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Caribbean Heritage in 3D

New Heritage and Historical Archaeology in Nevis, West Indies

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The application of digital technologies to document and interpret the historical archaeology of the Caribbean is part of a new heritage (González-Tennant and González-Tennant 2016) that offers an opportunity to share archaeological work with the public. New heritage centers on the use of 3D technologies such as photogrammetry and virtual reality by archaeologists and other heritage workers. Although new heritage shares commonalities with virtual archaeology, digital archaeology, and cyberarchaeology, these other named approaches differ in their focus on specific technologies, or how archaeologists use them. We begin the chapter with a brief description of new heritage to clarify the shared and unique aspects of this approach. We see our work in Nevis as part of a tradition of methodological experimentation in Caribbean historical archaeology, which continues to support innovative treatments of the region's colonial past. This includes the use of macroscopic and chemical composition studies to document the production and trade of Afro-Caribbean ceramics (Ahlman et al. 2008; Ahlman et al. 2009; Hauser et al. 2008; Heath 1988, 1999; Kelly et al. 2008; Petersen et al. 1999), the increasing use of geographic information systems (GIS) to document and interpret colonial landscapes (Armstrong et al. 2008; Leech 2008), and a reorientation bringing historical documents into a fuller conversation with artifacts and ruins (Armstrong 1985, 1990, 2003; Wilkie and Farnsworth 1999, 2005). These studies highlight the ability of archaeologists to embrace a wide range of evidence when investigating the historical period of the Caribbean. Many of these studies have become models for archaeologists working in other areas such as North America, but the rapidly expanding practice of new heritage has yet to significantly affect Caribbean historical archaeology, and we hope to encourage more of this experimentation by discussing our preliminary work in this regard.

This case study is based on three seasons of work at the site of Fort Charles, Nevis. This site represents one of the earliest and longest-lived British forts in the region. New digital technologies are central to our investigation of this site's unique history. Our work combines perspectives from qualitative GIS

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(Elwood and Cope 2009) with immersive virtual reality simulations in archaeology (Carrozzino and Bergamasco 2010) to produce what we are calling an immersive qualitative GIS (IQ-GIS). Our central goal with this system is to reach a broader public by democratizing access to archaeological data and interpretations by placing this information within a framework that is increasingly intuitive, particularly as video games and other new media become more popular around the world. This approach provides users with access to various data in an accessible and intuitive way. Such an approach allows archaeologists to represent the site at multiple points in time, including the juxtaposition of present ruins alongside archaeological interpretations in real time. The ability to share our investigations in this way also speaks to public archaeology at the site.

Digital Approaches to Representing Archaeological Heritage

This section offers a brief overview of the various ways archaeologists have used new media in recent years. (See González-Tennant and González-Tennant [2016] for a more exhaustive treatment of these topics.) Archaeologists tend to be early adopters of new technologies. Our discipline was one of the first social sciences to embrace the use of GIS (Kvamme 1999). Similarly, as 3D modeling and virtual technologies emerged in the late 1970s and 1980s, archaeologists quickly adapted them to heritage work. The term "virtual archaeology" emerged at this time to denote the use of 3D models to represent archaeological contexts (Reilly 1990) and quickly came to focus on this to produce still images of past sites for interpretative publications and public outreach (Forte 1997). Early virtual archaeology focused almost exclusively on monumental or prehistoric archaeology, and particularly on sites associated with Greek and Roman history from across Europe. The late 1990s represent a crucial period for the use of digital technologies within archaeology. The increasing affordability of computing hardware allowed more archaeologists to experiment with 3D projects (Koller et al. 2009:73). The use of these 3D technologies was a minor aspect of the overall digitization of archaeology, which grew out of the increasing adoption of GIS, global positioning systems (GPS), and remote sensing technologies during the 1980s and 1990s (Kvamme 1999; Zubrow 2006). Several archaeologists have come to refer to the use of any or all of these approaches as part of a broader digital archaeology, which explores "the basic relationships that archaeologists have with Information and Communication Technology (ICT) and digital technology to assess the impact that such innovations have had on the very basic ways that archaeology is performed and considered" (Daly and Evans 2006:3). Digital archaeology offered a powerful way to investi-

gate the past and was not restricted to one theoretical viewpoint. Processualists embraced GIS and simulations to model past environments and various forms of human action. Postprocessualists drew on digital technologies to develop reflexive field methods (Hodder 2000), and those embracing phenomenological approaches viewed the technology as a way to develop a deeper awareness of the experiential aspects of past landscapes.

