UNIVERSITY of York

This is a repository copy of *Analog to Digital:Transitions in Theory and Practice in Archaeological Photography at Çatalhöyük*.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/107945/

Version: Accepted Version

Article:
Morgan, Colleen Leah orcid.org/0000-0001-6907-5535 (2016) Analog to Digital:Transitions in Theory and Practice in Archaeological Photography at Çatalhöyük. Internet Archaeology. ISSN 1363-5387

https://doi.org/10.11141/ia.42.7

Reuse
This article is distributed under the terms of the Creative Commons Attribution (CC BY) licence. This licence allows you to distribute, remix, tweak, and build upon the work, even commercially, as long as you credit the authors for the original work. More information and the full terms of the licence here: https://creativecommons.org/licenses/

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

White Rose university consortium
Universities of Leeds, Sheffield & York

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk/

Cite this as: Morgan, C. (2016) Analog to Digital: Transitions in Theory and Practice in Archaeological Photography at Çatalhöyük, Internet Archaeology 42. http://dx.doi.org/10.11141/ia.42.7

Author:

Colleen Morgan, PhD
colleen.morgan@york.ac.uk
ORCID: 0000-0001-6907-5535
Centre for Digital Heritage Postdoctoral Fellow
Associate Lecturer
The University of York

Title: Analog to Digital: Transitions in Theory and Practice in Archaeological Photography at Çatalhöyük

Keywords: photography, archaeological photography, digital media, visual studies, reflexivity, post-processual archaeology, Çatalhöyük, Dhiban

Abstract:

Archaeology and photography has a long, co-constructed history that has increasingly come under scrutiny as archaeologists negotiate the visual turn. Yet these investigations do not make use of existing qualitative and quantitative strategies developed by visual studies to understand representation in archaeological photographs. This article queries the large photographic archive created by ongoing work at the archaeological site of Çatalhöyük in Turkey to consider the visual impact of changing photographic technologies and of a shifting theoretical focus in archaeology. While using content analysis and semiotic analysis to better understand the visual record, these analyses also unexpectedly reveal power dynamics and other social factors present during archaeological investigation. Consequently, becoming conversant in visual analyses can contribute to developing more reflexive modes of representation in archaeology.

Archaeology has a long, complex, and fascinating entanglement with photography, a relationship that continues into the digital age. While there have been several inquiries regarding analog archaeological photography, relatively few have queried this transition toward digital media. Fewer still have connected critical theoretical viewpoints to a more informed media-making practice in archaeology. To investigate the effects of the transition from analog to digital photography on archaeological theory building and practice, I drew from an established body of theory in visual studies to create a more robust, interdisciplinary study of visualization in archaeology. While my investigation of digital archaeological photography revealed important technological considerations, issues regarding representation, authority, and authenticity also quickly became apparent. Quantitative and qualitative analyses of both analog and digital archaeological photographs exposed interesting disciplinary shifts and uninterrogated power dynamics in the field. While digital photography is changing the way that archaeologists are thinking about and doing archaeology, it also reveals the complexity of the relationships present on an archaeological project, in the local community and online. In this, photography can act as a *dangerous supplement* for archaeology, a Derridean concept W.J.T. Mitchell (2002) ascribed to visuality disrupting the cohesion of traditionally defined disciplines. Examining visual practice opens archaeology as a discipline to new avenues of critique that can encourage more reflexive practice.

To provide a context to this research, I first briefly describe the background of photography and archaeology as practiced by archaeologists from the United States and the United Kingdom. Then, using the photographic record from the site of Çatalhöyük in Turkey as a case study, I elaborate on techniques from visual studies to understand the social context and implications of photography in archaeology. Following this analysis I discuss the process of creating a theory-laden practice of archaeological photography and investigate photography and visualization as a particularly productive instance of the *dangerous supplement.* Finally, I explore the implications of merging this theory-laden practice with emancipatory strategies toward a more inclusive, reflexive digital archaeology.

A brief contextualization of analog photography in archaeology

Archaeology and photography, both considered projects and products of modernity, have extensively exchanged metaphorical weight throughout their complimentary histories (Bohrer 2011; Shanks and Svabo 2013; Thomas 2004). As early as 1839, Dominique François Jean Arago enthusiastically embraced photography as a means to accurately "copy the millions of hieroglyphics which cover even the exterior of the great monuments of Thebes, Memphis, Karnak" in a way that would "excel the works of the most accomplished painters, in fidelity of detail and true reproduction of the local atmosphere" (Banta et al. 1986:73). Fox Talbot, the inventor of the 'Calotype' process in 1841, was an antiquarian and took photographs of manuscripts, engravings, and busts (Dorrell 1989, see discussions of Talbot's *Pencil of Nature* by Hamilakis and Ifantidis 2015; Shanks and Svabo 2013).

(Figure 1: Flinders Petrie behind a camera in Abydos, 1899, courtesy. © *Petrie Museum of Egyptian Archaeology, University College London)*

Monumental architecture and artifacts aside, photographs of excavations were also produced at this time, but were often used as the basis of lithographs or engravings that were used instead of the original photographs to illustrate books (Dorrell 1989). Moving beyond using these photographs as the basis for drawings, Salzmann's photography of Jerusalem was used by archaeologist Felicien de Saulcy to ascribe greater age to artifacts previously associated with biblical times. Salzmann contrasts his work to the earlier standard of drawing by stating "Photographs are more than tales, they are facts endowed with a convincing brute force", commenting on photography's "putative objectivity" and "rhetorical force" to "not just passively document, but actively argues for an interpretive position" (Bohrer 2005: 181-182).

By 1906, British archaeologist Sir Flinders Petrie (Figure 1) published a chapter on photography in *Methods and Aims of Archaeology*, and North American archaeological photography was not far behind. The move from cataloguing of architectural remains such as Mesa Verde and the monumental buildings of Mexico to the integration of photography into field methodology also marks the move to the culture history era of Americanist archaeology, which characterizes the first 50 years of 20th century scholarship. During this time there was a shift in excavation imagery that culminated in the regimented World War II-era excavation photography of British archaeologist Mortimer Wheeler. With the onset of large-scale excavations, the objective to make "quantifiable documents" that could be used comparatively became important in archaeology (Guha 2002: 97). In the 1910s, the measuring scale that is now a defining feature of archaeological photographs appeared and became ubiquitous (Guha 2002:98; see also Chadha 2002). Wheeler imposed strict regulations for site photography, using the camera as a scientific recording device and created new genres of archaeological photography in making fieldwork explicitly visible. Wheeler also ushered in a more strictly 'scientific' and 'objective' "abandoning all aesthetic genres of representation" and removing the names of the photographers from the individual photographs (Guha 2002:99).

This regimented use of photography would characterize a larger move within British and Americanist archaeology toward scientific positivism after World War II. During this time, a number of manuals dictating a proscribed methodology emerged, reflecting the rapidly changing technology in photography. An emphasis on the camera as part of the archaeological toolkit appears throughout this literature, and the archaeologist-photographer is considered a poor second to a more professional photographer. An archaeologist makes "use of the camera simply as a recording instrument, referring to the photograph or transparency later as a means of refreshing memory or to confirm previous findings" (Matthews 1968:101). Another concern is site cleanliness, where the photographer must communicate to the archaeologist a need for the workers to remove "unsightly clutter" which can detract from the "intended subject" (Simmons 1969:48). Yet there are also several instances where archaeologists question the veracity of photography as a recording method. Indeed, when matters of inaccuracy in photographs are raised, the camera is cast as an "awful liar" and the archaeologist must struggle to produce an objective of truth "as he sees it and not as the camera may see it" and that a failure in this regard might lead us to "misinterpret its product with our subjective eyes or minds" (Simmons 1969:4; see also Bohrer 2011).

