

Chapter 1

Cyber-archaeology and Grand Narratives: Where Do We Currently Stand?

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Introduction

The digital “data avalanche” in archaeology is a result of the relatively inexpensive plethora of digital data capture tools (digital cameras, GPS units, mobile phones, laptop computers, external hard drives, drones, and more) that are rapidly becoming part of the archaeologist’s toolbox. How do field archaeologists and their teams grapple with the exponential growth in using these digital tools for effective research? The adoption of digital methodologies by these researchers has led to the emergence of a new subfield that may be called “cyber-archaeology” (see below). This volume brings together contributions by a number of authors exploring the potential of cyber-archaeology in the Middle East to answer large-scale research questions of anthropological and historical concern. In this sense, this volume is not about the most effective methods for curating digital cultural heritage data or developing the next best program for a Web-based database for archaeological field research. Instead, it demonstrates how archaeologists working in a variety of countries in the eastern Mediterranean—primarily Israel, Jordan, and neighboring countries—apply cyber-archaeology methods to help create “grand narratives” to explain what happened in the past in one of the world’s most complex historical and cultural regions.

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Cyber-archaeology

In this volume, the term “cyber-archaeology” is defined, following Levy (2013: 28), as “the integration of the latest developments in computer science, engineering, science, and archaeology” (see also Levy et al. 2012). This use of the term is different from that of Forte (2010, 2016), who envisions cyber-archaeology as a Deleuzian revision of “virtual archaeology” (Forte and Siliotti 1997), aimed primarily at simulating “a potential past” in a 3D “cyber-environment” (Forte 2011: 8). Instead, cyber-archaeology is used in a broader sense here, closer to the more general term “digital archaeology” (see Averett et al. 2016; Evans and Daly 2006; Kansa et al. 2011; Levy et al. 2001; Levy and Smith 2007). Cyber-archaeology is a preferable term in the context of this volume, however, because it emerged as a way of describing collaborative efforts between digital archaeologists and computer scientists to develop cyberinfrastructure for archaeology (Levy et al. 2010), with cyberinfrastructure, in this case, referring to linked regional archaeological databases (see also Kansa and Kansa 2011; Kintigh 2006; Snow et al. 2006). This effort led to the creation of the Mediterranean Archaeology Network (MedArchNet; Savage and Levy 2014b) and, in particular, its active Levantine node, the Digital Archaeological Atlas of the Holy Land (DAAHL; Savage and Levy 2014a) with Stephen Savage. In short, cyber-archaeology emphasizes digital data acquisition, curation with Web-based cyberinfrastructure (Fig. 1.1; cf. Levy 2013), analyses and dissemination over the Internet, and access across more protected high-speed fiber-optic networks and in 3D visualization platforms.

In recent years, digital and cyber-archaeology have become robust, interdisciplinary fields concerned with collecting, curating, and displaying data at all points of the archaeological research process. Much attention, naturally, has been given to the recovery and management of archaeological data in the field and laboratory (e.g., Averett et al. 2016; Berggren et al. 2015; Cascalheira et al. 2014; Fee et al. 2013; Gidding et al. 2013; Levy et al. 2001; Roosevelt et al. 2015; Smith and Levy 2014a, 2014b; Vincent et al. 2014). As tablet computers, handheld computers, and smartphones have become increasingly powerful and affordable, they have also become standard parts of archaeologists’ field toolkits, and a body of literature has developed around how best to integrate these devices into field and laboratory workflows. This a recurrent theme among the chapters in this volume, as well—in particular Howland (Chap. 2), Maeir (Chap. 3), McKinney and Shai (Chap. 4), Cabrelles, Blanco-Pons, Carrión-Ruiz, and Lerma (Chap. 5), and Levy et al. (Chap. 9)—as the shift to digital recording practices no doubt affects the way archaeologists interpret a site (Huggett 2015: 89–90), and the types of data being recorded have implications for the types of questions that can later be asked.

