts of Italy, are indiscriminately cut and sold in the markets for the use of the table. (Richard Deakin, *Flora of the Colosseum,* p. 27)

***

FIGURE 6. Asparagus acutifolius *L.* — *Collection: Gray Herbarium; Description: F. Schultz, herbarium normale, nov. ser. Cent. 13 Florentiae. Halia; October 1978, Nov. 1881; Leg. Dr. E. Levier. Source: Photograph by Miranda Mote © Harvard University. Reproduced by permission of Harvard University. Permission to reuse must be obtained from the rightsholder.*

FIGURE 7. Rosa sempervirens *L.* — *Collection: Herbarium of the Arnold Arboretum; Description: Pescara, Italy, 1866 (28896); Legit: Albert Kuntze Dresden; showing detail contents of envelope, seeds. Source: Photograph by Miranda Mote © Harvard University. Reproduced by permission of Harvard University. Permission to reuse must be obtained from the rightsholder.*

***Rosa sempervirens* L.**
Evergreen rose, climbing evergreen perennial
Flower of Aphrodite, grown for chaplets, scent and medicinal use, economic luxury
Noted in Colosseum: 1815, 1855, 1874, & 2001 (Caneva, pp. 23–39).

The rose was considered the queen of flowers in Rome and attributed to Aphrodite. It was cultivated for its blossoms and rose hips for garlands, chaplets, medicine, wine, for bees, and scented oils. Romans grew roses in greenhouses. To sustain rose production year-round Rome imported blossoms from Egypt to excess.
It is an evergreen plant mostly growing in maquis and in sheltered valleys. The fruit is shiny and red.
A maquis region is unique to the Mediterranean. It is a shrub land biome consisting of dense growth of evergreen shrubs such as holm oak, kermes oak, tree heath, strawberry tree, sage, juniper, buckthorn, spurge olive and myrtle.

> According to the account of Pliny, the unguents used to anoint the body after bathing, at the time of the Trojan war, were commonly oil, perfumed with odoriferous herbs and flowers, and especially the rose. (Richard Deakin, *Flora of the Colosseum,* p. 27)

***

FIGURE 8. Acanthus mollis *L. (detail)* — *Collection: Gray Herbarium; Description: Ex. Herb. John Ball, 1890, Taormina, Sicily. Source: Photograph by Miranda Mote © Harvard University. Reproduced by permission of Harvard University. Permission to reuse must be obtained from the rightsholder.*

***Acanthus mollis* L.**
Bear's breeches, perennial
Drought tolerant, black seeds, *Acanthus* = Rome, plant of Apollo
Noted in Colosseum: 1643, 1815, 1855, 1874, 1951, and 2001 (Caneva, pp. 23–39).

Acanthus mollis is native to the Mediterranean region of North Africa and southwestern Europe and appropriated a mythical persona for its capacity to endure drought; in the middle of its growing season it appears to die, lies dormant then returns to life with rain. It is a tall, slim plant; reaching up to five feet, that grows in wasteland and dry areas. It would likely favor the upper tiers of Colosseum on the northern edge, heated by southern exposure. This plant is associated with Apollo and rebirth, the foundation of the Roman golden age and populates the Corinthian order with flourish. Its subterranean habit is a thick mass of roots, a rhizome, which is actually a stem. The plant is pollinated by bees and bumble-bees (entomophily). The bees must be large enough to open up the upper and lower sepal at the bottom of the tube. The fruit is a capsule that contains two to four black seeds that are distributed by wind (anemochory). This plant dominates the facades of the Ara Pacis, Rome's Augustan altar of rebirth and is also found painted in ancient wall paintings, notably the subterranean room at Villa Livia. Its habit exemplifies natural tendencies to persist. If I were a Roman, I would remind you that Acanthus equals Rome.

***

***Ficus carica* L.**
Common fig tree
Invisible multiplicity; duplicity in reproduction; food for humans and bees
Noted in Colosseum: 1643, 1815, 1855, 1874, 1951, 2001 (Caneva, pp. 23–39).