If virtual and digital archaeologies center on the documentation and display of archaeological contexts, then cyberarchaeology focuses on the immersive aspects of online worlds (Forte 2010:13), and quickly came to represent "a new way of understanding virtual communities through the study of their cultural artifacts" (Harrison 2009:4). Harrison believes that cyberarchaeology "has the potential to provide insights into the ways in which the notions of heritage are transforming in the early twenty-first century" (2009:16) as researchers watch the process of heritage creation unfold before their eyes. In this way, cyberarchaeology differs from virtual and digital archaeology because it is less concerned with technological experimentation and more concerned with the ways people use virtual technologies to interact with one another and to create objects virtually that represent archaeological artifacts, sites, and contexts.

New heritage is the intersection of new media technologies and cultural heritage (Kalay et al. 2008). New media is the "translation of all existing media into numerical data accessible through computers" (Manovich 2001: 20) and includes the digitization of analog materials (e.g., photographs, movies, and records) as well as computer images and 3D models. We view new heritage as a covering term bridging the range of practices within virtual, digital, and cyberarchaeologies. Without advocating for a hierarchical ordering of these concepts, new heritage does highlight a distinctive practice central to representing archaeological contexts in time and space. New heritage easily accommodates methodologies from a range of disciplines, including historical archaeology, oral history, ethnography, and the digital humanities. This approach supports the use of various technologies to further the goals of collaboration, public outreach, and social justice (González-Tennant 2013). Another benefit of using the term "new heritage" addresses unintended meanings that may arise when researchers qualify their methodology as "virtual," which many see as reducing the value of such work by conflating the term "virtual" with notions of "less real" and therefore of less value (Boellstorff 2008:65–66). However, new heritage does not have the same cultural capital as more common terms like "virtual" or "digital," and it does not always resonate with the public in the way these other terms do. In other words, our choice to frame our work as new heritage is meant to highlight a practice rather than to overshadow or downplay other approaches.

This brief overview is offered to frame and understand trends associated with the ways archaeologists are exploring the use of these digital technologies. Other researchers have transitioned from one term to another over the course of their careers, usually to highlight some aspect of their evolving approach. Maurizio Forte, a pioneer in virtual archaeology (Forte 1997) describes his recent work as cyberarchaeology (Forte 2010). This transition emphasizes Forte's shift from an approach centered on representing archaeological contexts in 3D to his recent work focusing on the ways people interact with archaeological contexts and one another through virtual technologies. The four terms discussed here can be quickly characterized on the bases of methods and theories that scholars use. Virtual and digital archaeologists primarily focus on the methodological potentials that arise from new technologies. Cyberarchaeology and new heritage theorize the application of new media. These approaches specifically focus on the ways people in the present use these technologies to make sense of the past. We view new heritage as embracing a wider practice than cyberarchaeology by underscoring how tangible heritage (e.g., archaeological sites) only "becomes 'heritage' when it becomes recognizable within a particular set of cultural or social values, which are themselves 'intangible'" (Smith and Akagawa 2009:6). This type of work requires heritage researchers to employ an ethnographic engagement within online worlds, mirroring concerns at physical sites that gauge how various groups value local heritage resources (Meskell 2005; González-Tennant 2014). The application of these technologies to Caribbean historical archaeology is in its infancy. Following a brief history of Nevis and Fort Charles, the remainder of this chapter explores the potentials that new heritage holds for investigating and interpreting Caribbean historical archaeology.

