
RESEARCH ARTICLE

Traveling via *Rome through the Stereoscope*: Reality, Memory, and Virtual Travel

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Underwood and Underwood's *Rome through the Stereoscope* of 1902 was a landmark in stereoscopic photography publishing, both as an intense, visually immersive experience and as a cognitively demanding exercise. The set consisted of a guidebook, forty-six stereographs, and five maps whose notations enabled the reader/viewer to precisely replicate the location and orientation of the photographer at each site. Combined with the extensive narrative within the guidebook, the maps and images guided its users through the city via forty-six sites, whether as an example of armchair travel or an actual travel companion. The user's experience is examined and analyzed within the following parameters: the medium of stereoscopic photography, narrative, geographical imagination, and memory, bringing forth issues of movement, survey and route frames of reference, orientation, visualization, immersion, and primary versus secondary memories. *Rome through the Stereoscope* was an example of virtual travel, and the process of fusing dual images into one — stereoscopic synthesis — further demarcated the experience as a virtual environment.

Keywords: stereoscopic photography; tourism; Rome; geographical imagination; memory; virtual travel

Introduction

At the beginning of the 20th century, an innovative series of travel sets consisting of coordinated stereographs, guidebooks, and maps by the publishing house of Underwood and Underwood helped to revitalize the industry of stereoscopic photography, which was entering its second half-century. The firm's publication of 1902, *Rome through the Stereoscope*, was of special significance, given Rome's singular status as a tourist destination, a position whose longevity far surpassed that of Paris and other cities. This essay examines this travel set by analyzing the user's experience within the following parameters: the medium of stereoscopic photography, narrative, geographical imagination, and memory. These in turn bring forth issues of movement, survey and route frames of reference, orientation, visualization, immersion, interactivity, and primary versus secondary memories.

This set comprised four components: guidebook, maps, stereograph images, and stereograph texts (**Fig. 1**). A sixty-four-page history of Rome titled 'Introduction' by Albert E. Osborne was followed by a 299-page 'Itinerary' by Daniel James Ellison whose numbered sections corresponded to the forty-six stereographs included in the set. The text guided the reader from image to image as though one was holding the book while visiting Rome. Not included was a stereoscope: users would have used one similar to that seen in **Figure 2**.

Readers/viewers are given precise instructions regarding the direction of gaze and gait, whether the view was within a structure or outside in one of Rome's great *piazze*. At times, viewers are asked to retrace their steps, producing a complex assemblage of cognitive demands, regardless of whether viewers were armchair travelers or actually standing in Rome with book in hand.

Five maps were included in the book, and these possessed the richest nexus of text-image relationships, for the reader not only had to master map reading, but also reading the legend by which things were identified. Each stereograph's number appeared in red ink within a circle, and radiating from the circle were two 'bounding lines' that indicated the photographer's field of vision (**Fig. 3**). If an object obstructed the field of vision at any point, the bounding line thereafter continued as a broken one. If crowding on the map made placement of a number difficult, it was moved slightly off course, indicated by a wavy line that ran from the apex of the bounding lines to the circled number. The topography of Rome's famous seven hills also was indicated.

Rome through the Stereoscope was part of a substantial collection of travels that Underwood and Underwood pioneered. Ellen Strain provides the broader context for the firm's innovation:

Underwood and Underwood was able to prolong the stereoscope's popularity with the introduction of the Underwood Travel System, consisting of box

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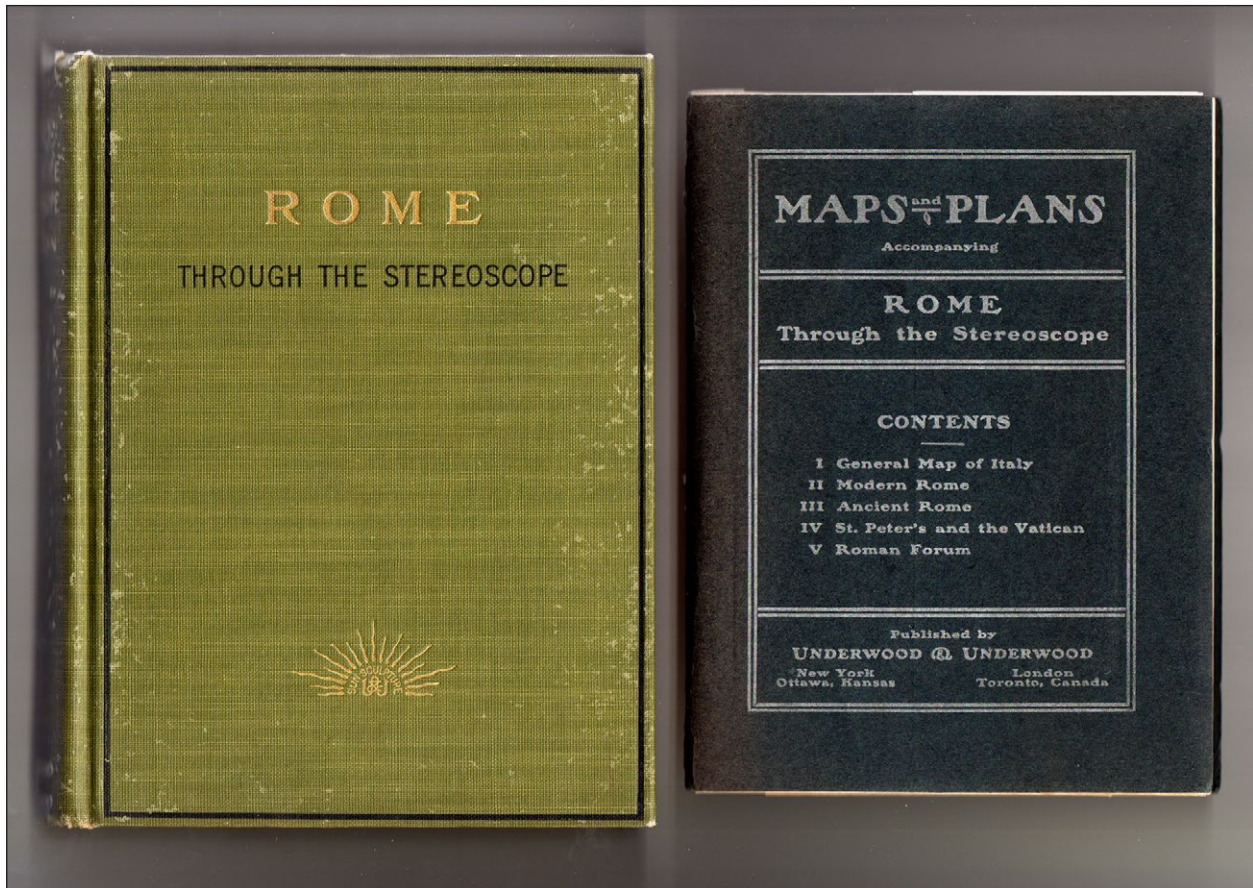


Figure 1: *Rome through the Stereoscope* (1902). Front covers of the guidebook and book of maps.