The fig is found in wall paintings throughout the Empire, was eaten fresh and dried, and used as food for bees. It was likely first cultivated in southern Arabia 6000 years ago, spread to western Asia (Turkey and Afghanistan). Latnium has cultivated figs since eighth century BCE. Archaeologists have found burned figs at Temple of Isis (sacrifice).

It is a small tree in the mulberry family that typically stands 10 to 30 feet tall and favors hot dry soil in forest or rocky habitats. The fruit is called a synconium; a type of specialized hollow, fleshy branch or receptacle with numerous flowers forming into fruits inside it. What we see as the fruit are actually receptacles filled with small blossoms, 30 to 1600 tiny flowers surrounded by flesh. Once pollinated, the tiny blossoms become the fruit. Some require cross-pollination with male figs, others not. The blossoms are pollinated by tiny wasps, then birds eat the fruit and distribute the seeds (pre-scarified which aids propagation). Figs are an excellent source of calcium, magnesium, potassium, and manganese.

***

FIGURE 9. Ficus carica *L.* — *Collection: Gray Herbarium; Description: Flora Italica Exsiccata; Adr. Fiori, A. Bēguinot, R. Pampanini, 784, Loc. Venetia; Legit: R. Pampanini. Source: Photograph by Miranda Mote © Harvard University. Reproduced by permission of Harvard University. Permission to reuse must be obtained from the rightsholder.*

FIGURE 10. Hedera helix *L.* — *Collection: Gray Herbarium; Description: Herbarium of Arthur Stanley Pease, Continental Italy, Roman theatre, Fiesole; 17 Nov. 1905, No. 8662; also Colorado State University Herbarium. Source: Photograph by Miranda Mote © Harvard University. Reproduced by permission of Harvard University. Permission to reuse must be obtained from the rightsholder.*

***Hedera helix* L.**
Ivy, woody evergreen climber
Symbolic of vegetative force, used in chaplets, indispensable in Roman garden
Noted in Colosseum: 1643, 1815, 1855, 1874, 1951, & 2001 (Caneva, pp. 23–39).

Romans associated ivy with Dionysus because of its vegetative force. It was used in chaplets as the cord to bind flowers to. This made ivy indispensable in festivals and celebrations. Romans would also decorate garden sculpture with strands of ivy. It is found frequently in wall paintings, on the Ara Pacis, and in Livia's wall paintings.
Its native habitat is Mediterranean and sub-Mediterranean forests and it can grow upwards of 30 m high. The plant takes on different forms as juvenile and adult. Its flowers are pollinated by wasps and moths.

To enumerate the fragmentary remains of the former splendour and greatness of Rome's temples, baths, towers, palaces, and tombs, over which the Ivy now throws her slender arms and ever-shadowing mantle, would be to describe most of those crumbling monuments venerated for their antiquity, and associated with the earliest periods of the history of civilisation, and mingled with the still more interesting one of Christianity. (Richard Deakin, *Flora of the Colosseum,* p. 95)