By the mid-1970s, the complexity of archaeological photography had increased considerably. In the comprehensive and highly technical book edited by Harp (1975), there are sections on aerial

photography, underwater photography, and, notably, public audiencing of technical photographs. The suggestion is that photographs can be used to communicate messages, and that "photographs, like messages in any other medium, are symbolic simplifications" (Dechert 1975:348), but this question is still framed in terms of miscommunication between the photographer and the camera and the biases introduced by the camera. A similar book was published in the United Kingdom, with an emphasis on technical detail, intending to inform the "production of dispassionate factual records rather than pleasing illustrations of them" and that "the execution of the photographs is an important element in ensuring that they present the facts they are to illustrate as strikingly and vividly, as well as accurately as possible" (Conlon 1973:xiii). The positivism displayed in these books reflects the move toward scientific methodology characteristic of the New Archaeology, or processual archaeology, championed in North America by Lewis Binford and in the United Kingdom by David Clarke.

Further developments in infrared and ultra-violet photography enhanced visibility of sites and as technology in photography became available and more inexpensive, archaeology manuals were updated to reflect this change, but hints of self-awareness remained scarce. In Dorrell's (1989) *Photography in Archaeology and Conservation*, a brief section regarding photographing people hints at the complexities inherent in staging site photography. The author encourages the photographer to emulate *National Geographic Magazine* when possible, that the work area should look clean and efficient, and to exercise tact when photographing local people. This advice is perhaps ill-conceived, as the photography in *National Geographic Magazine* has come under considerable scrutiny in postcolonial theory and visual anthropology (in particular, Gero and Root 1990; Lutz and Collins 1993) and possibly suspect in photographic veracity (Morgan *in press).*

By the 1980s, archaeological photography had become, for the most part, standardized. The photo scale was now accompanied by an arrow to indicate north and a board with the photograph's locale prominently displayed. People, when present, were working diligently and anonymously. Artifacts were photographed or scanned in isolation, with the background burned out in post-processing (Houk and Moses 1998). This impression of the artifact "floating in space," far removed from the dirt of the excavation, was seen as more scientific, with fewer distractions. This mechanization and standardization of photography in archaeology was also due to the growing professionalization of archaeology. In the United States and the United Kingdom, excavations were increasingly performed by developer-funded specialists with deadlines and budgets to meet. This remains the case today, with archaeologists in these countries often excavating in the shadow of developers' bulldozers.

In the last two decades, critiques from post-processual, feminist and indigenous archaeologists have destabilized scientific positivism in archaeology. The use of visual media for recording, interpretation and dissemination in archaeology has come under similar scrutiny, including illustrations (Moser 2012; 2014, Perry & Johnson 2014; Perry 2009; Wright and Morgan *in press),* model-making (Moser 1999; Perry 2013), film (Taylor 2007; Stern 2007; Piccini 1996; 2007) and Virtual Reconstruction (Morgan 2009; Earl 2008; Gillings 2005; Watterson 2015) among many other forms of representation (Moser 2009; Moser & Gamble 1997; Morgan 2012; Van Dyke 2006). Amidst these media, I find photography to be a particularly productive means to explore visual representation in archaeology. Shanks (1997) introduced a critique of

archaeological photography, identifying genres and suggested potential venues for future research. He proposed using montage and disunity with text to throw into question the use of photography and for ethnographies of the profession. Since the 1990s, these ideas have been developed and explored in many publications. Bateman (2005) questions the assumed objectivity of photography during an archaeological project in the United Kingdom and juxtaposes professional and private categories of photography in archaeology. Bateman also discusses archaeological portraiture as social photography, a theme further considered by Stephen and Morgan (2014) of diverse heritage actors at the World Archaeological Congress, by Webb (Swain 1996; Witmore 2007) of archaeological excavators in the United Kingdom, and Hamilakis *et. al* (2009) of local workers in Greece.

Representation in archaeological photography has been explored more broadly than portraiture; analyses of Wheeler's representations of sites and workers in India reveal the "disciplinarian ideologies of the colonial project" (Chadha 2002; see also Guha 2002). Shepherd extends this critique to South Africa, where "archaeology and photography coincide exactly" and discusses arresting photographs of unidentified local workers from John Goodwin's archive within the framework of archaeological knowledge production (2003: 335). Bohrer discusses the representation of differential power on archaeological sites, with the individuation of site directors from indigenous workers who are "most commonly gathered together in a single group" (2011:73). Shanks and Svabo (2013) have more recently identified an ontological association between archaeology and photography, conflating the two into "archaeography." Hamilakis and Ifantidis also identify photography and archaeology' shared ontological and epistemic principles, proposing an alternative mode of production, which they characterize as "counter-modern" (2015:134).

Digital Photography in Archaeology: Rupture or Continuation?

Just as archaeologists were grappling with increased attention and critique directed toward archaeological visual media, photography was undergoing the transition to digital. In the last decade, archaeologists have overwhelmingly adopted digital photography. Since digital cameras first appeared on archaeological sites, great improvements to the technology have taken place in terms of resolution, file size, and cost. While a few museum archives still require slides or negatives for their permanent records, archival standards are also shifting to favor digital records (Wheatley 2010). In addition to improvements to the technological aspects of digital photography, people have learned to use digital cameras with better results and with greater ease than analog photography, through the simple mechanism of instant feedback on an LCD screen when using the digital camera. Many archaeologists have their own digital cameras or smart phones, and while they may not be employed as official site photographers, they often take photographs during archaeological excavations that can correspond to Bateman's (2005) categories of documentary and personal photography or, increasingly, to a third category of archaeological photographers, "photography that is between artwork and visual ethnographic commentary" (Hamilakis et al. 2009: 289).

While the transition from analog to digital photography within archaeology seems transparent in the direct translation of framing of archaeological site photography, I have found it to be considerably more complex (see also Bateman 2000). A better understanding of the surrounding

theory within visual studies situates the subsequent study of photography over time at Çatalhöyük and provides several points of consideration for future practice. As outlined by Mitchell (1992), the materiality of digital photography differs from analog photography, a difference "grounded in fundamental physical characteristics that have logical and cultural consequences" (Mitchell 1992: 4). This materiality manifests itself in multiple ways; Mitchell cites the photograph as being "an analog representation of the differentiation of space in a scene: it varies continuously, both spatially and tonally" whereas digital photographs describe "smooth curves and continuous gradients" by discrete pixels (1992: 4-5). While the technology of digital photography is rapidly improving, the images are still reproduced by a "two-dimensional array of integers" that "can be stored in computer memory, transmitted electronically, and interpreted by various devices to produce displays and printed images" (1992: 5).

It is important to note that this difference does not negate the materiality of the digital photograph; digital media is often seen in contrast to the material world; while the material world "carries weight—aura, evidence, the passage of time...authority, knowledge, and privilege", digital media is characterized as "immediate, surface, temporary, modern, popular, and democratic" (Witcomb 2007: 35). This misconception of the immateriality of digital media is reified in the prevalence of "cloud-computing", wherein information is not stored on a local device, but accessed and manipulated over the internet. This vision of invisible computing was disrupted by Connie Zhou, who photographed the massive interiors of Google data centers, filled with blue lights, tubes, wires and servers that dwarfed the humans that stood near them for scale.