Figure 2: Stereoscope, ca. 1900, with Stereograph no. 23 from *Rome through the Stereoscope* (1902), 'Sanctuary and Home of Art and Piety – Pantheon! Pride of Rome'.



Figure 3: Detail of Map 2, 'Modern Rome' (see **Figure 4**).

sets covering particular locales and accompanied by companion books that often were written by degree-holding travel authorities. Between 1902 and 1910, more than three hundred different box sets were assembled into the Underwood Stereographic Library. (Strain 2003: 82)

The firm listed forty-two 'Stereoscopic Tours' in 1902, and among them were the following: a 200-stereoview set of the United States (US\$33.20), a 100-stereoview tour of Italy (\$18.00), the forty-six-stereograph tour of Rome (\$8.60), and the firm's 'improved Aluminum-Mahogany' stereoscope, which retailed for \$0.60 (*Rome through the Stereoscope* 1902: 311). These items targeted a solid middle-class segment of American society, as their approximate monetary equivalents for 2014 indicate, respectively: \$942, \$511, \$244 and \$17.¹ This aspect of class has been addressed by Brendan Malin:

Because of its presumed ability to transport viewers to distant places, the stereoscope promised middle-class audiences a more literal access to the cultural knowledge and cultural capital of more mobile, moneyed classes. In line with this, stereoscope companies created a series of stereoscopic views and accompanying books.

Malin continues, explaining the company often posed well-dressed tourists in their photos: 'Through this and similar perspectives Underwood & Underwood encouraged viewers to identify with wealthier tourists' (Malin 2007: 409, 412).

As Lance Speer observes, 'An analysis of the role of the stereograph as a system of communication and entertainment reveals the importance of the medium in the development of a shared cultural and visual literacy.' He notes 'the development of a collective vision' in which one was 'allowed to share the "point of view" not only of the photographer but also of the culture' (Speer 1989: 302). Underwood and Underwood's tours were subsets of this vast and widely disseminated collection of images, and clearly purchasing a tour was a substantial 'investment' for many people. This was part of the firm's strategy: to set itself apart from the competition by offering sets that offered not only the prestige of scholars who wrote the sets' guidebooks, but also the exactitude of its innovative maps. A review of the Rome set in 1903 acknowledged both aspects: 'We should hardly have believed that this simple feature [maps] would be such a real gain toward giving the view verisimilitude' (*Rome through the Stereoscope* 1903: 11).

In 1906, the august *New York Times* explained that

looking at the picture in the stereoscope he sees what he would see if he were actually at the point marked in the map, looking in the direction indicated – that is, not merely a picture of the scene, but the scene as the spectator on the spot sees it. (Stereoscopic Traveling 1906: BR2)

Evidently, the complex maps that accompanied each of the firm's sets were noteworthy advances in helping the medium of stereoscopic photography achieve its goal of providing its users the convincing experience of 'being there'. Judith Babbitts notes that the maps 'added a

scientific and technological validity to the stereographs and placed them in the realm of “topographical studies.” [. . .] Diagrammatic and presumably accurate, the maps eliminated uncertainty and error and rooted stereographs in the prestigious world of science’ (Babbitts 2004: 408).

How such sets were used must remain unanswered; as Shirley Wadja observes, ‘Primary accounts of stereoscope viewing are few and offer even fewer specifics about that use’ (Wadja 1992: 116). Certainly Underwood and Underwood — as well as persons who reviewed their travel sets — spoke of dual usages: that by so-called arm-chair travelers who could not afford to travel, and that by persons who actually traveled. The second group most probably utilized tour sets as preparatory, pre-trip venues, although it is conceivable that well-heeled travelers took their sets with them. Although the concept of lugging along a stereoscope, a set of stereographs, a guidebook and maps may seem cumbersome to present-day readers, it is worth remembering that international travelers of the early 20th century brought with them great amounts of luggage in which such items could easily be accommodated.

Nevertheless, although some travelers may have brought the set in question with them to Rome, the stereographs and stereoscope probably functioned as *aides-mémoire*, to be viewed in one’s hotel room. The guidebook and maps, however, certainly were objects easily managed by a tourist walking through the streets of Rome, and this introduces the notion of memory: the traveler already would have progressed through the ‘itinerary’ of the book and experienced the visually immersive experience of viewing the set’s stereographs. Guidebook text and map text/imagery therefore came together with both the remembered stereoscopic image and the actual scene in front of the traveler, creating an intricate interface between text and image and reality and virtuality. It is this form of ‘travel’ that this paper examines.

Stereoscopic Photography

The stereoscope offered a viewing process that was radically different from that of other 19th-century visual devices, as well as viewing processes such as non-stereoscopic photography, panoramas, dioramas, and the later invention of cinema. The process began with the kinesthetic demands of a hand-held stereoscope and became profoundly corporeal, involving hands, face, and eyes, with the viewer required to merge two slightly different images into one (**Fig. 2**). One first inserted one’s face into the curved ‘hood’ of the stereoscope and then adjusted the distance of the stereograph from the apparatus’s dual lenses until the images came into focus.² The next step was to merge the two images into one to obtain the sensation of depth, accomplishing this through a series of neuromuscular adjustments.

Stereoscopy produces a series of receding planes of depth, yet the effect is ephemeral: although all the planes in a well-produced stereograph are in focus in the dual photographs, the viewer cannot focus upon them *all* at the same moment when viewed through

a stereoscope. One’s gaze therefore shifts not only from object to object, but from plane to plane, as Rosalind Krauss observes: ‘The actual readjustment of the eyes from plane to plane within the stereoscopic field is the representation by one part of the body of what another part of the body, the feet, would do in passing through real space’ (Krauss 1982: 314). This process, the narrative of viewing a stereograph, therefore is composed *anew by each viewer with each viewing*, resulting in an exceptionally fluid temporality, one that exceeds that of non-stereographic photography and even the predetermined, serial, sequential temporality of cinematic images. Jonathan Crary characterizes this process as ‘an assemblage of local zones of three-dimensionality, zones imbued with a hallucinatory clarity, but which when taken together never coalesce into a homogenous field’ (Crary 1990: 126). As Mary Jane Appel observes in a thesis about stereoscopy, the image is ‘a reality synthesized rather than depicted’ (Appel 1995: 48).