***

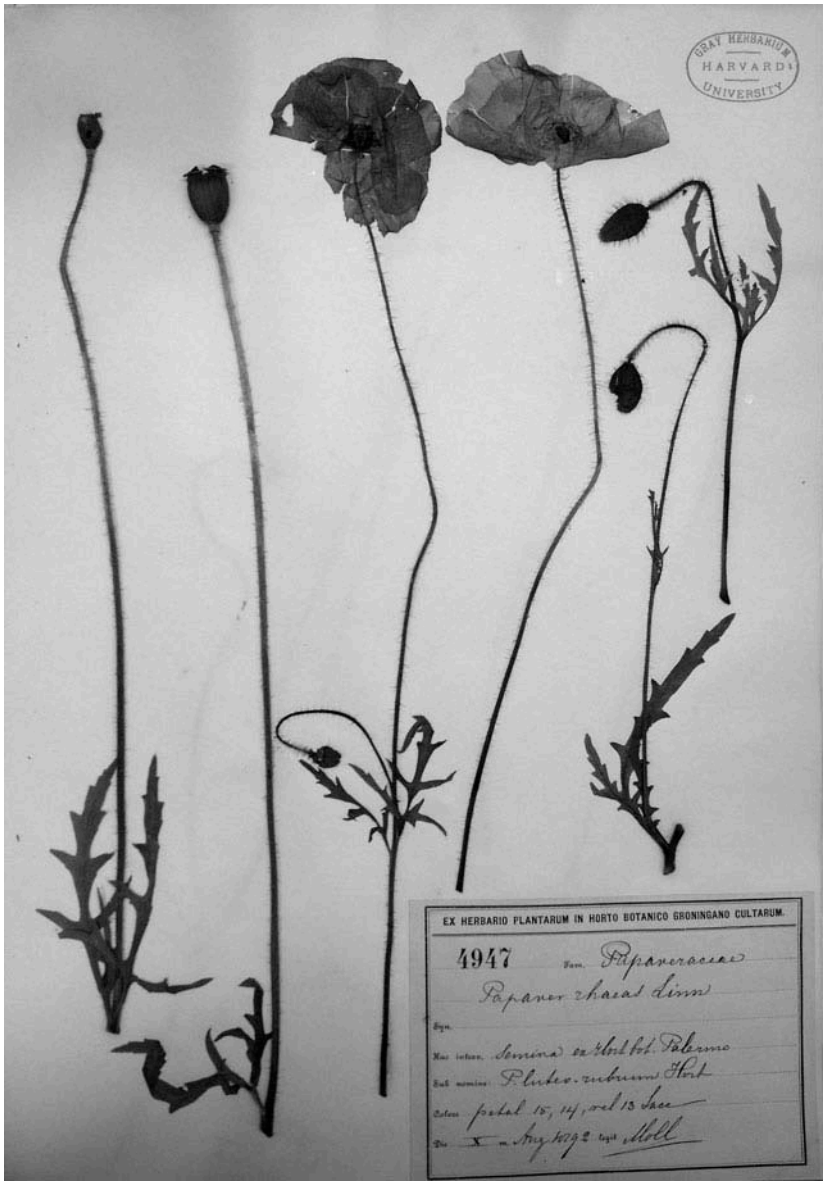
FIGURE 11. Malva sylvestris *L.* — *Collection: Gray Herbarium; Description: Flora Pedemontana, VI 1900, Verzuolo, Crueo, Italia; Legit: E. F. Paoletti. Source: Photograph by Miranda Mote © Harvard University. Permission to reuse must be obtained from the rightsholder.*

***Malva sylvestris* L.**
Wild mallow, annual, biennial or perennial
Ruderal habitat, quenches thirst, food of the divine and Apollo
Noted in the Colosseum: 1815, 1855, 1874, & 2001 (Caneva, pp. 23–39).

The Romans associated wild mallow with the return to the Golden Age and Apollo. It was a symbol of Apollo and laid at the altar of Apollo as food of the divine. They also used it for its medicinal emollient properties and thought of it as the perfect food for quenching thirst.

Its natural habit is in uncultivated ruderals and grows to 60–105 cm tall, blooming in the mid-summer. After blooming its flower is replaced by a fruit called a schizocarp in which the seed-containing carpels are arranged in a ring. It is found naturally in the region of the Nile and Mediterranean, Europe, Asia.

***



***Papaver rhoeas* L.**
Corn poppy, annual
Procreative persistence in the face of ruin; food for bees; medicinal; thrives in ruin
Noted in Colosseum: 1643, 1815, 1855, 1874, 1951, 2001 (Caneva, pp. 23–39).

Each plant is capable of producing 17 000 seeds; the seeds can remain dormant for 80 to 100 years. It has been a symbol of death and rebirth since ancient Egypt. Specimens have been found in Egyptian relics dating to 2500 BCE. They are pollinated by many kinds of insects, especially bees. They blossom from April to August and reach heights of 20–120 cm tall with stiff hairy stems. Their natural habitat is fields, pastures, stream banks, and disturbed sites. They thrive in light calcareous soils. It is likely they inhabited the northern mid tiers and lower parts of the Colosseum especially the center spectacle. For Romans the poppy was symbolic of rebirth of the earth, associated with the gods of the underworld, ideal food for bees and used for medicinal purposes (tranquilizer and sleep aids). Pliny notes that Romans cultivated three types of poppy (white, black, and red). They thought that the plants were endowed with seeds produced to negate death.