Mitchell also points out that "continuous spatial and tonal variation of analog pictures is not exactly replicable so such images cannot be transmitted or copied without degradation" while digital photographs can be reproduced exactly—"a digital copy is not a debased descendent but is absolutely indistinguishable from the original" (1992: 6). The changing morphology of the digital camera is also a consideration in the materiality of digital photography, as cameras are both getting smaller and moving inside objects that previously did not have cameras, such as cellphones. Analog photography also differs from digital photography in the relative mutability of the digital image. While there have been remixes and montages performed with analog photography, changing digital photographs is easily performed on a computer, or in some cases, on the camera itself (1992: 7).

Digital photography also dissolves boundaries, both between mediums (Lipkin 2005:10) and between people, between the photographer and photographed. For example, the ability to preview images on the camera's LCD screen introduced three elements into the process of photography. First, the instant feedback available to the photographer allowed for corrections and the ability to change the photograph, in essence teaching the photographer how to take better photographs. Secondly, the LCD screen allows for co-authorship of photographs, the person behind the camera and the person in front of the camera can discuss the photograph and decide to keep it, re-take the photograph, and/or delete the photograph entirely. It is considered polite to offer to show the subject of the photograph the image on the LCD screen for their approval, creating a social contract between the co-authors of the photograph. At this time the fate of the photograph can also be decided, as the photographed person can conditionally accept the photograph, yet ask for it not to be shared online. Finally, the LCD screen can serve as a way to show photographs to other audiences later on, an echo of the earlier method of sharing digital

photography by assembling around a computer screen, yet more mobile—perhaps recalling the passing around of a traditional photo album. Boundaries of subjectivity are transformed by the ability to co-author photographs.

Though there are clear differences, Lister disputes an easy categorization of the changes that digital technology has brought to analog photography. Instead of a dramatic impact "of one singular and monolithic technology on another" he frames the changes as a reconfiguration of existing modes of communication, not denying change, but "seek(ing) its dimensions in the untidiness and complexity of the lived rather than in rapidly conceived and overly abstract schemas of technological revolution" (Lister 1995:7). Understanding the changes that the move from analog to digital photography brought to archaeology must be seen in this way; an untidy, complex practice within a larger visual context.

Informed by her intensive fieldwork among users of digital photography, Van House (2011) outlines "what people do differently with digital technologies" that show a distinct progression in understanding compared to Mitchell's earlier comparison of analog and digital photography. She finds that as a result of digital photography there are "better images, more images, more varied, and more often," that "while people still make traditional kinds of images, what is considered photo-worthy has expanded to include the everyday" (2011: 127). Secondly, there are "shifting notions of privacy and ownership" in which boundaries imposed by the film-and-paper materiality of analog photography are now more liquid, allowing both open, easy sharing and the loss of control of ownership by professional photographers and artists (2011: 128). Finally, digital photography allows for a "large but fragile archive" (2011: 128). While a growing number of photographs are taken with digital cameras, the digital files of these photographs do not preserve as well as photographs taken with film cameras. This latter point has been of great concern to archaeologists and archivists who wish to prolong the usability of archaeological archives. Identifying these changes in practice and materiality as we move from analog to digital photography in archaeology produces interesting permutations on these themes.

Just as some of the earliest photographs represented archaeological objects, Ritchen (2009) cites a 1982 *National Geographic* photograph of the pyramids in Giza as marking the "date when the digital era came to photography" (2009: 27). The staff of *National Geographic* "electronically moved a section of the photograph depicting one of the pyramids to a position partially behind another pyramid, rather than next to it" (2009: 27). The scene, as Ritchen notes, is "an already romanticized version" that excludes "the garbage, tourist buses, and souvenir hawkers" (2009: 27). Rosler wonders if moving the pyramids, "a symbol of immutability and control" is "betraying history" by "asserting the easy domination of our civilization over all times and all places (Rosler 1991). The editor of National Geographic characterized the edit as a "retroactive repositioning of the photographer a few feet to one side so as to get another point of view" (Ritchen 2009:27).

While Ritchen describes this retroactive repositioning as "time travel" (2009: 28), archaeologists could understand this in alternate ways—archaeologists who have been relying on the apparent objectivity of photography to record architecture and excavations would identify this as falsification of the archaeological record, while other archaeologists may see it more as a remix, provided this repositioning was performed reflexively and transparently (Tringham 2009). The

former conceptualization of photography as an objective record of reality and the current ease of manipulating digital photographs led some theorists to become interested in the "loss of the real" or the so called "death of photography" (Lister 1995:1). With nearly two decades of perspective it is easy to dismiss these claims, as the use of the digital image as evidence has persisted and the "low-resolution, pixelated appearance of early camera phone photographs and video clips is now an accepted part of the syntax of truthful and authentic reportage" (Rubinstein and Sluis 2008:11).

Archaeologists regularly "photoshop" or modify archaeological photographs, but primarily in a transparent fashion. It is regular practice to replace scales that are photographed with artifacts with digitally-created scales. This is done to clean up the images, especially in the circumstance of bad lighting conditions during the initial photography of the artifact. Still, relatively few archaeologists are comfortable with radical remediation of their chosen subjects, though technology allows for easy photo manipulation and enhancement. There is no current policy in academic or professional archaeology regarding the alteration of photographs. While the "death of photography" may have been an overstatement, the death of the belief in photographic verisimilitude may be more accurate.

After the initial panic over the death of the real and the dawning of a "post-photographic era" (Lister 2004: 304) there was a rapid shift in theoretical orientation to confront the ubiquity of the photograph in Western life (Rubinstein and Sluis 2008). Rubinstein and Sluis characterize this shift from relatively stand-alone digital photography to the networked image. The networked image, that is, the "merging of photography with the Internet" has changed the production, distribution, consumption, and storage of images (Rubinstein and Sluis 2008:9). Even after the introduction of digital photography and image manipulation to a consumer market, "the promise of immediacy that digital photography offered was frustrated by unsuitable methods for instant image sharing" (2008:12). The expensive bandwidth and slow modems limited sharing, as did low capacities for email in-boxes—most of the sharing was still done by gathering around the computer screen (2008:12). As the internet developed and the ability to share increased, the volume of photographs taken and curated by digital camera owners grew exponentially (Van House 2011:128). This could be taken as another instance of archaeologists "drowning in data" wherein British contracting units were struggling with data management and there is the threat of losing good data as we "drown in the sheer volume of the bad" (Backhouse 2006: 49).

Considerations of archaeological photographic practice must engage with the multiplicity of the digital medium and the attending affordances of rapidly shifting technology. Archaeological photography can encompass aerial/kite photography, structure from motion, photogrammetry, RTI, partial and full panoramic photographs, satellite imagery, gigapan, drone photography, time lapse photography, and 3D photographic scanning. Each technology has benefits and limitations; a full assessment of each of these techniques is outside the purview of this article. Though there have been changes in technology, archaeologists still take very formulaic photographs of artifacts, features and buildings. While digital technology allows for more of these photographs to be taken, most archaeologists still do not experiment within the parameters of archival photography (but see Ifantidis 2013; Hamilakis et al. 2009; Morgan 2012; Shanks 1997). This is unsurprising, as clear, well-lit, "clean" photographs, or a "record shot" are still considered a

necessary standard in archaeological recording. The implications of digital media and shifting perceptions of archaeological labor are more discernable in "working" shots that contain people.