Another key consideration, however, is the management of the rapidly increasing quantities of digital data being generated—a problem that has been referred to as archaeology’s “data avalanche” (Levy et al. 2010; Petrovic et al. 2011)—particularly given the instability of many digital storage solutions (Jeffrey 2012), as well as the dissemination of these data, for which traditional publication is often inadequate

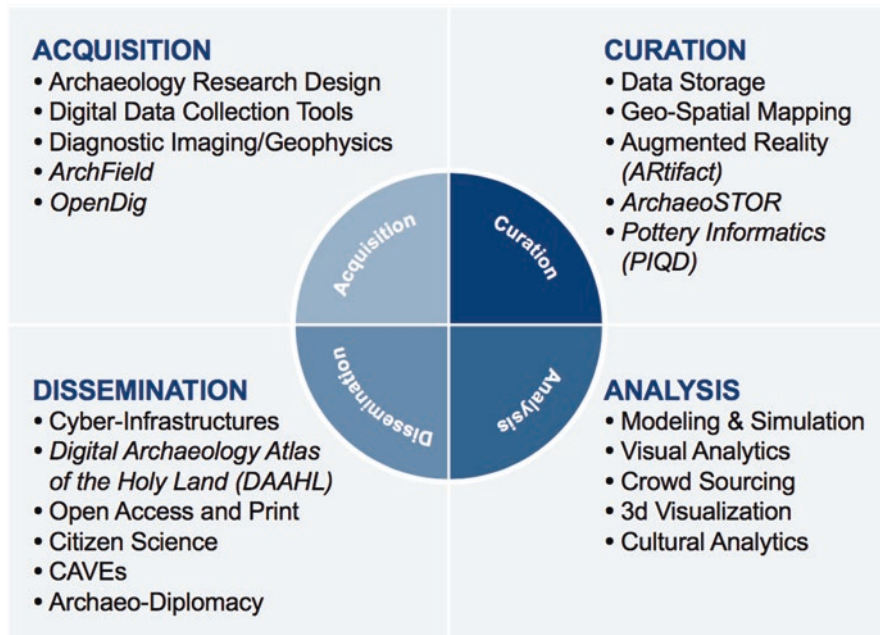


Fig. 1.1 A chart representing the UC San Diego Center for Cyber-Archaeology and Sustainability workflow (after Levy 2013)

(see Kansa and Kansa 2013; Kansa et al. 2014). A number of potential solutions to these problems have emerged, including regional site databases, such as MedArchNet, discussed above; state site inventories, such as the Middle Eastern Geodatabase for Antiquities (MEGA) project (Myers and Dalgity 2012; Palumbo 2012); and larger, worldwide databases archiving a wider range of archaeological data, such as the Digital Archaeological Record (tDAR; Kintigh and Altschul 2010; McManamon and Kintigh 2010), Open Context (Kansa et al. 2007; Kansa 2010; Kansa and Kansa 2011), and the Online Cultural and Historical Research Environment (OCHRE; Schloen and Schloen 2012). These projects represent an important step toward a culture of data sharing that will allow archaeologists to ask large-scale questions.

Several problems become evident when attempting to link data from numerous projects and regions in this way, however. First, how do practices of data collection and the types of data that are shared affect potential analyses? Shott (2014: 3), for example, notes that despite the proliferation of 3D imaging technologies, 2D documentation has remained the norm in lithic studies. Even if 3D models are freely shared, can these be easily analyzed alongside 2D data? More generally, even if data collected using new methods and “legacy” data can be stored together, can they be analyzed alongside one another? While certainly dependent on the analysis and the types of data on which it is conducted, in at least some cases the answer seems to be

yes. Smith et al. (2012), for example, have developed a method for analyzing mixed datasets made up of 3D scans and digitized 2D illustrations of ceramics in MATLAB. This is also being addressed at the level of individual projects, as long-term excavations increasingly involve the integration of digital data being collected now with legacy data collected during earlier seasons. Berggren et al.'s (2015) recent work at Çatalhöyük is particularly interesting in this respect, as those excavations have been conducted over the course of more than two decades. Researchers at UC San Diego have also been exploring methods for presenting a combination of cutting-edge and legacy data to the public, e.g., Srour et al.'s (2015) use of the MediaCommons Framework to engage in “scientific storytelling” about archaeological data during the *EX3: Exodus, Cyber-Archaeology and the Future* exhibition. This effort has been expanded as part of the University of California Office of the President's hallmark Catalyst Project, spearheaded by the UC San Diego Center for Cyber-Archaeology and Sustainability, which aims to establish an archaeological cyberinfrastructure across UC campuses, beginning with the installation of 3D kiosks, called CAVEkiosks, in UC libraries, allowing the public to access 3D data collected by UC-based excavation projects (see Lercari et al. 2016). For imagery, whether of artifacts or site features, the prospects for integrating cutting-edge and legacy data look increasingly good.