Brief History of Nevis and Fort Charles

Nevis is in the northern arc of the islands known as the Lesser Antilles. The island was initially settled by aceramic peoples migrating from South America more than two thousand years ago, although the greatest Precolumbian settlements did not occur on the island until the period between AD 600 and 1500 (Wilson 1989, 2007). The island was seen by Christopher Columbus during his second voyage in 1493, but European colonists did not establish a permanent settlement on Nevis until the 1620s (Hubbard 1996:23). Originally attempting to settle on the northeast coast of St. Kitts, and after visiting nearby Barbuda, Anthony Hilton led a small group of settlers to Nevis on July 22, 1628, where they settled the area that would become Charlestown, which is today the island's capital city. In 1629 a Spanish fleet attacked

Charlestown, and cannon were installed at Pelican Point (now Fort Charles) to defend the colony. This was ultimately a futile attempt, and the Spanish captured the island, burned fields and houses, and sent settlers back to England. Hilton returned to Nevis the following year (1630) to find that other displaced settlers were already rebuilding the settlement (Dyde 2005:32–38).

By 1667 the colonists in Nevis were increasingly turning away from tobacco in favor of sugar. The economy quickly prospered, and Nevis became the seat of the Leeward Islands Colony from 1670 until approximately 1700. During this time, Nevis's economic and political growth was dramatically affected in 1706 when a French fleet of nearly 50 ships landed troops on the island's southeast coast. The troops made their way to the western side of the island and took possession of Charlestown. The French burned a considerable portion of Charlestown and the island's cane fields as well as seizing all property, including the island's slave population. In a surprising turn, considerable numbers of slaves retreated to the slopes of Mt. Nevis during this time and mounted an armed but unsuccessful resistance to the French.

Nevis's decline was exacerbated over the coming decades as St. Kitts entered its own heyday of sugar production beginning in the 1730s (Meniketti 2006, 2009, 2015). During this time and throughout the eighteenth century freed Africans continued to leave their mark on Nevis. This included owning estates, operating small businesses, and joining the British military (Dyde 2005:106–107). Following the 1706 French invasion, the citizens of Nevis spent several decades attempting to construct a large fortification on the southern side of the island. The result was the Saddle Hill fortifications, built by slave labor but most likely never completed (González-Tennant 2014). During this time, the nearby site of Indian Castle, a partially fortified port, was also active on the island's southeast side. This site acted as a secondary port during the late seventeenth and early eighteenth centuries in addition to the port in Charlestown. Through the eighteenth century, and while the Revolutionary War continued in North America, the French harassed British colonies across the Caribbean and occupied Nevis for nearly two years in the 1780s. They removed signal cannon from Saddle Hill, spiked cannon at Fort Charles, and stationed a garrison in Charlestown during this time. Otherwise, the French largely left Nevis alone during this period. One possible explanation for this is revealed by Captain Horatio Nelson, who described many of Nevis's merchants as greater rebels than those in America (Dyde 2005:116).

While the Amelioration Act of 1798 advocated for more humane treatment of slaves in the British West Indies, it was not until the Slavery Abolition Act of 1833 that Afro-Caribbeans in Nevis began to enjoy greater freedoms. While other British colonies such as Jamaica instituted appren-

ticeship systems, this failed in Nevis where freed Afro-Caribbeans success-fully lobbied for more freedoms. As in other locations (Delle 1999), Nevi-sian merchants were able to restore their control of society by the 1840s through a variety of land control tactics. A growing absentee landowner population further undermined Nevis's economy throughout the second half of the nineteenth century, leading to widespread poverty and an island population largely devoid of European colonists and their descendants by the early twentieth century.

Fort Charles sits south of and overlooks Gallows Bay and Charlestown (Figure 9.1). The fort is an irregularly shaped polygonal fort with several uneven bastions where upwards of 26 cannons were placed as of the mid-1600s. The site covers approximately 1.5 acres. Still present are the remains of a structure that served as a guardhouse and armory, the cistern, and por-tions of the ravelin. The fort's western and northern walls are located above areas that are rapidly eroding into the sea, although discussions with lo-cal Nevisians suggest that the cutting away of land here did not begin until the 1950s or later following a series of earthquakes in the region. It is one of the earliest British forts in the New World and occupies a central role in the military history of Nevis. The fort's location was home to some of the central conflicts between the British settlers and other colonial nations in the West Indies. Sightings and engagements with the Spanish, Dutch, and French have occurred at or near the fort. Historical documents record mul-tiple construction phases increasing the size of the fort and resulting in the construction or improvement of numerous buildings within its walls. In re-cent decades, the faced stone of walls have been subjected to looting, which in turn destabilizes the structure in various places. The looting is regrettable, but it does provide researchers an opportunity to better record the multiple building phases at the site.