Understanding the shift from analog to digital photography in the larger theoretical context of visual and new media studies allows us to meaningfully situate archaeological photography as *metamedia*. Metamedia can be conceived as a media ecology of "larger personal communication that will keep appointments, make calls, take visual notes, check calendars, order from restaurants, find out about sales in neighboring stores, check blood pressure, and tune in to television, radio and personal playlists" (Richin 2009:145). As we venture into the "post-digital" in archaeology, we must understand archaeological photography, not simply as a separate methodology, but as part of a network of personal and professional digital practice (Morgan, in press).

Photographic Practice at Çatalhöyük

To understand changes over time in archaeological visualization, I examined the photographic record from Çatalhöyük, a Neolithic site in central Turkey where archaeological excavations have occurred since the 1960s. James Mellaart investigated Çatalhöyük from 1958-1965, then Ian Hodder from 1993-current day. Recording strategies have changed considerably during the half-century of archaeological investigation at Çatalhöyük. Mellaart led rapid, large areal excavations, employing teams of local men to dig while one or two specialists supervised. This was an excavation strategy that favored discovery of elaborate wall paintings, architecture, and large artifacts. Under Hodder, archaeological investigation at the site involves a "reflexive methodology" wherein archaeologists are instructed to interpret "at the trowel's edge," constructing contextual meanings as they excavate (Hodder 1997) though how this specifically translates into practice has been contested (Farid 2014). Several teams of different nationalities and methodologies excavated parts of the site, and excavation has employed "an impressive array of scientific techniques, digital technologies and analytical tools have been applied within a robust excavation and sampling framework" (Farid 2014: 59).

The strategies for creating the photographic record at Çatalhöyük have also changed over time, reflecting changes to the discipline as a whole. During the 1960s, site photography was performed by the James and Arlette Mellaart, Ian Todd, and a few other visiting archaeologists. For the purposes of this study, I looked primarily at digital copies of the Todd photos taken in 1963. The affordances of analog cameras affected the number of photographs taken, the framing of the photographs, and altered the conditions wherein photographs could be taken. While technological considerations are important, these do not account entirely for the changes in the visual depiction of Çatalhöyük. After Hodder reopened Çatalhöyük in 1993, several different photographic regimes were in place then changed; this rapid turnover can be seen in the photographic archive.

In general, formal archaeological site photography incorporates several imaging technologies and a specialist, disciplined visual practice that is informed by the affordances of these technologies and the historic standards of archaeological site photography. The visual practice employed during archaeological excavation is learned through experience and professionalization (Goodwin 1994). This process of learning how to *see* archaeology, that is,

minute differences in soil texture, color, and composition is then translated to framing a photograph that displays information gleaned from this disciplined visual practice. In particular, excavation at Çatalhöyük requires a substantial investment in experienced archaeological seeing, as it has very complex stratigraphy and the changes in deposition can be extremely subtle. Even so, visual outputs of this professional vision are not necessarily collectively understood; particular photographs need written or verbal annotation to describe the motivation behind taking the photograph.

Additionally, archaeological photographs are not always transparent in meaning upon later review, even to the archaeologist who took the photograph. In order to aid later interpretation, photos still include a scale, an arrow indicating north, and sometimes a photoboard, on which is written the day, the locale, and sometimes the initials of the excavators. Photo registers are often required on site, with the metadata of the photograph written down to accompany the shot for later entry into a database. This technology is shifting as well, with increased digital-only site documentation (Berggren et al. 2015). There are several genres of formal archaeological site photography including overviews, architectural/artifact detail shots, process/excavation or "working" shots, level/surface/context completion shots, and informal personal photography. Formal photographs are then downloaded, tagged with their metadata and sometimes catalogued in a database, while informal photographs are generally excluded from this archive. Informal archaeological photography was not included in this study, but has been discussed in other publications (Morgan *in press*).

Further complicating our analysis of archaeological photography at Çatalhöyük, different teams had different standards of professionalism. At the time of the initial study, the team directed by Shahina Farid employed professional archaeologists, while the other teams on site were mainly staffed by students of varying degrees of expertise (Farid 2015). Additionally, the professional archaeologists were also teaching students, and would encourage them to take record photographs during the course of excavation. To mitigate this inconsistency, I have focused on the photography produced by the Berkeley Archaeology at ÇatalHöyük (BACH) team, and later by Jason Quinlan. The BACH team consisted of students led by Ruth Tringham and Mirjana Stevanović; Ruth Tringham, Michael Ashley, and Jason Quinlan took the majority of the BACH photographs and Quinlan would later become the photographer for the whole site. Quinlan would photograph the more difficult phase shots and detail shots, as well as photographing finds. This is an exception within archaeology, as many sites do not have the budget to employ an exclusive photographer. Most of the photographic recording on archaeological sites is performed by the archaeologists themselves. This is more relevant in the last twenty years, as specialist photographers who do not also excavate or at least have no archaeological training are rare and fieldworkers are expected to incorporate photography into the process of excavation and documentation of the site.

Even with these inconsistencies, Çatalhöyük provides an excellent case study with a photographic record that spans both the change from analog to digital photography and a methodological change to post-processual archaeology, which incorporates a reflexive excavation strategy (Hodder 1997). Additionally, there is a large quantity of images available; by 2014, the Çatalhöyük photographic database held over 100,000 images (Quinlan & Morgan 2014). The site itself has been subject to intensive, repeated mediation and remediation by

hundreds of academics and the changes made regarding current processes of digital documentation at the site have not been considered for this study (but see Berggren et al. 2015). This initial study of the Çatalhöyük archive took place in 2007, with a follow-up study conducted in 2014.

To investigate this archive, I employed quantitative and qualitative methods developed in visual studies (Rose 2001; Pink 2001; van Leeuwen and Jewitt 1996). After an initial rapid review of the materials, I surveyed a stratified sample of the genres of archaeological photography to conduct a content analysis to categorize manifest components of images (Bell 2003). A content analysis seeks to identify commonalities between photographs to elicit comparative categories across data sets. These commonalities are then coded according to type (Figure 2). Ideally for this study, additional researchers would have been available to code the photos, perhaps even a non-archaeologist who might have added insight to the process and test comparability, but this was not the case. Additionally, for the purposes of this study I did not examine "personal" shots of extra-archaeological activity, though they are of deep interest to the social practice and knowledge production of archaeology (Bateman 2005). Likewise, there is not an extended examination of archaeological photography within social media within this limited space (but see Corley 2009; Morgan *in press*).

Letter	**Type**	**Description**
A	Artifact Shot	Close-up photograph of artifact, generally isolated on blank background
E	Excavation Shot	Photographs from any range of excavation process or results
P	Personal Shot	Personal photographs
F	Feature Shot	Photographs of non-moveable objects, such as wall paintings and hearths

(Figure 2: Codes assigned to photographs from the Çatalhöyük archives)

There was a small amount of overlap in these categories, as some of them are obviously co-constitutive, such as artifacts appearing within an excavation shot. After this initial classification, I predicted the following:

1) These photos would reflect a change in technology—there would be more photos in general, and these photos would be better in quality than the older photos.
2) These photos would reflect change in theoretical stance, i.e., the move toward post-processualism in archaeology.

In all, I coded 495 photos and added a simple description to each, then selected 120 of these to look at more closely (Figure 3). The initial stratified sample included photographs taken in 1963, 2000, and 2006.