For other types of artifact data, there is a second problem: standardization. Kansa and Kansa (2013) encapsulate this problem in their title, drawn from an interview with an archaeologist: “We all know that a 14 is a sheep.” Methods for recording data are often idiosyncratic, which makes data sharing and the development of cyberinfrastructure difficult. This is not a new problem in digital archaeology. Indeed, it has been a concern for the discipline since its earliest days, dating back to the Ban Chiang Project's use of a punchcard-based IBM System/370 mainframe in the late 1970s and early 1980s (Hastings 1982) and even earlier experiments with “computer archaeology” in the 1950s and 1960s (Chenhall 1967; Cowgill 1967; Gardin 1958; Gardin 1967). Kansa and Kansa (2013: 89) suggest that the solution is a “model of ‘data sharing as publication,’” where archaeologists assume that other researchers will have access to their data and adhere to certain standards in order to facilitate use beyond a single lab. This model of publication has the potential to encourage sharing of data that might otherwise remain unpublished (E. C. Kansa et al. 2010), and this model of standardization has been identified as one key advantage of Open Context for academic archaeologists (Sheehan 2015: 208).

For certain types of data, where most researchers agree upon standards, this is an excellent solution. It is not surprising, in this respect, that many of the studies that have been conducted using Open Context have focused on faunal data (Arbuckle et al. 2014; Kansa et al. 2014; Kansa and MacKinnon 2014; Kansa 2015). Even in these cases, problems with legacy datasets have been noted (Atici et al. 2013). For other types of data, this problem is more difficult to resolve. Labrador (2012: 241–241), following Bowker (2000a: 653), notes the problem of

“local data cultures’ ... wherein point typologies for the same region may use differing terms depending upon author, locale, or whim.” Snow et al. (2006: 958) identify the same problem for a variety of project data: “Data classifications and terminology vary, are regionally and temporally specific, and are inconsistently applied.” This is particularly the case for spatial data, which is a key focus for several of the authors in this volume, including Fall, Soto-Berelov, Ridder, and Falconer (Chap. 6), Haiman (Chap. 7), and Keinan-Schoonbaert (Chap. 8). The same period may be glossed by different terms in different regions, but even more problematically, the same term may be used to refer to different periods. As an example, in Anatolia, the term “Late Byzantine” refers to a period up to 1000 years later than the period glossed by the same term in the southern Levant (Jones et al. 2014: 174). While some of these issues can be resolved by adopting different metadata standards—for example, the use of “fuzzy dates” in spatial databases (Belussi and Migliorini 2014), in addition to or as a replacement for regionally specific temporal terms—the ideal solution is unclear. Bowker (2000b) suggested nearly 20 years ago, in the context of biodiversity studies, that forcing the issue of standardization might be misguided, and that analysts should account for variation due to “local data cultures,” rather than trying to eliminate this variation. In the context of the development of archaeological cyberinfrastructure, Huggett (2012) and Dallas (2015) have more recently argued that standards are necessary, but must be developed with the practices of archaeological data collection and curation in mind, and even then are unlikely to ever be truly satisfactory. One attractive solution is Labrador’s (2012: 241) suggestion that multiple tags could be given to data in addition to standardized metadata, which could also have the added benefit of making this data more open for use in public archaeology and crowdsourcing projects (Lake 2012; for an example of this type of project, see Lin et al. 2014). Many of the authors in this volume take a pragmatic approach—one also recently used by Bradbury et al. (2016) for mortuary data—developing regional databases to fit the needs of a particular project or analysis. As archaeological cyberinfrastructure continues to develop, however, these databases can be linked and the methods used in the projects described in this volume applied to increasingly large and complex datasets.