During the seventeenth century, Fort Charles served as Nevis's central de-fensive site and engaged in numerous encounters that successfully repelled the ships of other nations. For instance, in 1673 the fort's cannons accurately hit several passing Dutch ships "so smartly that we could perceive people go-ing overboard with plugs to stop their leaks" (William Stapleton to the Coun-cil of Plantations, quoted in Machling 2012:145). Plans from the early 1700s document a sizable and well-designed fort. During this time, slave labor was often sought to improve various elements of the fort, and these workers may have spent considerable time at the site (Machling 2012:150). This aspect of the fort's history may support the investigation of nonplantation expe-riences of Afro-Nevisian lives, providing a comparative context for similar studies on neighboring St. Kitts (Schroedl and Ahlman 2002). The histori-cal documents also record a well-provisioned fort during the eighteenth cen-
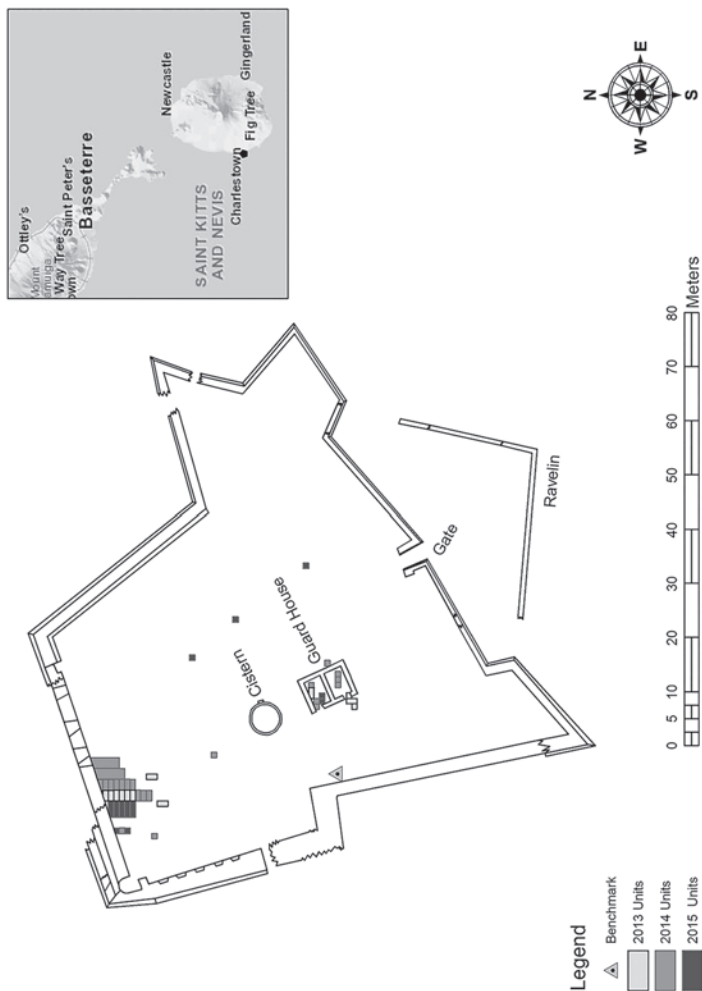
Figure 9.1. Archaeological work at Fort Charles. (Edward González-Tennant)

tury, and numerous structural improvements are known to have taken place at the site during this time (Machling 2012:150–155). A standing guard of men was initially placed at the fort in the 1600s and was maintained until the French occupied Nevis between 1782 and 1784.

Fort Charles was central to Nevis's defense, but it was not the sole military installation on the island. Indeed, it was only one of 14 military installations that eventually ringed the island (Machling 2012). These included a redoubt located along the island's northern shore that was eventually destroyed to make way for an airport runway, a series of gun emplacements along the island's western shore, considerable armaments at Indian Bay along the island's southern shore, and the aforementioned Saddle Hill. The majority of these installations were in operation by the late 1600s, with Saddle Hill following decades later in response to the French invasion of 1706.

Of the various military facilities in Nevis, Fort Charles operated for by far the longest period of time. It continued operation as a basic military facility until the 1870s as documented by salary payments to military personnel until then (Machling 2012:160). Anecdotal evidence suggests that Fort Charles remained in use until the 1890s, ending its life as a customs fort.