Photographer	**Year**	**#**	**Photo Subject**
Ian Todd	1963	20	Excavation Process
Ian Todd	1963	20	Artifacts/Features
BACH Team	2000	20	Excavation Process
BACH Team	2000	20	Artifacts/Features

Jason Quinlan	2006	20	Excavation Process
Jason Quinlan	2006	20	Artifacts/Features

(Figure 3: photographs selected for examination, coded by subject)

After this initial content analysis, I added the codes "social distance" and "behavior" to the photos (Figure 4). These categories were devised by Kress and van Leeuwen (1996) for their visual analysis of the magazine *Cleo*. While they used six categories of social distance, ranging from intimate to public, I simplified their approach considerably to "near", "medium" and "far" distances. The second principle drawn from Kress and van Leeuwen was the concept of "behavior" which addresses the gaze of the subject of the photograph. Describing their social, semiotic approach to the analysis of visual material, Carey Jewitt and Rumiko Oyama (2001) emphasize the importance of the point of view or azimuth of the photograph (looking up or down on the subject), the level of engagement with the photographer (eye contact), and the distance between the photographer and the subject as key components in bringing out "hidden messages" in the materials. Again, I simplified the categories described to "eye contact", "no eye contact", and "not applicable." Even with these simplified categories and a limited sample, this method of inter-personal semiosis proved to be a powerful tool for the analysis of archaeological photographs.

Social Distance		**Behavior**	
Letter	Description	Letter	Description
N	The photographer is within ~2 meters of the subject of the photograph	C	The subject of the photo makes eye contact with the photographer
M	The photographer is within ~10 meters of the subject of the photograph	NC	The subject of the photo does not make eye contact with the photographer
F	The photographer is greater than ~10 meters from the subject of the photograph	X	There is not a human subject in the photograph

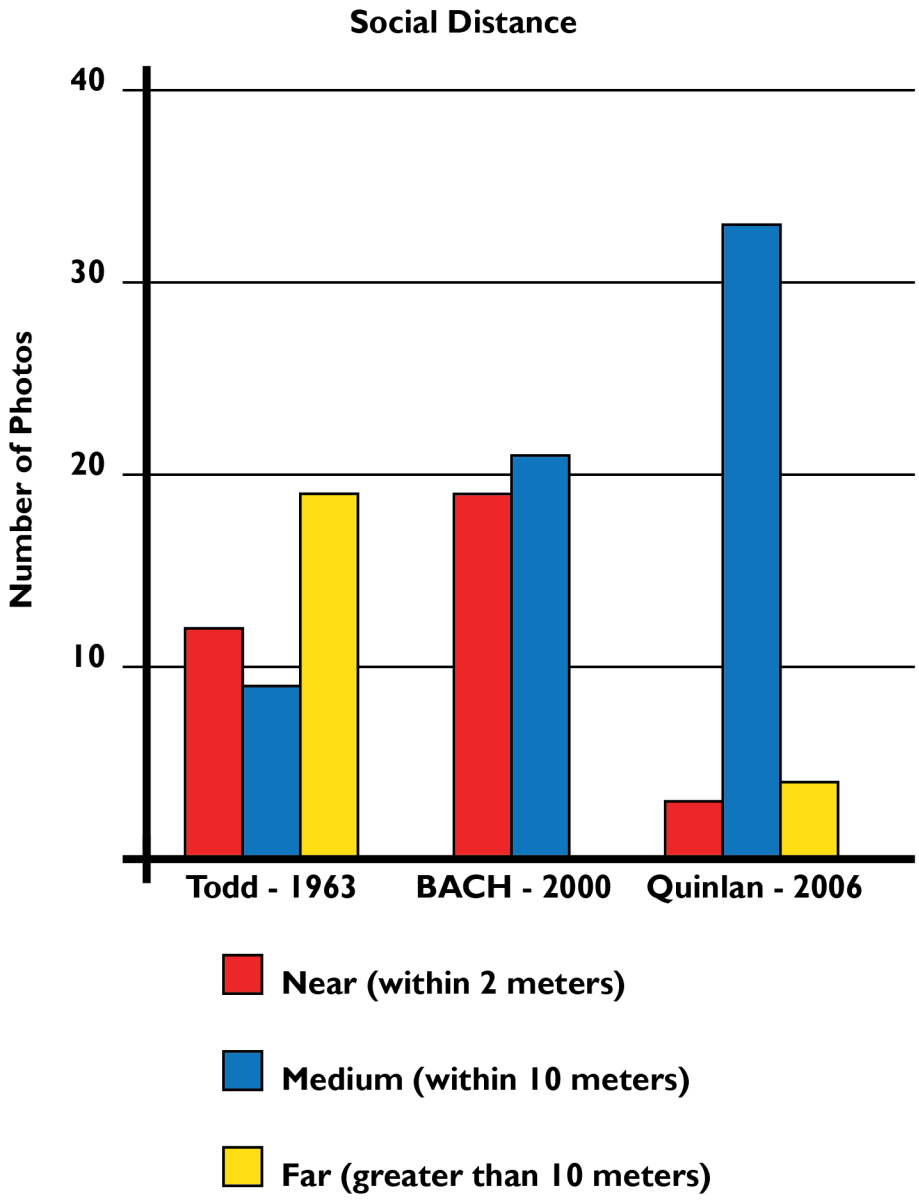
(Figure 4: Semiotic codes assigned to photographs from the Çatalhöyük archives)

(Figure 5: Demonstration of coding strategy of photographs)

Results

In raw numbers, social distance between the photographer and the subject of the photograph decreased over time, with over three times as many shots taken of excavations at a "medium" distance by Quinlan in 2006 as there were in 1963 by Todd (figure 6). The composition, framing and quantity of photographs could be partially attributed to the different technological affordances of analog and digital photography and of the physical conditions on site. Many of the BACH photographs in 2000 were taken within the confines of a tent structure over the excavation, which may explain the paucity of "far" distance photographs. The BACH team discussed the technological affordances of digital photography, noting greater creativity, near-instant access to the images, lower cost and a 240% increase in amount of photographs as they

moved from analog to digital (Tringham et. al 2012). This is also reflected in the 2014 re-hash of this study, wherein a similar increase resulted from the adoption of 3D recording strategies such as structure from motion imaging (Quinlan and Morgan 2014). While there was a rapid increase in number of photographs, these initial digital photographs were considered to be worse in quality than analog photos, with quality measured as usefulness for archaeological explanation or illustrations in reports (Shahina Farid, 2014, personal communication). A later increase in quality occurred gradually between 2000 and 2006, after digital photography became normalized. A parallel decrease in quality came after the widespread adoption of structure from motion imaging (Jason Quinlan, 2014, personal communication).



(Figure 6: Chart of shifting social distance over time)

This quantitative device of measuring framing distance encouraged a closer qualitative look at the photographs as well, which revealed a varied treatment of bodies by the photographers. The photos Todd took of the Turkish workers that Mellaart employed to excavate never came closer than a "medium" distance, and more often they were depicted far away. They were also rarely segmented in the frame, but captured as whole bodies working within the photograph. This separation between the archaeologists framing the photos and workers was also noted in the

Dura-Europos photographic archive (Baird 2011). Measuring "behavior" by noting eye contact with the camera was less conclusive—there were similar amounts of eye contact and no eye contact in Todd and Quinlan's photos, for example. Yet quantifying eye contact also encouraged further consideration of the relationship between the photographer and the subject of the photograph.