The third problem relates to the reliability of the disparate datasets brought together into larger databases. One of the primary uses of spatial databases is the analysis of settlement patterns and particularly changes in settlement patterns over time (Kowalewski 2008). These studies are inherently limited by the quality and reliability of available data. Answering questions about sociopolitical organization and site hierarchy often requires the use of site size estimates, but these estimates can vary considerably depending on the methodology and criteria used (for an example of this, see Iacovou 2007: 6–7). At an even more basic level, the reconstruction of any settlement pattern is dependent not only on survey methodology and quality but on the reliability of the underlying chronological indicators and particularly regional ceramic typologies.



Fig. 1.2 Map of site distributions for six periods from the Digital Archaeological Atlas of the Holy Land (DAAHL). (a) Sites attributed to the Fatimid period (970–1099 AD); (b) sites attributed to the Crusader period (1099–1291 AD); (c) sites attributed to the Ayyubid period (1187–ca. 1260 AD); (d) sites attributed to the Mamluk period (ca. 1260–1516 AD); (e) sites attributed to the Ayyubid/Mamluk period (1187–1516 AD); (f) sites attributed to the Middle Islamic period (1000–1400 AD). Data: DAAHL (<http://daahl.ucsd.edu>)

A Brief Example

Considering an example from the *Digital Archaeological Atlas of the Holy Land* (DAAHL) will illustrate this point (Fig. 1.2). Figure 1.2 shows six distribution maps for sites listed in the DAAHL. The first four represent periods in a dynastic chronology: the Fatimid (Fig. 1.2a; 970–1099 AD), Crusader (Fig. 1.2b; 1099–1291 AD), Ayyubid (Fig. 1.2c; 1187–ca. 1260 AD), and Mamluk (Fig. 1.2d; ca. 1260–1516 AD) periods. The remaining two represent broader periods: the “Ayyubid/Mamluk” period (Fig. 1.2e; 1187–1516 AD)—a term once commonly used on surveys due to the difficulty of dating the common handmade ceramics of these periods (Walker 1999: 207)—and the Middle Islamic period (Fig. 1.2f; 1000–1400 AD).

The first four maps appear to show fairly major geographic shifts in site concentration, with a gradual increase in the number of sites from a trough during the Fatimid period to a peak in the Mamluk period. Several problems with this data complicate this picture, however. Schick (1997: 81–82) noted the difficulty of distinguishing Fatimid ceramics from those of earlier and later periods, particularly in southern Jordan. While the situation has improved somewhat since the publication of that article, this remains a problem—again, particularly in southern Jordan—and has no doubt affected many of the older surveys entered into the DAAHL.

The Crusader period map is likely more accurate, but does not represent the same period throughout the entire map. While the Crusaders entered Jerusalem in 1099 AD, the Crusader settlements in southern Jordan were not established until at least 1115 (Mayer 1987: 199). Likewise, while the Crusaders were ousted from Jordan in 1189 AD, they were able to reconquer Acre and much of coastal Israel in 1191, and did not lose these holdings until 1291 (Boas 1998: 141). The lack of Ayyubid period settlements in northwestern Israel, then, is not due to a decrease in settlement in this region after the late twelfth century, but instead to differences in dynastic chronological terms (see also Jones et al. 2014: Fig. 12.69).

The similarity of the Ayyubid and “Ayyubid/Mamluk” settlement patterns in Jordan is also suspect, particularly given the historical difficulty of separating Ayyubid and Mamluk ceramics—a problem now largely resolved—which made the identification of distinct Ayyubid period occupations difficult to identify (Walker 1999: 211, 219). While many of these sites were without doubt occupied in the Ayyubid period, the similarity of Figs. 1.2c and e, particularly compared to Fig. 1.2d, suggests that many sites dated “Ayyubid/Mamluk” on survey have also been entered into the DAAHL as Ayyubid. All Ayyubid/Mamluk sites listed for the Archaeological Survey of the Karak Plateau (Miller 1991), Wadi al-Hasa Survey (MacDonald 1988), and Edom Survey (Hart and Falkner 1985), to give several examples, have also been entered into the DAAHL as Ayyubid sites, despite the fact that none of these surveys distinguished between these two periods.