Appendix 2: plant life of the Colosseum in art and botanical studies

Representation of the Colosseum in the following studies, poems, drawings, paintings, etchings, and photographs describe the building and the plants which occupied the building, some are imaginary, others scientific studies. Botanists have documented 684 total species since 1643. Giulia Caneva tabulates all species across the five studies in her book, *The Augustus Botanical Code, Rome-Ara Pacis, Speaking to the People Through the Images of Nature*, published in 2010. Scholars acknowledge that error in identification and translation is likely with regard to species identification but, as a whole, the texts reflect an accurate assemblage of plants growing in the Colosseum:

- Maerten van Heemskerck, paintings & drawings of Colosseum as a planted ruin and *Colosseum, Seven Wonders of the World*, late sixteenth century.
- Jan Brueghel the Elder, drawings of Colosseum, late sixteenth and early seventeenth centuries.

FIGURE 12. Papaver rhoeas *L.* — *Collection: Gray Herbarium; Description: Ex Herbario Plantarum, in Horto Botanico Groningano Cultarum 4947, Semnina Palermo, 10 August 1892; Legit.: Moll. Source: Photograph by Miranda Mote © Harvard University. Reproduced by permission of Harvard University. Permission to reuse must be obtained from the rightsholder.*

- Domenico Panaroli, 1643, *Plantarvm Amphytheatralivm Catalogvs*; 221 species documented.
- Giovanni Battista Piranesi, late eighteenth century.
- Adam Bartsch, Colosseum etching, eighteenth century.
- Louis Ducros, painting of Colosseum, late eighteenth century.
- Antonio Sebastiani, 1815, *Romanarum Plantarum, Fasciculus Alter*; 256 species documented.
- Lord Byron visits Rome, 1815.
- J. Duc, construction drawings of Colosseum, 1831.
- Thomas Cole visits Rome, 1832.
- Richard Deakin, 1855, *Flora of the Colosseum of Rome*; 420 species documented.
- Francis Frith, 1860, photographs, *The Colosseum, Interior.*
- Contessa Elisabetta Fiorini-Mazzanti, 1874, *Florula Del Colosseo*; 258 species documented.
- Dott. Bruno Anzalone, 1951, *Flora e vegetazione dei muri di Roma*; 119 species documented.
- Giorgio Cutini, 1995–2012, photography of Rome.
- Giulia Caneva, 2001, *Amphitheatrvm Natvrae, Il Colosseo: storia e ambiente letti attraverso la sua flora*; 242 species documented.

Appendix 3: plant life of the Colosseum and other Roman sites documented in botanical studies

Plant species persistent in Colosseum in all botanical studies, depicted on either the Ara Pacis or Livia's Wall Painting at the Imperial Villa at Prima Porta, and documented in Vesuvian gardens (Caneva, pp. 23–39):

- *Acanthus mollis* L. (acanthus)
- *Asparagus acutifolius* L. (asparagus)
- *Ficus carica* L. (fig)
- *Foeniculum vulgare* Mill. (wild fennel)
- *Hedera helix* L. (ivy)
- *Hypericum perforatum* L. (St. John's wort)
- *Leopoldia comosa* (L.) Parl. [= *Muscari comosum* (L.) Mill.] (hyacinth)
- *Malva sylvestris* L. (wild mallow)
- *Olea europaea* L. (olive tree)
- *Papaver rhoeas* L. (corn poppy)
- *Rosa sempervirens* L. (rose)
- *Verbascum* L. (mullein)
- *Viburnum tinus* L. (viburnum)
- *Vitis vinifera* L. subsp. *vinifera* (common grapevine)

The species at the Colosseum and Vesuvian gardens have been identified by either botanists or archeologists. The species of the Ara Pacis and at Livia's Villa have been identified by art historians and botanists. These species were grown and represented in Roman gardens and valued by Imperial Rome for their symbolic, medicinal, political and economic power.

Plant Life of the Colosseum: Distribution of Plant Species Across the Colosseum's Orders, 2001 (Caneva, pp. 23–39):

- *Ipogei* (underground): 168
- I *Ordine* (first level/order): 116
- II *Ordine* (second level/order): 81
- III *Ordine* (third level/order): 56
- *Attico* (penthouse): 42