This aspect of synthesis — which is accomplished only and often fleetingly by the viewer’s neuromuscular adjustments — is what differentiates stereoscopy from photography and painting. Pulling these strands together, a paradoxical aspect emerges, as Harold Layer explains, noting stereoscopy’s ‘ability to transmit simultaneously a sense of our isolation and our immersion in the world — both a gulf and a proximity that are most strongly sensed binocularly.’ He continues, ‘This would explain the greater emotive power of an image as seen through a hand stereoscope (total immersion — loss of conflicting cues of physical surroundings) compared to viewing it on a screen’ (Layer 1971: 234). Alan Sekula delves more deeply into the powerful effect offered by the stereoscope:

Despite the slight discomfort caused by the weight of the machine, the experience was one of disembodied vision, vision lacking the illusion shattering boundary of a frame. Thus the stereo process was particularly liable to give rise to a belief in its dematerialized form. (Sekula 1981: 22)

This aspect of dematerialized form is what differentiated the stereoscope from a precursor of *immersive* visual experience, the panorama. What links such panoramas to stereoscopes is that both media attempted to reduce any visual information that was not related to the scene being depicted. In a panorama, this was accomplished by having all the spectators facing outward on an elevated, circular viewing platform placed within a large circular building and reducing ambient lighting to a minimum. In an essay about panoramas, Dietrich Neumann examines what this viewing stance really meant to the viewer: ‘After all, seeing 360 degrees of one’s environment was not an unusual experience. What made the encounter with the continuous panorama painting so crucially different was the sudden, highly convincing passage into another world’ (Neumann 2008: 48–49). A ‘passage into another world’ describes an immersive visual experience, and although the later invention of the stereoscope did

not provide a 360-degree view, it bested the panorama by totally blocking peripheral vision, something difficult to achieve within a panorama unless the scene was so dimly illuminated so as to preclude a spectator being able to see adjacent viewers on a crowded platform.

However, in contrast to the panorama, stereoscopic synthesis remains a solitary endeavor that precludes simultaneous discourse between viewers: one cannot exclaim 'Look at that!' and then point to something. The merging of dual images into one is ephemeral and *is restricted at that moment to the individual viewer*. This is both a distinction and a limitation, and it is connected to the fact that to some, using a stereoscope seemed to be less 'natural' than visiting a panorama or — in a later period — sitting in a cinema to view a film. This issue, which I examined in an earlier essay (Klahr 2013), revolves around the somewhat 'prosthetic' nature of the stereoscope: one needs to literally attach it to one's face, almost as a temporary appendage, to obtain the visual experience.

The most notable 19th-century scholar to write about the medium was Oliver Wendell Holmes, who examined the medium in three articles he wrote for *The Atlantic Monthly* in 1859, 1861, and 1863. Although various stereoscopes had appeared since the late 1830s, it wasn't until Queen Victoria gazed into one at the Great Exhibition of 1851 that the medium began its meteoric ascent into mass popularity. By the time Holmes wrote his first article about stereoscopy eight years later, he had invented the hooded type of stereoscope shown in **Figure 2**, which intensified the experience by totally blocking a viewer's peripheral vision, something earlier models had not done. Holmes did not seek a patent for his stereoscope, for he viewed stereoscopic photography as one of the 19th century's greatest inventions and therefore regarded his version of the stereoscope as part of a public service. His words of 1859 reflect his convictions about how stereoscopic photography would change society:

The consequence of this will soon be such an enormous collection of forms that they will have to be classified and arranged in vast libraries, as books are now. The time will come when a man who wishes to see any object, natural or artificial, will go to the Imperial, National or City Stereoscopic Library, and call for its skin or form as he would for a book at any common library. (Holmes 1859: 162)

Holmes's comment about 'skin or form' requires a brief explanation, for it needs to be placed within the context of another argument he makes in his article, namely, that 'form is henceforth divorced from matter. In fact, matter as a visible object is of no great use any longer, except as the mold upon which form is shaped'. What he meant was that if one knew an object's form in its three-dimensional totality, that 'skin' — its form — imparted such a great amount of information to the viewer that the object's matter became secondary. He readily acknowledged that 'there is only one Colosseum or Pantheon', but then noted that 'matter in large masses must always be fixed and dear;

form is cheap and transportable. We have got the fruit of creation now, and need not trouble ourselves with the core. Every conceivable object of Nature and Art will soon scale off its surface for us'. Finally, regarding the largely black-and-white medium of stereoscopic photography, Holmes stated that 'we must, perhaps, sacrifice some luxury in the loss of color; but form and light and shade are the great things' (Holmes 1859: 161–62).

Holmes's enthusiastic embrace of stereoscopic photography is perhaps off-putting to the present-day reader, yet his comments about form and matter were part of a broader discourse about what the medium communicated that continued throughout the remainder of the 19th century. As Wadja notes, 'The three-dimensionality afforded by the magnifying stereoscope offered what was widely believed to be the truest representation of reality' (Wadja 1992: 114). So strong was this belief that stereoscopy was used as an analogy to describe more profound experiences. An essay of 1896 entitled 'Piety's Two Eyes' grappled with the challenge that many Christians faced regarding a major tenet of the faith:

There are two aspects of truth which piety ought always to see as one — what Christ does for us and what the Holy Spirit does for us. We theologize these apart. We must do so if we would get a distinctive idea of either [. . .] We are at liberty to distinguish; but we must hope always, like eyes that seek the focus in a stereoscope, to reach the point where distinction merges into identification. (Johnson 1896: 2)

The author, E H Johnson, used the analogy of the stereoscope to underscore that an effort is required to delve past the surface — the compartmentalization of a Trinitarian God — to get at a deeper level of knowledge regarding the indivisible unity of the Father, Son, and Holy Spirit. In 1898, Jane Barlow published a compendium of her short stories, entitled *From East unto the West*. Near the end of the tale 'An Advance Sheet', the narrator is struggling to solve a mystery when a series of questions asked by another character prompts the following sequence of thoughts: 'At this moment, a whole sequence of recollections stood out abruptly in my mind with a substantial distinctness, as if my thoughts had been put under a stereoscope' (Barlow 1898: 164). What Barlow was describing is that sensation of seeing everything suddenly come into sharp, three-dimensional relief after a period of indistinctness and befuddlement: the stereoscopic experience. These observations and ruminations by 19th-century writers, in concert with modern scholars' analyses, provide a context in which *Rome through the Stereoscope* now can be examined. Issues of narrative, geographical imagination, and memory coalesced to provide an immersive experience for the user.