(Figure 7) – **Excavators with plastered bull skull mounted in wall, Ian Todd, 1963**

In figure seven, the photographer is looking down on the team of excavators from the edge of the excavation trench, his shadow overlaying one of the workers. The excavators are posed with a plastered bull skull, mounted in one of the walls. Two of the men are pointing toward the skull, and two are regarding the photographer, eyes shaded by their hats. In figure eight, the photograph is again taken from above, with excavators depicted as whole figures, working in tandem while being supervised by the figure on the right. There is a marked social distance between the photographer and his subjects; the workers serve to illustrate the production of the archaeological process and there is no attempt to portray them as individuals.

(Figure 8**: Overview of excavation in progress, Ian Todd, 1963)**

Photographs taken by the BACH Team in 2000 are framed at a close social distance, the photographer working alongside the excavators. The archaeological process is apparent, with tools and clutter remaining in the photo, in contrast to calls for cleanliness in publications about archaeological photography (Figure 9). Photos of important artifacts are repeated several times, with and without photo scales, and from different angles, showing many perspectives of the same subject. Excavators are seen as deeply involved in the surrounding archaeology, yet are almost all segmented bodies, portrayed as either headless or looking away from the camera. The gaze of the archaeologist depicted is not engaged with the camera, but is looking at the "real" subject of the photograph, the archaeological object, and encourages the viewer to follow his or her line of gaze (Figure 10).

Figure 9: Excavators demonstrating a feature, BACH team 2000

(Figure 10**: Excavators unearthing a burial, BACH team, 2000)**

Jason Quinlan's 2006 photography is often taken at an extremely close social distance, showing the faces of the excavators as they work. In Figure 11, Shahina Farid is visibly engaged in conversation with the photographer, even as her photograph is taken. Authorship of the excavation is explicit, with the tools of the excavators in their hands, their faces visible, bits of red wall taken off during excavation (Figure 12) not hidden or swept away, but still in the photograph as evidence of the inevitable destruction of archaeology. The subjects of the photographs are aware of the photography, and are engaged with the photographer, forming an easy dialogue.

(Figure 11 – Shahina Farid discussing a red painted plaster wall, Jason Quinlan, 2006)
(Figure 12: Excavators working on the red plaster wall, Jason Quinlan, 2006)

Conclusions

The shifts in social distance apparent in comparing these three eras of archaeological photography show the photographer's changing relationship with the subjects of the photographs. The photography of Ian Todd depicts the workers as part of the larger milieu, indistinguishable from the landscape of archaeology that surrounds them. The workers act as human scales that add proportion to archaeology. The perspective from the BACH Team emphasizes the constructed nature of archaeology and a multiplicity of voices in the archaeological endeavor. The camera is closely implicated in the scene and the view is primarily that of an archaeologist participating in the ongoing excavations. The excavators and the archaeology are co-constructive, yet the identity of the individual excavating the grave (Figure 9) or holding the photo scale (Figure 8) is not documented. Perhaps the photographer assumed that the person would be known or identified in the archive. Finally, Jason Quinlan has produced thousands of images while working at Çatalhöyük. His ease with the camera and personal relationship with the excavators is apparent in his photography, and each feature is depicted dozens of times, from several angles.

These photographs undoubtedly display a change in technology, as there is a large increase in quantity, but other affordances such as relative quality in terms of resolution, file durability and utility for reexamining the archaeological record is varied. Semiotic analyses introduced from the field of visual studies highlight changing social relationships on site. When the photographer and the subject of the photograph are not equal in the power structure of the site, this can be discerned from the interactions captured by photography. It is difficult to determine how much of a shift to a methodology informed by post-processual theory can be recognized from this particular data set. Each photographer was capturing a different approach to excavation. Mellaart employed local workers to rapidly excavate large areas. The BACH team had unpaid undergraduate and postgraduate students excavating a single structure over many years. The segmented, chaotic photography of the 2000 BACH team may be related to relative inexperience with digital cameras and archaeological photography, rather than a statement regarding transparency of process in leaving tools and other evidence of archaeological work within the frame of the photograph. In 2006, Hodder employed expert field archaeologists; while he employed local workers as well, their participation is limited to non-excavation work such as shifting sandbags and taking samples to the flotation tanks. Quinlan's 2006 photography grew out of his participation on the BACH team and reflects his long-term employment at Çatalhöyük and relationships formed with the excavators.

The questions at the center of this study—the visibility of changing technology and of the shift in theory within the photographic record of an archaeological field site—have been addressed, yet there was an additional, unexpected result from this research. I was not expecting the underlying social dynamics of archaeological research to be so readily revealed within the photographic record. As previously mentioned, Mitchell situates the field of visual studies as an instance of Derrida's 'dangerous supplement,' disrupting traditionally defined disciplines with an ambiguous interdisciplinary stance, indicating an "incompleteness in the internal coherence of aesthetics and art history" and that it "opens both disciplines to outside issues that threaten their boundaries" (2002:167). Research on visual production threatens the disciplinary boundaries of archaeology and reveals structural imbalances, colonialism, and social relationships that can destabilize

archaeological labor practices. In her study of the photographic archive of Dura-Europos, Baird (2011) calls for the creation of alternative histories of archaeology, one that does not rely on photographs that "build a nostalgic atmosphere around a complicated encounter, capitalizing on popular notions of archaeology as exotic adventure" (2011: 443). Bateman (2000) argues that photographs and other media need to be understood as part of a larger visual ecology of knowledge production within archaeology.

Yet while there have been more recent efforts to form a more cohesive understanding of visuality within archaeology (Balm 2016), these tend to incorporate critiques of media made by archaeologists without productively integrating these criticisms into a more critical archaeological methodology. The most profound result of this study has been the change in my own photographic practice on archaeological sites. While working as a trench supervisor and archaeological photographer at Tall Dhiban, an archaeological site in central Jordan in 2009-2010, I found my own lens trained on the subaltern—our workers who lived in the town next to the archaeological site. Rather than treat these workers as convenient props to illustrate the archaeological process, or as part of naturalistic local "color", my analyses of archaeological photography led me to carefully attend the framing of workers on archaeological sites. This required renegotiating individual relationships and a greater understanding of the local context of photography.

(Figure 13) Saleh, a local worker employed at Tall Dhiban, Jordan.

An initial inquiry into visual ethics and human subjects review revealed that it was not required to obtain permission to photograph workers employed by archaeological projects, though perspectives on this are evolving. Though permission was not required, I simply asked before I took a photograph and would show the individual the resulting photograph on the digital camera's LCD screen. Several older men did not want their photograph to be taken at all, and I respected this throughout the field season. Younger men did not like having their photo taken while they were working, but desired posed photos (Figure 13), sometimes together with their cohort of younger men or with the students on the excavation (Morgan 2012). As a result, these photographs were at a close social distance, taken at an azimuth level with their perspective, and did not frame the workers as archaeological set dressing, but sought to draw out their individual experience on site and in the local community. There were several times that I was requested to take a posed photo of friends together, or of the children of the workers.

The cultural context of photography in rural Jordan is very different than in the United States and the United Kingdom; analog photography still has a prominent function as a display of heritage inside the household receiving hall and sepia-toned copies of honored ancestors are available for sale at photo studios (Shryock 1997). Digital photography occupies the space on cellphones and computer screens and is increasingly present in the daily lives of Jordanians; yet some elements such as a performance of the "sullen, 'dangerous' look" prevalent in photos of the honored ancestors persist. As Shryock notes,

"cameras were meant to preserve images of propriety, solemnity, and power. They balked at my attempts to take casual, unposed shots. They insisted on wearing their best clothes, donning a pair of 'scholarly' glasses (sometimes my own), or placing a service of tea or a coffee thermos in

front of them as a sign of hospitality. Only in recent years have people begun to smile at the camera, and many of the older men still meet the lens with an imperious scowl. Photographic representation is, for them, a context in which individuals should present their noblest, most public face" (1997:296).