Archaeological Investigations of Fort Charles

Significant archaeological investigations at the site of Fort Charles began with our 2013 historical archaeology field school. Our work seeks to address several themes in Caribbean historical archaeology. Fort Charles provides an important case study for investigating long-term aspects of colonial life in the region. Research at Caribbean military sites addresses key deficiencies in the historical archaeology of the region (Watters 2001). For instance, our project seeks to document the experiences of soldiers and other colonial citizens between initial settlement and the late nineteenth century. While investigations of plantation sites continue to represent most historical archaeological projects in the Caribbean (Armstrong and Hauser 2009), archaeologists have increasingly turned their attention to nonplantation contexts, including a growing literature associated with Afro-Caribbean experiences at military sites (Ahlman et al. 2008; Ahlman et al. 2009; González-Tennant 2014; Goucher 1999; Schroedl and Ahlman 2002). Preliminary investigations at Fort Charles reveal a potentially unique pattern of ceramics in regard to the interaction between the island's British and Afro-Caribbean populations. Our work combines recent advances in the British empirical tradition of landscape archaeology (Leech 2008) with emerging theoretical studies refocusing attention on interaction and transculturation (Curet and Hauser 2011). Investigating the changing landscape of Fort Charles reveals changing Caribbean lifeways during three centuries, and our project aims to join

a growing list of archaeological projects investigating identity (Wilkie and Farnsworth 2005), power (Delle 1998), and interaction while contributing to recent landscape studies in the British West Indies.

Excavations have focused on two contexts at the site (Figure 9.1). The first is a section of stone flooring along the northern wall. This area of the fort is in greatest danger of eroding into the sea, and our excavations here seek to document various architectural features. The second area focuses on the only remaining building, now in ruins. This building is recorded on maps dating to the late 1600s and was most likely constructed during a series of site improvements at that time. The two-room structure served as an officers' quarters and armory.

British export and Afro-Nevisian ceramics make up the largest percentage of diagnostic artifacts. This includes 1,004 sherds from the 2013 season and 661 sherds from the 2014 season. The 2015 season is still being analyzed. Refined earthernwares account for 35% (n = 612) of the 1,704 diagnostic ceramics currently analyzed. The full range of British export ceramics are present given the long-term occupation of Fort Charles between the early 1600s and late 1800s. This includes delftwares, creamwares, slipwares, pearlwares, and whitewares. Similarly, the full range of British stonewares, from Rhenish blue and gray to white salt glazed, Nottingham, and ginger beer bottles are present at the site. Stonewares account for 10% (n = 177) of the sherds recovered in 2013 and 2014. Figure 9.2 includes a sampling of these ceramics from the 2013 field season. Although Nevis remained a British colony well into the twentieth century, there is evidence of trade with the United States in the form of yellow wares and alkaline glazed stonewares. This is unsurprising given the attitude many Nevisian traders and merchants had toward Britain in the late eighteenth century, leading to Captain Nelson's remark that the island's citizens were more rebellious than those even in the American colonies (Dyde 2005:116). Afro-Nevisian ceramics are one of the most common artifact types found at Fort Charles. They account for 49% (n = 830) of the current ceramic assemblage. Our analysis of these ceramics follows previous studies in Nevis and the nearby islands of St. Eustatius (Heath 1988, 1999), Anguilla, Antigua, Barbuda, Montserrat (Petersen et al. 1999), and St. Kitts (Ahlman et al. 2008; Ahlman et al. 2009; Ahlman et al. chapter 4 herein). Most of the Afro-Nevisian ceramics fall into a generic hollowware category, but a small number of sherds represent cooking pots, *yabba*, and griddle vessels.