Rome through the Stereoscope and Narrative

Although Underwood and Underwood produced a series of book sets that focused upon specific locations around the globe, *Rome through the Stereoscope* is unique, for no

other city had such a long history of being a tourist destination, a history dating from the medieval period. In her study *The Vision of Rome in Late Renaissance France*, Margaret McGowan explains the city's singular status regarding tourists:

The process of seeing was made infinitely more complicated by the fact that visions of the city had already been gained by most travelers to Rome from their reading [. . .]. This web of association, constituted by all those layerings which come into play at the moment of seeing – sights seen, imagined visions, and views absorbed through reading – can be disentangled best if the argument dwells on the one hand on what visitors to Rome actually saw and transported back with them to their own countries, and on the other on what could *not* be seen by them. (McGowan 2000: 3)

McGowan's final point – what was *not* seen by actual tourists – will reemerge later in this essay, when the purported advantage of a stereoscopic experience over an actual tourist experience is examined. By the time Underwood and Underwood published *Rome through the Stereoscope* in 1902, mass tourism among Europeans and Americans was well established, as was the shift from prints to photographs to acquaint would-be tourists with sites around the globe. The multiple components of the set – stereographs, book, and map – built upon this long history of tourists arriving in Rome with detailed preconceptions and visions about the city.

In Osborne's lengthy introduction to the book, he addresses issues regarding the potential experience the set would offer readers/viewers. He begins with a maneuver, claiming that 'it is possible for the observer to obtain the same mental experience that he would if he were looking at the scene itself. Certainly the real end sought by a traveler to Italy is his mental experiences, his states of consciousness there' (Osborne 1902: xiv). Osborne clearly anticipates skepticism that any stereoscopic viewing experience could approximate standing in front of an actual scene; hence his immediate focus upon the *mental* experience, which he will subsequently align with memory. He forthrightly acknowledges the two major aspects of actual travel that *Rome through the Stereoscope* did not deliver: an 'experience of movement' and the presence of color. Yet he strongly dismisses the notion that the primacy of vision inherent in armchair travel delivers a less than real experience, and he anchors this within an argument about the important role that the book's maps play in providing the reader/viewer a sense of location:

Our sense of location is determined in nearly all cases not from what we hear or feel, but from what we *see* [. . .]. The best evidence, and indeed a sufficient proof, that we do get such an experience when we look at stereoscopic photographs properly, is the fact that, ever afterwards, we find ourselves going back in memory over mountains and seas to the place in the distant country where

the real place is located, rather than to the room in America or England where we saw the stereoscopic scene. (Osborne 1902: xxi–xxii)

Osborne makes this claim by noting that when using the type of stereoscope for which the set was designed, one's immediate surroundings are blocked out: all one can see is the image. It is clear that Osborne is attempting to persuade the reader that stereoscopy's visual experience might be superior to actually viewing a foreign scene on account of the medium's ability to – at least temporarily – remove all extraneous visual stimuli. Unaddressed, of course, is how well the armchair traveler, peering into a stereoscope, would be able to disregard whatever tactile, aural, and olfactory stimuli happen to occur during such a viewing.

This introduces the two types of reality that Osborne next addresses. He begins with a problematic statement: 'Our purpose in making that long and arduous journey would be to gain certain *experiences of being in Italy*. What we would bring back with us would not be the *material Italy*' (1902: xxiv). This is problematic because he ignores two important factors of actual travel: the non-visual stimuli that complement visual stimuli to produce a richly layered memory and the potent power that souvenirs – fragments of the material Italy – have to elicit memories. At first glance it seems especially unfortunate for Osborne to ignore this second factor, for Rome's singular history put it at the forefront of creating the tourist souvenir or relic, as Sarah Benson examines in her essay 'Reproduction, Fragmentation, and Collection: Rome and the Origin of Souvenirs'. In other words, Osborne's disregard for the material Italy seems counterproductive if he is attempting to validate experiencing Rome through a stereoscope, which afforded no possibility of obtaining a souvenir. Yet Benson makes two interesting points: 'The kind of memory these souvenirs embody is not interior and personal but outward and collective. The production and consumption of souvenirs functioned to provide prefabricated, standardized memories of Rome even to those who never set foot within the city walls' (Benson 2004: 16).

Benson is speaking about mass-produced souvenirs of the 16th to 18th centuries, whether prints, medals, or models of Roman buildings. Her claim that the memories these embody are not interior seems to strengthen Osborne's claim that one's mental experience – *something internal* – is of greater significance than anything external. Yet Benson's second point – that materiality plays a role in generating knowledge – suggests that even 'outward and collective' memories are important.

In a sense, therefore, Osborne is attempting to short-circuit actual travel by stating that if memories are the *end goal of travel*, then the memory of viewing a photograph might be as valid a memory as having actually viewed a site or object. He acknowledges the materiality of actual travel, but keeps on deflecting a reader's mind from questioning what is relinquished when one doesn't *actually* travel by suggesting the superiority of the mental over the physical, a position similar to Oliver Wendell Holmes's

statement about form being divorced from matter. Osborne writes, 'The realities of the physical world have weight and material substance, the realities of his inner mental states are without weight and material substance' (Osborne 1902: xxv).

This brings to mind an observation by Richard Wrigley specifically regarding Rome and how the actual act of seeing a sight, or site, might not have been the *ne plus ultra* experience: 'Indeed, so much in responses to Rome is centered around the recognition of an expected script that the physical object or site on view can seem to be no more than instrumental or even irrelevant' (Wrigley 2012: 552). Steven Mailloux goes one step further, almost tacitly affirming the potency that Osborne claimed: 'For many Americans visiting Rome in the 19th century, the city became an imaginative landscape [. . .]. Often such rhetorical imaginings developed through the narrative placement of real and fictive bodies into Rome's urban space and its historical time' (Mailloux 2013: 126). Nevertheless, a reader might have been tempted at this point in Osborne's introduction to question how a collection of forty-six views of Rome could constitute more than a fragmented jumble of impressions. Once again, Osborne maneuvers deftly, anticipating this challenge and using it as an opportunity to underscore how important and innovative Underwood's patented map system was:

It is easily seen that without such maps all series of photographs or illustrations that have been or can be published must show a country or city to our minds in disconnected, unrelated fragments [. . .]. [B]ecause of the fragmentary and unrelated character of photographs, it has been impossible to make them the foundation of any systematic and intelligent study of a city or country. With the invention of this new map system it has been made possible for the first time to gain information of distant places in as intelligent and systematic a way as by actual journey. (Osborne 1902: xxix–xxx)

Osborne's emphasis upon Underwood's distinctive maps introduces the topic of geographic imagination.