This may also explain the apparent decrease in settlement in these survey areas, particularly central Jordan, during the Mamluk period, as these Ayyubid/Mamluk sites have also been entered as Ayyubid, but not as Mamluk. While the sharp increase in Mamluk period settlement on the coast is due, as mentioned above, to the length of the Crusader settlement there, in other regions this may be related to surveyors using the term “Mamluk” to refer to the entire Middle Islamic period. This is particularly likely for the Golan Heights and Jerusalem region, which were both without doubt settled during the Ayyubid period.

The most interesting maps are Figs. 1.2e and f, which show broader, nondynastic periods. Sites identified as Ayyubid/Mamluk are limited almost entirely to modern Jordan, reflecting regional practices in archaeological survey and terminology. Most problematically, the map of Middle Islamic period settlement, which should include most of the sites from the other maps, instead shows only two small clusters, which suggests that this term is only used in the database for a small number of surveys that have adopted a nondynastic chronology. It is also worth noting the absence, on

all of these maps, of sites in the West Bank, an issue discussed by Keinan-Schoonbaert (Chap. 8).

These issues would make it difficult to accurately discuss settlement pattern changes in the first half of the second millennium AD without first revisiting much of the underlying data and perhaps even reanalyzing some of the material from these surveys in person. This is not a specific critique of the DAAHL. Walker (2011: 162–163, 175, Figs. 1–2) has made a similar argument about the apparent decrease in settlement during the Ottoman period (1516–1918 AD) seen in the Jordan Antiquities Database and Information System (JADIS), the predecessor to MEGA-Jordan, mentioned above, and these are only two of many examples. Any archaeological database or cyberinfrastructure bringing together legacy data from many projects will reveal inconsistencies in how the data was collected and described. These projects are still quite worthwhile, but the limitations described above place constraints on the types of questions that can be productively asked of the data. While the chronological resolution of the data in the DAAHL poses problems for identifying settlement pattern shifts during the early second millennium AD, with some manipulation the data could be used to investigate shifts on longer, coarser timescales.

Grand Narratives and Theory

It has often been noted, both by archaeologists (e.g., Sherratt 1995: 1) and scholars in related disciplines (e.g., Braudel 1970: 149), that a key advantage of archaeology is its ability to reconstruct human history on long timescales. Because of this, archaeology is uniquely placed to address questions concerning “grand narratives” of human history, defined by Andrew Sherratt (1995: 1) as “a sense of the architecture of the human past, why parts of it are different from others, and how they all fit together.” Levy (2006) has suggested a view of grand narratives as explanations of long-term change and draws on Childean concepts such as technological stages (Childe 1944), e.g., the Stone Age, the Bronze Age, and the Iron Age, and technological revolutions, e.g., the Neolithic Revolution, the Urban Revolution (Childe 1950), and the Secondary Products Revolution (Sherratt 1983), to define them. Grand narratives explain specific, durable shifts in technology, economy, and socio-political organization. In this sense, grand narrative explanations are similar to Sewell’s (1996: 843) “events,” which he defines as “sequences of occurrences that result in transformations of structures.” Sewell’s conception of the “event” has, within the last decade, seen some adoption in archaeology (Bolender 2010), but this usage is also paralleled in Childe’s (1952: 1) later work on technological revolutions, demonstrating that archaeology is well suited to this scale of analysis.

This was, however, challenged by the postmodern turn in the social sciences and humanities. Lyotard (1984: xxiv), for example, “define[d] *postmodern* as incredulity toward metanarratives” or grand narratives (see also Rosenau 1992: 85). While the place of Marxian—and, by extension, Childean—thinking was debated among

scholars with differing views of postmodernism, Marxism was generally viewed with some skepticism, particularly due to its reliance on grand narratives (Rosenau 1992: 160–164). In archaeology’s post-modern school—post-processualism—this played out similarly. While works exploring long-term approaches were published even during the height of post-processualism (e.g., Bintliff 1991; Hodder 1987; Knapp 1992), these were generally exceptions to the overall trend, and, by 1995, Sherratt (1995: 4) was lamenting “[t]he current lack of thinking about the large scale and long term” and calling for a revival of grand narratives.