In many ways, the ongoing analysis of materials from Fort Charles is typical of a colonial British military site. In addition to the fortifications and standing ruins, ordinance, pipes, and British export ceramics all conform to a site established in the early to mid-1600s with an occupation lasting until
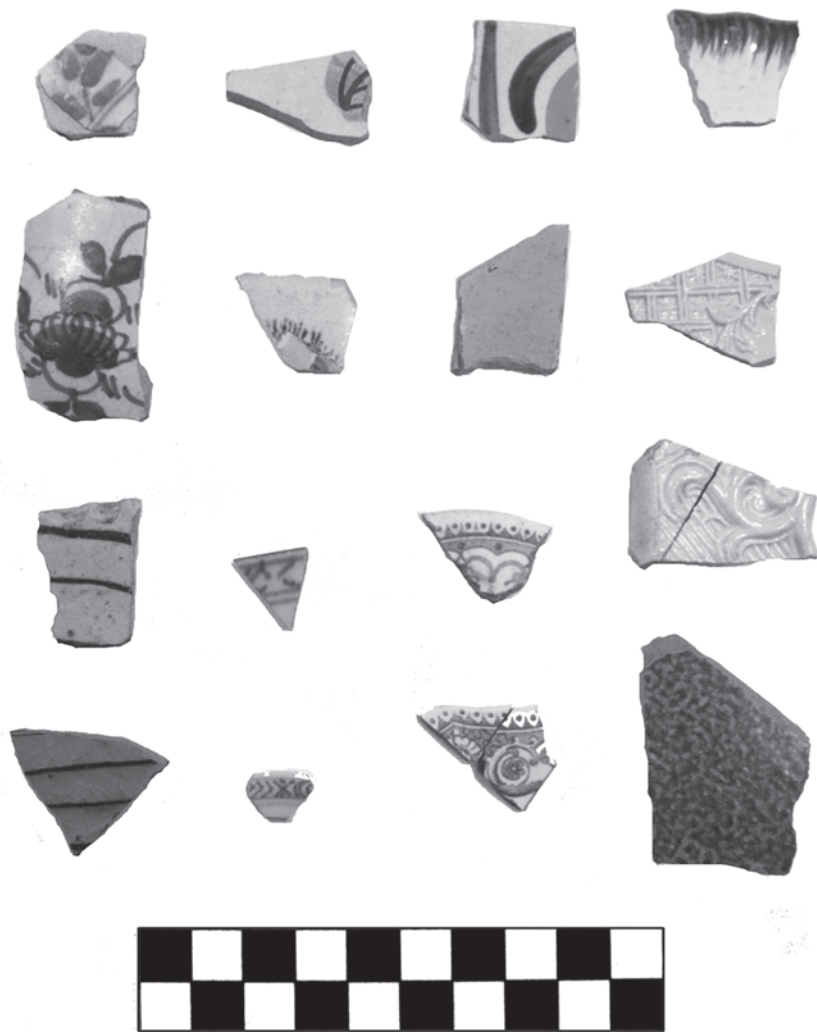
Figure 9.2. Selection of ceramics recovered through excavation at the site of Fort Charles. *Top row, from left to right*: hand-painted blue delftware, polychrome pearlware, polychrome pearlware, blue shell-edged pearlware. *Second row*: polychrome pearlware, hand-painted blue delftware, Staffordshire-type slipware, white salt-glazed stoneware. *Third row*: Staffordshire-type slipware, porcelain, transfer-printed blue on white pearlware, white salt-glazed stoneware with basket weave design. *Fourth row*: Staffordshire-type slipware, porcelain, transfer-printed blue on white pearlware, brown salt-glazed stoneware. (Edward González-Tennant)

the late 1800s. The main exception to this traditional military site pattern is the presence of an unusually large percentage of Afro-Nevisian ceramics. Our continuing work acknowledges that economic growth and developing colonial societies were structured in unclear and locally unique ways (Kelly 2004; Curet and Hauser 2011). One important avenue in this line of research centers on the ways archaeologists promote these expanded histories of local contexts. Our work at Fort Charles draws on new heritage to accomplish this. New heritage, and particularly the use of game engines to construct immersive virtual world environments, provides a powerful tool for revealing the evidence drawn on by archaeologists in the discipline's interpretive work. The remainder of this chapter examines the preliminary ways we are using these technologies to create a digital record of our archaeological work at Fort Charles, in a form that invites exploration by a larger segment of the public than is traditionally possible at Caribbean archaeological sites.