Geographical Imagination

Rome through the Stereoscope is, in essence, an exercise in geographical imagination. It offers the reader/viewer not only an experience wherein scenes are visually experienced with the haptic intensity provided by stereoscopy, but also an experience that instructs and guides the user from site to site using text and maps. So what is geographical imagination? Joan Schwartz and James Ryan offer a definition:

We have interpreted the geographical imagination broadly to be the mechanism by which people come to know the world and situate themselves in space and time. It consists, in essence, of a chain of practices and processes by which geographical information is gathered, geographical facts are ordered, and imaginative geographies are constructed.

Photography is one of those practices. (Schwartz and Ryan 2003: 6)

Schwartz and Ryan single out photography because it functions as an especially potent medium regarding geographical imagination, especially when it concerns tourism. In their well-known study, *The Tourist Gaze*, John Urry and Jonas Larsen note that 'photographs activate both "imaginative mobility" and "memory travel", and they frame tourists' gazes and the manipulation of their cameras' (Urry and Larson 2011: 155). An objection might be raised that the images in *Rome through the Stereoscope* were *not* those taken by the reader/viewer, but rather by one of Underwood's photographers, so how could such images activate imaginative mobility and memory travel? The question is precisely *why* Underwood created not only its distinctive maps, but also the textual narrative, so that the reader/viewer would come to experience the precise stances of the photographer and the precise route he took to go from site to site.

These two components of the Rome set — maps and narrative — can be easily translated into the terms that scholars of geographical imagination use, and Tad Bruny  and Holly Taylor provide a clear example:

Survey descriptions, like maps, convey spatial information in an aerial (allocentric) perspective, using an extrinsic reference frame (i.e., relative to other spatial information) and cardinal directions (*north, south, east, and west*). In contrast, route descriptions convey spatial information from a first-person (egocentric) perspective, using an intrinsic reference frame (i.e., relative to the viewer) that guides readers on an imaginary tour, conveying information about landmarks, distances, and turns. (Bruny  and Taylor 2008: 340)

The distinction between allocentric and egocentric perspectives is important, for what emerges from a group of recent studies is that while these two frames of reference work in tandem, knowledge is gained more readily and directly from allocentric (survey) than from egocentric (route) descriptions. The reason that this occurs is because a route description, as Bruny  and Taylor explain it, presents 'additional cognitive overload at the expense of higher-level abstraction'. They reinforce this point, noting that 'in addition to spatial information, route descriptions inherently convey temporal-sequential information (e.g., *after* turning onto Maple St.), perhaps necessitating increased cognitive load and detracting from central resources' (2008: 349). It is this temporal aspect that demands greater cognitive input on the part of the reader. The authors of another study succinctly summarize the role that time plays in egocentric perspective: 'The allocentric reference frame is a fixed one, whereas in route perspective, the reference frame is continuously changing. This means that the perspective has to be updated every time a new reorientation is prescribed in the description' (Deyzac, Logie, and Denis 2006: 237).

A further study utilized an experiment that offers some intriguing corollaries to the photographic, allocentric, and egocentric frames of reference present in *Rome through the Stereoscope*. Patrick Péruch et al. describe the experiment:

Participants memorized a virtual environment (a garden consisting of six objects) under one of four learning conditions: (a) viewing a map of the garden (visual-survey); (b) viewing a video presentation of a journey along the path around the garden (visual-route); (c) listening to a verbal description of the map of the garden (verbal-survey); (d) listening to a verbal description of the journey around the garden (verbal-route). [. . .] The conditions involving a survey perspective resulted in a higher frequency of correct responses and shorter response times than those involving a route perspective. (Péruch et al. 2006: 1950)

Learning conditions (a), (c) and (d) (visual-survey, verbal-survey and verbal-route) were present in *Rome through the Stereoscope* if the reader listened to someone reading the textual narrative and also describing what appeared in a section of the maps. The only learning condition not present in the book was (b), the visual-route permutation. In fact, what might be termed the *obverse* to learning condition (b) was present: instead of presenting objects briefly as one moved throughout the garden, *Rome through the Stereoscope* presented *stationary images* of the objects in question. The 2006 experiment offered its subjects a dynamic albeit brief and ever-changing glimpse of objects, whereas the 1902 book offered its viewers the opportunity to study the image of an object in detail at their leisure. It therefore would appear that the only route or egocentric frame of reference the book contained was the textual narrative that guided a reader through the streets of Rome.

Yet the images in the book were *stereoscopic* ones: each one offered numerous routes through which a viewer could travel from plane to plane of depth. The new route or *visual narrative* that viewers created each time they viewed an image seems to fit classification as an egocentric frame of reference. The neuromuscular demands of first fusing the dual images into one – stereoscopic synthesis – and then navigating throughout the planes correspond to the cognitive overload noted with egocentric or route descriptions, as does the temporal aspect. Any scholar studying stereoscopic photography will be familiar with the experience of attempting to view a high-quality, deep-focus stereograph and being frustrated when one's eyes refuse to merge the dual images or one experiences ocular fatigue after navigating the numerous planes within such an image. Passage of time therefore is an important component of the stereoscopic experience, and this further aligns it with route descriptions, albeit the tools no longer are words but rather receding planes of photographic imagery.

With regard to frames of reference, a subject's orientation also matters. Tobias Meilinger, Julia Frankenstein, and Heinrich Bühlhoff note that 'spatial information is stored

in a certain reference frame orientation, and accessing it from a different orientation usually yields interference costs such as errors and delays. Otherwise it is classified as orientation-free'. They note that descriptions routinely are depicted from an 'imagined, horizontal *walking* perspective', whereas survey descriptions utilize 'a single imagined *aerial*, bird's eye or map perspective' (Meilinger, Frankenstein, and Bühlhoff 2013: 25). So the goal is to have orientation-free frames of reference. A 2015 paper cites prior studies whose results 'clearly indicated that performance was better for the 0° orientation than for the other imagined orientations [. . .]. The authors concluded that mental representations are orientation-dependent' (Meneghetti, Pazzaglia, and De Beni 2015: 290).

Route descriptions, despite their greater cognitive demands than survey descriptions, routinely are orientation-free, for the writer usually is directing the reader to move in a forward manner. However, survey descriptions are very sensitive to orientation, as Daniel Montello notes in a study about you-are-here (YAH) maps, the sort commonly seen in shopping malls. It is worth quoting him at some length, for the descriptions he provides underscore how complex the maps of *Rome through the Stereoscope* were:

YAH maps are aligned with the surrounds when the 'up' direction on a vertically-displayed map (or the forward direction on a horizontally-displayed map) represents the direction a person faces in the environment – his or her heading – while viewing the map [. . .] [A] YAH map can be aligned or misaligned by any angular amount between 1° and 359° [. . .]. In cases when YAH maps are misaligned, they often engender a subjective sense of confusion or disorientation, and this may be accompanied by anxiety or other negative effect. (Montello 2010: 95)

Montello has described the cognitive difficulties that arise when users consult relatively simple YAH maps. To explain what is meant, he provides the example of a four-sided pier in a shopping mall that had the same map posted on all four sides. Yet because the forward-up or track-up alignment was correct for only one of those sides – an upward direction on the map surface indicating the direction in which the shopper should walk – the other three sides were misaligned.