At the turn of the millennium, the development of post-Braudelian thought in a number of disciplines—whether in the form of revisitations of Braudel’s Mediterranean, as in Horden and Purcell’s (2000) influential *The Corrupting Sea*, or rapprochement with postmodernism (e.g., De Landa 1997)—revived interest in long-term thinking. In archaeology, the past decade has seen the publication of a number of volumes exploring long-term narratives of human history and theorizing archaeological conceptions of timescales (e.g., Bolender 2010; Emberling 2016; Lucas 2005; Robb and Pauketat 2013). This has especially been the case for the eastern Mediterranean. In addition to a recent edited volume (Concannon and Mazurek 2016) explicitly engaging Horden and Purcell’s (2000) work, scholars have proposed several other approaches to the long term, including “global moments” (Manger and LaBianca 2009), a concept recalling Sewell’s “events”; LaBianca’s (2007) revival of Redfield’s (1955) “great and little traditions” framework, with the persistence of local “little traditions” over time proposed as an alternative to Braudelian approaches to the *longue durée*; and “grand narratives” of social and technological change (Levy 2006).

This revival of interest in long-term change and grand narratives has been quite productive. As Hodder (2000: 21) has pointed out, however, “archaeological understanding of the long term is built up from traces of the smallest and least significant of acts.” Answering questions concerning long-term change requires access to a range of data beyond the level of individual projects. Given the revival of interest in grand narratives and long-term change, and the increasing success with which cyber-archaeologists are integrating disparate datasets into regional databases and cyberinfrastructure, it is appropriate to ask explicitly what contributions cyber-archaeology can make to the study of grand narratives, and what barriers still remain to be overcome. The chapters in this volume are dedicated primarily to this task, and can be broadly divided into three categories.

3D Recording and Documentation

Two of the chapters in this volume explore the potential contributions of the “subtle revolution” (Shott 2014) of 3D recording in archaeology to grand narratives. Howland (Chap. 2) provides a welcome critical review of common 3D recording techniques, including aerial and terrestrial laser scanning and image-based modeling. Although he takes a skeptical approach to the question of whether these

techniques provide “style without substance,” he ends on a “cautiously optimistic” note, arguing that these technologies do, in fact, have the ability to contribute to grand narratives of social change.

Cabrelles, Blanco-Pons, Carrión-Ruiz, and Lerma (Chap. 5) focus instead on a specific example: the documentation of Djinn Block No. 9, a Nabataean monument in the Petra Archaeological Park in southern Jordan. They describe the impressive range of 2D and 3D recording techniques that they have applied to the monument, as well as a smartphone app they have developed to disseminate this data to visitors at Petra. They argue that this type of dissemination allows tourists at Petra to engage with archaeological narratives through “self-learning” and that the tourists’ feedback on the app can provide information to archaeologists and site managers as to how visitors to the site interact and engage with this data as they explore the park.

Excavation Recording and Documentation

Two of the chapters in this volume address the adoption of cyber-archaeology to record excavation at large, multiperiod sites. Maeir (Chap. 3) describes the integration of microarchaeology and macroarchaeology at Tell es-Safi in the Shephelah, or foothills, of central Israel. The adoption of microarchaeological techniques allows archaeologists working at the site to identify what are without doubt the “traces of the smallest and least significant of acts” (Hodder 2000: 21), and this, combined with precise macroarchaeological and dating techniques, provides a robust database for understanding changes in how the site was used over time.

McKinny and Shai (Chap. 4) describe the adoption of a specific digital tool, PlanGrid, to record excavations at Tel Burna, another site in the Shephelah, ca. 8 km southeast of Tell es-Safi. Some projects have developed purpose-built excavation recording software, e.g., the Edom Lowlands Regional Archaeology Project’s ArchField program (Smith and Levy 2014a, 2014b), which has successfully been implemented on a number of excavations in southern Jordan and recently in Greece (Sideris et al. 2017). At Tel Burna, however, McKinny and Shai have adapted a program designed for a different task. PlanGrid was originally developed as a tool for construction workers, but McKinny and Shai describe using it “in ways ... not intended,” as a replacement for traditional paper forms. They describe their successful integration of PlanGrid into the archaeological workflow at Tel Burna, and end their chapter by stating their plans to store the data they have collected using PlanGrid in the Codifi database. Codifi’s adherence to linked open data standards (Prins et al. 2014: 196) makes this especially promising, as this ensures that the data can be easily integrated into larger databases.