New Heritage as Immersive Qualitative GIS

The digital reconstruction of archaeological contexts is accomplished by one of two primary methods: the use of 3D capture technologies to automatically measure extant or ruined objects and structures, or the use of 3D modeling software to reconstruct vanished objects as interpreted through archaeological investigations (Koller et al. 2009:2). This later method is sometimes referred to as hand modeling because the designer must create the 3D image by hand using software. The first method can be divided into two subcategories. The first involves the use of high-priced 3D scanners capable of capturing entire landscapes or less expensive and smaller units for scanning artifacts. The second subcategory is photogrammetry and refers to the use of software to extract spatially accurate 3D models from a series of photographs. Our work at Fort Charles draws on this second type, and specifically the use of Agisoft's Photoscan software to aid in documenting the site.

This chapter's case study provides a Caribbean example using both scanning technologies and 3D software to digitally document the site and reconstruct it based on documentary research and archaeological fieldwork. Our exploration of new heritage at Fort Charles also examines different ways of interacting with the resulting virtual content. Regardless of whether using 3D scanning or hand modeling, all virtual content is manipulated within 3D software as part of any new heritage workflow. This allows for the integration of captured and 3D models produced by hand using software. The 3D data created by scanning technologies requires post-processing, often by the same programs used for hand modeling (e.g., Blender). As such, the use of

3D software remains central to new heritage projects that seek to produce interactive and immersive versions of reconstructed archaeological contexts. Unfortunately, very few archaeologists are well versed in the use of these programs. This typically requires archaeologists to work with specialists outside the field. This is not intrinsically problematic, but archaeologists who learn this software provide an important bridge between traditional archaeological practice and digital technologies.

We rely on photogrammetry to help us digitally document different aspects of Fort Charles. Photogrammetry uses a series of photographs taken at regularly spaced intervals around and over the object or context. An article by Porter and colleagues (2016) is an excellent overview of integrating photogrammetry into archaeological fieldwork. Although this article specifically deals with scanning artifacts, the principles are the same for recording larger objects and contexts. Our primary use of this technology centers on recording our excavation units and the site's ruined structures in three dimensions. Figure 9.3 shows an intermediate step in this process, the creation of a point cloud in Agisoft's PhotoScan software (Agisoft 2018) based on a series of photographs (represented as labeled squares in the image), the positions of which are calculated by the software. The resulting model is a spatially accurate 3D model that can be integrated into a virtual world environment.

The process of using 3D software to model archaeological contexts (a.k.a. hand modeling) involves five general steps. The first step centers on the collection and organization of supporting evidence. The second step in hand modeling archaeological contexts involves "blocking out" the general layout of the virtual reconstruction (Figure 9.4). The blocking-out phase at Fort Charles relies on data from field mapping that is first processed using GIS software. Alternatively, a scaled map image can be exported from the GIS and used as a base map in the 3D software. The third step involves adding details to the model. The standing ruins at Fort Charles present a challenging object to hand modeling. As such, we have reconstructed a conjectural version representing what the structure likely looked like during occupation (Figure 9.5). A version of the ruined structure is also available based on photogrammetry (see Figure 9.3). The current working 3D model of Fort Charles attempts to represent the site as it would have existed following improvements in the late 1600s. The fourth step involves adding textures to the 3D model (see Figure 9.5). Texturing refers to the placement of images on the surfaces of 3D models. Adding an image or photograph of stone walls or plaster provides a more realistic appearance.