In contrast to the example that Montello offered, the maps of *Rome through the Stereoscope* were exponentially more complex, for they required of the reader/walker continual shifts in orientation to align with the precise orientation of the photographer. As an example, the second of the book's five maps, which will be examined later, contained eighteen different orientations. This differs from the maps used in the studies cited above, which merely depicted objects *but did not require subjects to orient their bodies in a specific manner with regard to each object*, whether a store within a mall or a building within a city. In those maps, one proceeded through them arriving simply at a destination, as opposed to arriving at a destination and then pivoting to replicate a precise orientation.

The cognitive demands that the maps of *Rome through the Stereoscope* presented to a reader/walker were substantial, whether mentally traversing the map or using the map while actually in the city of Rome. Yet these demands, along with the egocentric frames of reference that the book provided, suggest that the total experience could be a complex, multilayered one. Taking all these aspects into account, it is time to consider the aspect of memory.

Memory

To begin, let us summarize the different scenarios in which one or more persons would have used *Rome through the Stereoscope*. A couple might have purchased the set at home in America and subsequently read the text, studied the maps, and proceeded through all forty-six views, following the precise and detailed instructions. At this point, their memories might have included visual, oral, aural, and tactile experiences regarding the environment – usually the home – in which they used their stereoscope. Indeed, one could challenge Osborne's assertion that the memory of a stereoscopic image would be more direct than that of viewing a painting in a museum, for although the stereoscope did exclude extraneous visual information, whether one would *first* remember the tactile sensations involved in using a stereoscope as opposed to a stereoscopic image remains an open question. Nevertheless, what is clear is that a complex, multi-layered interface of memories would have been gained at this point.

If that couple then decided to visit Rome but not bring along any components of *Rome through the Stereoscope*, their prior memories would be overlaid with new ones gained in situ. Certainly, new memories of color and movement – in addition to those contributed by the five senses – would add layers of meaning to these memories.

There is then a third possible scenario for our couple: they bring all the components of *Rome through the Stereoscope* with them on their trip to Rome. We can imagine them viewing the stereoscopic images in their hotel room before and after visiting sites, thereby adding more layers of memory, as well as reading the text and studying the maps. If by chance they decide to bring along the maps one day while in Rome, they will have the sensation of navigating themselves by using visual-survey, verbal-survey, and verbal-route frames of reference. All these challenges of cognitive process would come into play if they wanted to orient themselves so as to replicate the photographer's precise positions, which the book emphatically and repeatedly recommended doing. Finally, if they decided amidst the tumult of Rome to bring along the stereoscope and images as well – admittedly an unlikely scenario – they would have the means of constructing comparisons between what was depicted and what existed, thereby documenting – or at least noticing – whatever changes had occurred since the photographs were taken.

Regardless of the precise scenario, utilizing *Rome through the Stereoscope* would have provided them with something unique, as Derek Gregory observed in his essay

about Underwood and Underwood's *Egypt through the Stereoscope*. He observes that 'viewing these stereoscopic pairs in sequence, in association with the maps and commentary, produced an enveloping sense of completeness'. Gregory continues, 'This sense of completeness and of closure was not only an achievement denied to the ordinary tourist; it was also an accomplishment deemed inaccessible to the inhabitants of Egypt' (Gregory 2003: 208). Gregory's 'enveloping sense of completeness' can be seen as another way of expressing what I have argued in this essay: the distinctive illusion of reality that the experience offered.

So how would our Underwood couple synthesize this *mélange* of memories? In his seminal 1976 study about tourists, Dean MacCannell defined a tourist attraction as 'an empirical relationship between a *tourist*, a *sight* and a *marker*' (a piece of information about a site) (MacCannell 1976: 41). If we examine the Roman scenarios recounted above, they correspond to his explanation about what occurs during what he terms 'the last moments of the sightseeing act' when 'there is a little flurry of activity during which the markers are passed back and forth, added and subtracted, and eventually organized in a final composition relating several markers, the tourist, and the sight' (MacCannell 1976: 136). The markers gained from bringing *Rome through the Stereoscope* on one's trip to Rome would include information gained from the book's text, the maps, visiting a site, and viewing the stereographs prior to, after, and even perhaps during a site visit. In other words, there existed a prior history of stereoscopically 'visiting' Rome that became interwoven not merely with the actual visit, but also with *revisiting that intensely immersive stereoscopic experience while in Rome*.

It is at this moment that the text component of the book reasserts itself, for most of the markers that would be cognitively processed accrued through reading about the forty-six sites in *Rome through the Stereoscope's* itinerary, not viewing them. The notion of the book's itinerary may seem tangential, but as Nina Wang explains, itineraries play an important role: 'Rather than being trivial, itineraries act as important media through which the tourism industry interacts with the tourist [. . .]. As *temporal-spatial carriers* of tourist experience, itineraries are significant in the ways that tourism is consumed and in the ways that tourists' experiences are shaped' (Wang 2006: 65–66). Wang's point about temporal-spatial carriers is important, for even though a reader/viewer of *Rome through the Stereoscope* could read/view the site descriptions and views in any order, there still was a *predetermined sequence of markers* regarding each site, manifestations of how the historian Daniel James Ellison elected to present each site in the book's main text that examined each of the forty-six sites. Wang notes that travel is essentially about intangible experiences, but to turn these into tangible products, one needs an organizing form, and it is through itineraries – and their related texts – that this is accomplished:

Thus, itineraries are a way in which travel experiences are objectified, operationalized, and

temporally and spatially ‘materialized.’ In a literal sense, we cannot sell experiences or pleasure per se, but we can sell the itineraries that are the ‘containers,’ carriers or confines of experiences and pleasures. In short, itineraries are the ‘tangible’ temporal-spatial carrier of intangible travel experiences. (Wang 2006: 68)

So in *Rome through the Stereoscope*, the reader would have read a history and description of each site as part of this itinerary, with each site description being a temporal-spatial carrier of an intangible experience. This requires a very brief look at how history and memory intersect; in other words, how the take-away experience of *Rome through the Stereoscope* might be summarized.