A third, Levy et al. (Chap. 9), instead takes a transdisciplinary, cyber-archaeological approach to regional archaeology, focusing on the Antikyra Bay region in eastern Phokis, Greece, on the northern Gulf of Corinth. Their research integrates excavation and geophysical survey of a Mycenaean tomb at Kastrouli with marine archaeology in the bay itself, investigating how coastal zones provide

ideal sediment and cultural “traps” for studies of historical ecology and the roles played by exchange, climate, and environmental change in long-term cultural change. The transdisciplinary team included experts in archaeometry, archaeology, terrestrial and marine geophysics, paleo-marine biology, geomorphology, and more. This approach is linked to broader issues in Mediterranean archaeology, such as the Late Bronze Age collapse of civilizations including the Hittites in Anatolia, New Kingdom Egypt, and the Mycenaeans in Greece, the importance of which has recently been stressed by Cline (2014). They explicitly take up the challenge of Thomas F. Tartaron (2013) to develop methodologies and carry out research concerning the identification and analyses of longneglected “Mycenaean coastal worlds,” focusing on local interaction between Late Bronze Age settlements and their anchorages. This project should become a model for the integration of cyber-archaeology and marine archaeology in coastal studies around the Mediterranean basin.

Surveys and Databases

The three remaining chapters are concerned with the collection, compilation, and management of data at the regional level. Fall, Soto-Berelov, Ridder, and Falconer (Chap. 6) present the results of a project modeling patterns of vegetation between 5500 and 3000 BP, roughly corresponding to the Bronze Age, in the Jordan Valley and surrounding areas. This project directly explores the Childean grand narrative of the Urban Revolution. Using a database of almost 1700 points at which plant species were observed and recorded, they argue that the formation of towns at the beginning of the Early and Middle Bronze Ages correspond to “sudden shifts in vegetation,” while the collapses at the end of the Early and Late Bronze Ages were instead the result of longer-term trends. Their study demonstrates the great potential of GIS and statistical modeling software to provide a more nuanced picture of how grand narratives play out.

Haiman (Chap. 7) considers issues with the recording and management of survey data, using Byzantine (fourth to early seventh centuries AD) and Early Islamic (seventh to tenth centuries AD) period agricultural sites in the Negev of southern Israel as examples. He argues that the common method of entering sites as “points” in databases obscures information about their associated features necessary for evaluating changes in agricultural landscape use over time, echoing McCoy and Ladefoged’s (2009: 280) concerns about the inability of many databases to adequately deal with data from “siteless” surveys. This is the motivation for this Ancient Desert Agriculture Systems Revived and Mapping Agricultural Systems Projects, which have the goal of recording high-resolution spatial data at sites previously recorded only as points in order to investigate shifts in patterns of land use in the Negev between the fourth and tenth centuries AD.

Keinan-Schoonbaert (Chap. 8) discusses the compilation of the West Bank and East Jerusalem Archaeological Database, which documents Israeli archaeological

activities in the West Bank between 1967 and 2007. While the database is the most complete archive of these sites, its creation highlighted many issues familiar from the discussion of the DAAHL, mentioned above. Much of the data was difficult to find, some of it remains unpublished, and different sources occasionally had contradictory data. Additionally, the data reveals the biases of the surveyors who were primarily interested in Bronze Age-Roman period sites; the Paleolithic-Neolithic and Islamic periods were generally not a focus, and this is represented in the data. The political issues lurking in this chapter, particularly concerning Israeli archaeologists working in the occupied territories and the lack of recognition of the Green Line by some of these researchers, likewise highlight the importance of and controversies surrounding heritage in the present, and force consideration of whose grand narratives are being told.

Conclusion

Overall, the contributors to this volume make a compelling, if occasionally cautious, case for the ability of cyber-archaeology to contribute to the revival of grand narratives. The limitations of new techniques and the problems of disparate legacy datasets must, of course, be kept in mind. Recognizing these limitations should not, however, prevent archaeologists from using innovative technologies and large databases to ask questions about sociopolitical and technological change on a large scale and in the long term. The chapters in this volume demonstrate that it is possible to ask new questions of old data and show a concern with data standardization and openness that promises to make addressing large-scale questions increasingly easy in the future.

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