Similar to Hamilakis et al. (2009), I took several portraits of the local workers and community members, and displayed them alongside other framed prints of the excavation in a photography show in the community hall (Morgan 2012). Repatriating the photographic archaeological record was important to the Dhiban Excavation and Development Project and we made prints of several of the photos to give to community members at the photography show. In addition to the prints, we uploaded the photographs to Flickr, licensed under a Creative Commons Attribution license. In this way, applying a theory-based practice of archaeological photography, one informed by a local understanding of visual representation and in service to public archaeology and outreach reveals the advantage of the de-centering afforded by the "dangerous supplement" of visual studies. Even so, I cannot pretend that my careful negotiation of individual relationships and the local context of photography particularly privileged my understanding of the residents of Dhiban; there are considerable structural issues including deep poverty and power imbalances that eclipse the sensitive use of a digital camera for archaeological recording (Morgan 2012).

This analysis is only a beginning, and only one way to examine archaeological photography. As social science adopts network analyses and as image searches become more nuanced, research on visual representation within archaeological practice can adopt advanced techniques to better understand archaeological knowledge production. These studies are critical; the explosive growth in the creation of visual media for archaeological recording and the subsequent dissemination of these media must not perpetuate visions of archaeology's colonial past. Being aware of perpetuating power imbalances within archaeological photography and attending to modes of interpretation and dissemination preferred by project members and local workers can change other aspects of archaeological practice. It may be that these analyses become much easier through the widespread adoption of social media. It is not difficult to determine who is and who is not tagged in a photograph, and see how archaeologists perform their identity through selfies and hashtags. As such, appreciating a theory-laden practice is not enough; we must transform meaning making in archaeology with emancipatory strategies to adhere to a more inclusive and multivocal vision of archaeological practice. The nuanced use of recording strategies in archaeological methodology and the critical examination of the structuring processes of these media with a broader awareness of visual studies can make full use of the dangerous supplement to shift practice in archaeology.

Acknowledgements

The author would like to thank Nancy Van House for the original inspiration for this paper and the background in visual studies. Thanks are also due to Ruth Tringham and the BACH team for making their photography available for study, and to Jason Quinlan and Shahina Farid for their insights regarding photography and archaeological methodology at Çatalhöyük. This article also benefitted from insightful comments from Jonathan Bateman and two anonymous peer reviewers.

Bibliography

Backhouse, P. (2006). Drowning in Data? Digital data in a British contracting unit. In P. Daly & T.L. Evans (Eds). *Digital Archaeology: Bridging Method and Theory.* London: Routledge. 50-58.

Baird, J. A. (2011). Photographing Dura-Europos, 1928–1937: An Archaeology of the Archive. *American Journal of Archaeology*, *115*, 427–446.

Bateman, J. (2000). Immediate Realities: an anthropology of computer visualisation in archaeology. Internet Archaeology 8. http://dx.doi.org/10.11141/ia.8.6

Bateman, J. (2005). Wearing Juninho's Shirt: Record and Negotiation in Excavation Photographs. In S. Smiles and S. Moser (Eds.) *Envisioning the past: Archaeology and the image*. Malden, MA: Blackwell. 192-203.

Benjamin, W., Arendt, H., & Zohn, H. (1968). *Illuminations*. New York: Harcourt, Brace & World.

Bell, P. (2003). Content analysis of visual images. In Van Leeuwen, T. & Hewitt, C. *The Handbook of Visual Analysis*. London: Sage.

Berggren, Å., Nicolo Dell'Unto, Maurizio Forte, Scott Haddow, Ian Hodder, Justine Issavi, Nicola Lercari, Camilla Mazzucato, Allison Mickel and James S. Taylor (2015). Revisiting reflexive archaeology at Çatalhöyük: integrating digital and 3D technologies at the trowel's edge. *Antiquity*, *89*(344), 433–448.

Bohrer, F. N. (2008). Photography and archaeology: the image as object. In S. Smiles & S. Moser (Eds.) *Envisioning the Past: Archaeology and the Image*. Oxford: Blackwell. 180-191.

Bohrer, F. N. (2011). *Photography and archaeology*. London: Reaktion Books.

Chadha, A. (2002). Visions of discipline Sir Mortimer Wheeler and the archaeological method in India (1944-1948). *Journal of social archaeology,* (2.3), 378-401.

Conlon, V. M. (1973). *Camera Techniques in Archaeology*. John Baker Publishers, London.

Corley, H. (2009). Tagged: Digital Photography and Archaeologists, EVA 2009 London Conference, 6-8 July.

Dechert, P. (1975). Communication, Photography, and the Archaeologist. In *Photography in Archaeological Research*, edited by E. Harp. University of New Mexico Press, Albuquerque.

Dorrell, P. G. (1989). *Photography in archaeology and conservation.* Cambridge: Cambridge University Press.

Earl, G. P. (2008). Video Killed Engaging VR? Computer Visualizations on the TV Screen. In S. Smiles and S. Moser (Eds.) *Envisioning the Past: Archaeology and the Image*. Oxford: Blackwell Publishing Ltd. pp 204- 222.

Farid, S. (2014). Multiple voices in archaeological interpretation at Çatalhöyük. Eds. Chapman, R., & Wylie, A. (2014). *Material Evidence: Learning from Archaeological Practice*. Taylor & Francis.

Gero, J., and Root, D. (1990). Public Presentations and Private Concerns: Archaeology in the Pages of National Geographic. In *The Politics of the Past*. Peter Gathercole and David Lowenthal, (Eds.) Pp. 19-37. London: Unwin Hyman.

Gillings, M. (2005). The real, the virtually real, and the hyperreal: The role of VR in archaeology. In S. Smiles and S. Moser (Eds.), *Envisioning the Past: Archaeology and the Image*, 223-239.

Goodwin, C. (1994). Professional Vision. *American Anthropologist*, *96*(3), 606–633.

Guha, S. (2002). The visual in archaeology: Photographic representation of archaeological practice in British India. *Antiquity,* (76), 93-100.

Hamilakis, Y., Anagnostopoulos, A. & Ifantidis, F. (2009). Postcards from the edge of time: archaeology, photography, archaeological ethnography. *Public Archaeology*, 8, (2-3), 283-309.

Hamilakis, Y. & Ifantidis, F. (2015). The photographic and the archaeological: The 'Other Acropolis'. In Carabott, P., Hamilakis, Y. and E. Papargyriou (Eds), *Camera Graeca: Photographs, Narratives, Materialities*. Ashgate, pp. 133-157.

Harp, E. (1975). *Photography in Archaeological Research*. University of New Mexico Press, Albuquerque.

Hodder, I. (1997). Always momentary, fluid and flexible: Towards a reflexive excavation methodology. *Antiquity*, 71(273), 691-700.

Houk, B. & Moses, B. (1998). Scanning Artifacts: Using a Flatbed Scanner to Image Three-Dimensional Objects, Society for American Archaeology Bulletin, 16(3).

Ifantidis, F. (2013). *Archæographies: Excavating Neolithic Dispilio.* Oxford: Archaeopress.

Jewitt, C. and Oyama, R. (2001). Visual meaning: a social semiotic approach. In C. Jewitt and T. Van Leeuwen (Eds.) *The handbook of visual analysis*. London: Sage Publications Limited. 134-156.