David Lowenthal notes that ‘memory and history are processes of insight; each involves components of the other, and their boundaries are shadowy’ (Lowenthal 1985: 187). So reading Ellison’s history about a site in Rome, which included an account of his own visit, would constitute what is called a *secondary* memory: a memory that is told to the reader. Yet the reader now would have what is called a *primary* memory: a memory of having read about Ellison’s visit in the book. If the reader then traveled to Rome, more primary memories would accrue, including those of rereading Ellison’s history, restudying the maps, and re-viewing the stereographs. If we take all this into account and then return to Lowenthal, what he notes is particularly relevant to the experience just described: ‘We can seldom distinguish primary from secondary memories, remembering things from remembering remembering them [. . .] many events we think we recall from our own experience were in fact told to us and then become an indistinguishable part of our memory’ (1985: 196). The word pair ‘remembering remembering’ is the key to Lowenthal’s observation, for it heralds a potentially many-leveled assemblage of primary and secondary memories based upon remembering, akin to peeling off the layers of an onion. Indeed, later in his book Lowenthal summarizes how complex this becomes, notably using the word ‘recollections’ to embrace both secondary memories, which he labels ‘historical’, and primary ones that he labels ‘memorial’: ‘To discriminate the historical and memorial components of our recollections is extremely difficult’ (1985: 213).

A Journey through Three Consecutive Images

We have examined the issues of stereoscopic photography, narrative, geographical imagination, and memory in this analysis of *Rome through the Stereoscope*. To pull all these strands together, we are going to briefly journey through three consecutive sites: approaching the Colosseum, standing within the structure, and then climbing up to its highest point. These are the stereographs 30, 31, and 32 within the set. **Figure 3** is a small portion of the second of five maps included in the set, and it is titled ‘Modern Rome’. In **Figure 3**, the oval shape of the Colosseum clearly is seen in the center of the image. To the left of the Colosseum are a series of red lines demarcating a rectangle: this area is the focus of the fifth map. We are going to

focus upon the Colosseum, which is shown in greater detail in **Figure 4**.

In this figure, I have colored the numbers and radiating lines of the three stereographs we will examine: 30 (green), 31 (blue), and 32 (orange). Red undulating lines connect the numerals 30 and 31 to their respective radiating lines so that their enclosing circles do not interrupt or obscure the radiating lines of other numerals. The blue radiating lines of 31 do not progress past the confines of the Colosseum, indicating that the view will not extend past the walls of the structure. In contrast, the radiating lines of 30 and 32 extend until they reach the borders of the map, where their numerals are provided once again as an aid to the viewer. The amount of information provided within this survey frame of reference thus already is substantial. Moreover, it should be remembered that purchasers of *Rome through the Stereoscope* did not have the visual aid of the different colored lines that have been applied to **Figure 4** via Photoshop: they had to contend with an almost overwhelming mass of red lines, increasing the cognitive demands made upon them.

In the narrative text, Ellison provides specific directions to orient the reader, down to the level of specific eye movements. The stereograph for number 30 is shown in **Figure 5**, and the arrow that I placed in the left image underscores a passage in his text:

We are going to take our next position within the Colosseum near the level of the arena, on the side to our right, and look up toward the side on our left which still towers to its full height. We can see from here a small section of the inner side of that highest left-hand wall, and near the top you notice a white patch of wall immediately over a dark opening for a window. That will be above us and to our left, when we stand within the Colosseum. On the map, this new position is given by the lines which branch within the Colosseum extending from the southern to the northern side. (Ellison 1902: 246)

The arrow in **Figure 5** indicates that white section of wall.³

If we progress to **Figure 6**, which illustrates number 31, the section of white wall clearly is seen in the upper left corner. The arrow that I placed in this image refers to



Figure 4: Close-up of detail of Map 2, ‘Modern Rome’, color tinting and lines added by author.



Figure 5: Stereograph no. 30 from *Rome through the Stereoscope* (1902), 'A Mighty Monument to Heathen Brutality and Christian Courage – the Colosseum, Rome'.

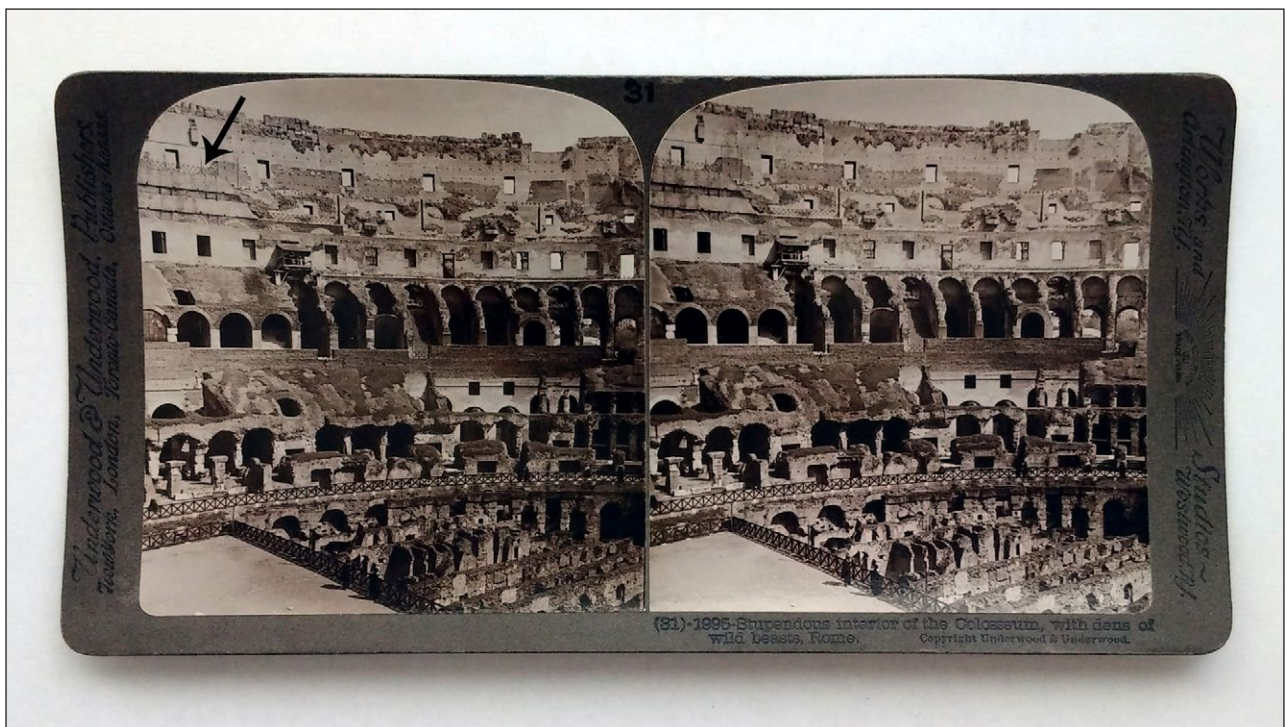


Figure 6: Stereograph no. 31 from *Rome through the Stereoscope* (1902), 'Stupendous Interior of the Colosseum – Dens beneath the Arena and Sweep of Arcades where 50,000 People Sat – Rome'.

Ellison's text that directs us to number 32: 'A few feet below that highest row of windows, and to our left, you will see a short section of modern railing similar to that which we see below us surrounding the arena. We shall now climb to that point and look to the Palatine Hill behind us and to our left' (Ellison 1902: 250). The X-shaped 'modern railing' around the arena is clearly visible in the lower third of the

image, and the portion to which Ellison directed our eyes is faintly visible below the arrow.

Figure 7 indicates the final image of our short virtual journey, number 32. Ellison has us take note of those arches below that remain in perfect condition as well as the highest remaining section of the Colosseum's wall. It now becomes clear that in a temporal-spatial sequence of



Figure 7: Stereograph no. 32 from *Rome through the Stereoscope* (1902), 'Palatine Hill – from the Colosseum – Rome'.

three images, he has guided us to and through the building. Moreover, he has brought us to the summit of the structure, responding to the tourist's inclination to ascend to the highest point. Once we are there – whether holding the book while atop the Colosseum or in our armchair—Ellison delivers a lengthy narrative about what is visible in this view, from details about the building to the history of the Palatine Hill that is visible in the background. Survey and route frames of reference were used to get us to this point, and the result was an economical sequence of images – three – that exists within the complex assemblage of cognitive demands. In essence, this is a skillful itinerary amidst all the historical detail that Ellison provides regarding each view.

The rather emotionally overwrought title of **Figure 5**, 'A Mighty Monument to Heathen Brutality and Christian Courage – the Colosseum, Rome', perhaps negatively affects a contemporary reader. It goes without saying that for the purposes of this essay, such language needs to be placed within the cultural context of the period and not be assessed through a contemporary stance. However, there is a far more important point to be made: such impassioned language, present throughout Ellison's 299-page narrative, probably contributed in a *positive* manner to create more intense geographical imaginations within the book's readers/viewers. Lowenthal, in his study of memory, addresses this issue of how history is recounted:

The very process of communication demands creative change to make the past convincing and intelligible. Like memory, history conflates, compresses, exaggerates [. . .]. Unless history displays conviction, interest, and involvement, it will not

be understood or attended to. That is why subjective interpretation, while limiting knowledge, is also essential to its communication. Indeed, the better a narrative exemplifies an historian's point of view the more credible his account. History is persuasive because it is organized by and filtered through individual minds, not in spite of the fact; subjective interpretations give it life and meaning. (Lowenthal 1985: 218)

In the quote above, Lowenthal selects his words with great care: 'credible' and 'persuasive' form the crux of his argument, and any notion of a narrative being 'authentic' or 'neutral' – illusory notions when it comes to recounting history – are absent, as he argues in further detail in his study. This relates directly to Ellison's narrative about Rome: passion, undergirded by a wealth of historical information, worked toward creating a vivid geographical imagination within a reader. Ellison strove to bring along the reader as he journeyed through Rome, acting forthrightly as a very personal and enthusiastic guide.

In the end, *Rome through the Stereoscope* was an example of what Alison Byerly termed *virtual travel* in her study of 19th-century panoramas, noting that virtual travel 'compresses' the teleology of a conventional trip 'into a structured aesthetic experience that provides many of the same contrasts.' Several pages later, Byerly pinpoints a key factor, 'immersiveness', which she states 'is a primary goal of all virtual environments' (2013: 10, 18). The visually immersive aspect of stereoscopy defines it as a virtual environment, but more noteworthy is the required synthesis, for it pushed the medium deeper into the realm of virtual environments than, for instance, panoramas. This brings to mind Pierre Lévy's words about what constitutes

the virtual, and they will serve as the dénouement of this essay.

Lévy writes, 'The virtual *tends* toward actualization, without undergoing any form of effective or formal concretization' (1998: 23). The process of actualization to which Lévy referred is strikingly similar to the process of synthesizing a stereograph: the viewing process does not require any formal concretization. The fusing of the dual images into one vividly three-dimensional one is not 'real' in the sense of materiality or spatiality, for they remain flat, separate, and one-dimensional. Yet an event has occurred, and as Lévy observes, 'Actualization is an *event*, in the strongest sense of the term. An act is accomplished, but not predetermined, and it in turn modifies the dynamic configuration in which it assumes meaning' (1998: 171). This unpre-determined aspect describes the narrative of viewing a stereograph, which is created anew with each viewing. *Rome through the Stereoscope* – and other volumes in Underwood and Underwood's Travel System – therefore provided users with a deeply virtual travel experience. It was an experience that demanded significant cognitive capabilities, a concatenation whose complexity is even more apparent a century later. It is this nexus that I have attempted to elucidate in this essay.

Competing Interests

The author declares that they have no competing interests.

Notes

- ¹ The approximate 2014 equivalents reflect the real price of the commodity, not the labor value or income value, which would be appreciably higher, and were calculated on the site *MeasuringWorth.com*, <http://www.measuringworth.com/uscompare/> [accessed 18 August 2015].
- ² The terms 'stereograph' and 'stereoview' are used interchangeably by scholars, whereas 'stereoview' tends to be the term favored by collectors and auction houses. Both terms can refer to any form of the medium, whether cardboard-mounted photographs, photographs printed on glass plates, or scenes composed of multiple layers of tissue paper. The term 'stereocard' usually is reserved for cardboard versions, which were by far the most popular form of the medium. Regardless of the final form, cameras in which dual lenses were positioned at approximately the human interocular distance were used to record dual images that mimicked human vision. Once developed and processed into its final form, the stereograph was then inserted into whatever stereoscope corresponded to the final product's format, for sizes varied.
- ³ The stereographs shown in **Figures 5, 6** and **7** are curved cardboard versions that Underwood promoted as offering a more intensive three-dimensional experience; hence the curvature noticed in the figures. In reality, what produced a superior stereograph was unrelated to any processing that produced a curved product. Rather, the photographer's skill in composition, exposure, and working within the confines of the medium's square format determined the end result.

Underwood and other firms occasionally positioned locals in their views (as seen in **Figure 5**), and sometimes the narrative text commented upon them. Often people were included to give the viewer a sense of scale, to underscore changes in topography, or to give a bit of local 'flavor', and sometimes they performed both functions, as did the locals in **Figure 5**.

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How to cite this article: Klahr, D M 2016 Traveling via *Rome through the Stereoscope*: Reality, Memory, and Virtual Travel. *Architectural Histories*, 4(1): 8, pp. 1–14, DOI: <http://dx.doi.org/10.5334/ah.185>

Published: 13 June 2016

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