Kress, G. & Van Leeuwen, T. (1996). *Reading Images: The Grammar of Visual Design*. Routledge, London.

Lipkin, J. (2005). *Photography reborn*. New York: Abrams.

Lister, M. (1995). *Introductory Essay in The Photographic Image in Digital Culture*. London: Routledge.

Lister, M. (2004). Photography in the age of electronic imaging. In L. Wells *Photography: a critical introduction*. London: Routledge. pp. 295-336.

Lutz, C., & Collins, J. L. (1993). *Reading National Geographic*. Chicago: University of Chicago Press.

Matthews, S. K. (1968). *Photography in archaeology and art*. London: John Baker.

Mitchell, W.J.T. (1992). *The reconfigured eye: visual truth in the post-photographic era*. Cambridge, Mass: MIT Press.

Mitchell, W. J. T. (2002). Showing seeing: a critique of visual culture. *Journal of visual culture,* (1.2), 165-181.

Morgan, C. (2009). (Re)Building Çatalhöyük: Changing Virtual Reality in Archaeology. *Archaeologies*, 5(3), 468-487.

Morgan, C. (2012). *Emancipatory Digital Archaeology*. Thesis Dissertation, University of California, Berkeley.

Moser, S. (1999). The dilemma of didactic displays. Habitat dioramas, life-groups and reconstructions of the past. In Merriman, N. (ed.) *Making Early Histories in Museums*. London: Frances Pinter, 65-116.

Moser, S. (2009). Archaeological representation: the consumption and creation of the past. In, Cunliffe, B., Gosden, C. and Joyce, R. A. (eds.) *The Oxford Book of Archaeology.* Oxford, UK,Oxford University Press, 1048-1077.

Moser, S. (2010). The devil is in the detail: museum displays and the creation of knowledge. Museum Anthropology, 33(1), Spring Issue, 22-32.

Moser, S. (2012). Archaeological visualisation: early artifact illustration and the birth of the archaeological image. In Hodder, I. (ed.) *Archaeological Theory Today, 2nd Edition*. Chichester: Polity Press, 292-322.

Moser, S. (2014). Making expert knowledge through the image: antiquarian images and early modern scientific illustration. Isis, 105, (1), 58-99.

Moser, S. & Gamble, C. (1997). Revolutionary images: the iconic vocabulary for representing human antiquity. In, Molyneaux, B. (ed.) The Cultural Life of Images: Visual Representation in Archaeology.London, GB, Routledge, 184-218.

Perry, S. (2009). Fractured media: Challenging the dimensions of archaeology's typical visual modes of engagement. *Archaeologies,* 5(3), 389-415.

Perry, S. (2013). Archaeological visualisation and the manifestation of the discipline: Model-making at the Institute of Archaeology, London in Archaeology after Interpretation: Returning Materials to Archaeological Theory, Eds. Alberti, B., Jones, A.M., Pollard, J., pp 281-303.

Perry, S. & Johnson, M. (2014). Reconstruction art and disciplinary practice: Alan Sorrell and the negotiation of the archaeological record, The Antiquaries Journal, 94, pp 1-30.

Pink, S. (2001). *Doing visual ethnography: Images, media, and representation in research.* London: Sage Publications.

Piccini, A. (1996). Filming through the mists of time: Celtic constructions and the documentary. *Current anthropology*, (37.1), 87-111.

Piccini, A. (2007). Faking it: why the truth is so important for TV archaeology. In T. Clack and M. Brittain (Eds) *Archaeology and the Media*. Walnut Creek : Left Coast Press. 221-236.

Quinlan, J. & Morgan, C. (2014). Fifty Years of Visualization at Çatalhöyük. Poster session presented at the European Association of Archaeologists, Istanbul, Turkey.

Ritchin, F. (2009). *After Photography*. New York: W.W. Norton.

Rose, G. (2001). *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*. London: Sage.

Rosler, M. (1991). Image Simulations, Computer Simulations: Some Considerations. *Digital Dialogues: Photography in the Age of Cyberspace,* (2.2), 52–63.

Rubinstein, D., & Sluis, K. (2008). A Life More Photographic. *Photographies*, (1.1), 9-28.

Shanks, M. (1997). Photography and Archaeology. In Brian Molyneaux (Ed.), *The Cultural Life of Images*: *Visual representation in archaeology.* New York: Routledge. 73-107.

Shanks, M., & Svabo, C. (2013). Archaeology and photography: A pragmatology. In A. González-Ruibal (Ed.), *Reclaiming archaeology: Beyond the tropes of modernity* (pp. 89-102). New York: Routledge.

Shepherd, N. (2003). `When the hand that holds the trowel is black...': Disciplinary practices of self-representation and the issue of `native' labour in archaeology. *Journal of Social Archaeology*, *3*(3), 334-352.

Shryock, A. (1997). *Nationalism and the genealogical imagination: Oral history and textual authority in tribal Jordan*. Berkeley: University of California Press.

Simmons, H. C. (1969). *Archaeological Photography*. New York University Press, New York.

Stephen, J. W., & Morgan, C. (2014). Faces of archaeology: A photographic portrait study from the seventh world archaeological congress. *Archaeologies*, *10*(2), 194-206.

Stern, T. (2007). 'Worldwonders' and 'Wonderworlds': A Festival of Archaeological Film. In Clack, T., & Brittain, M. (Eds.). *Archaeology and the Media.* Walnut Creek, CA: Left Coast Press. 201-220.

Swain, H. (1997). Mirroring reality? Images of archaeologists. The Archaeologist 30: 16–17.

Taylor, T. (2007). Screening biases: Archaeology, television, and the banal. In Clack, T. & Brittain, M. (Eds). *Archaeology and the media*, 187-195.

Thomas, J. (2004). *Archaeology and Modernity*. London: Routledge.

Thornton, A. & Perry, S. (2009-2011). Collection and Production: The History of the Institute of Archaeology Through Photography, Archaeology International No. 13/14: 101-107.

Tringham, R. (2009). Making the Most of the Medium of Film to Create Alternative Narratives about the Past and its Investigation. Paper presented at the conference *Archéologie Et Médias Quelles Représentations, Quels Enjeux*? Brussels.

Tringham, R., Ashley, M., & Quinlan, J. (2012). Creating and Archiving the Media Database and Documentation of the Excavation. In R. Tringham and M. Stevanović (Eds) *House Lives: Building, Inhabiting, Excavating a House at Çatalhöyük, Turkey: Reports from the BACH Area, Çatalhöyük, 1997-2003.* Los Angeles: Cotsen Institute of Archaeology. 31-48.

Van Dyke, R. M. (2006). Seeing the past: Visual media in archaeology. *American Anthropologist*, *108*(2), 370-375.

Van House, N. A. (2011). Personal photography, digital technologies and the uses of the visual. *Visual Studies*, (26.2), 125-134.

Watterson, A. (2015). Beyond Digital Dwelling: Re-thinking Interpretive Visualisation in Archaeology. *Open Archaeology*, *1*(1), 119–130.

Wheatley, D. (2011). High dynamic range imaging for archaeological recording. *Journal of Archaeological Method and Theory*, 18(3), pp. 256-271.

Witcomb, A. (2007). 2008, The Materiality of Virtual Technologies: A New Approach to Thinking about the Impact of Multimedia in Museums, in *New Heritage: New Media and Cultural Heritage*, London and New York, Routledge-Taylor and Francis Group, pp. 34-48

Witmore, C. (2007). Symmetrical archaeology: excerpts of a manifesto. *World Archaeology,* (39.4), 546- 562.