The fifth and final step focuses on sharing the virtual reconstruction. Virtual and digital archaeologists typically create a series of still images while
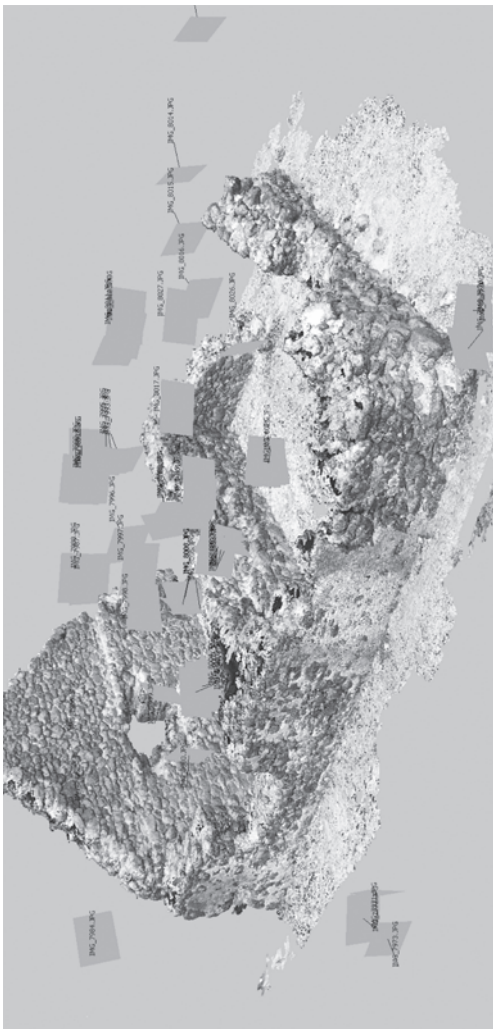
Figure 9.3. Documenting ruined structures at Fort Charles with PhotoScan software. (Edward González-Tennant)
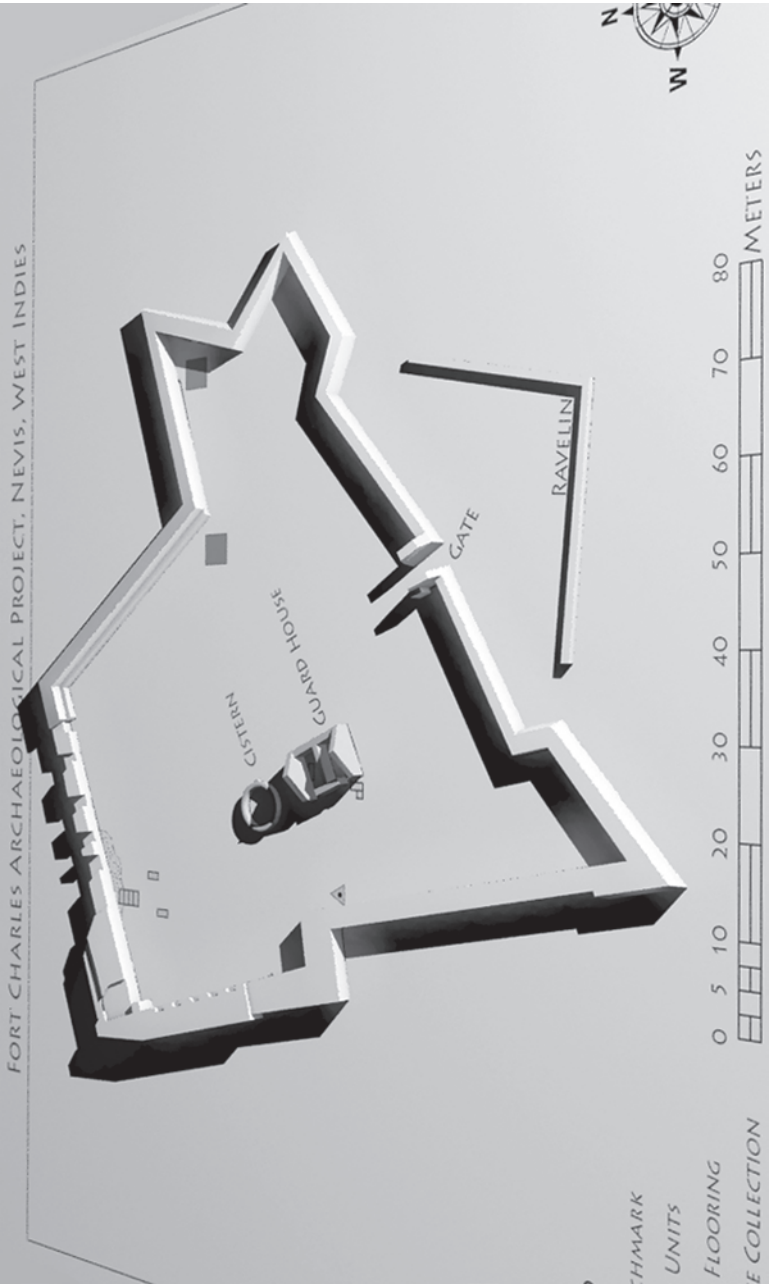
Figure 9.4. Blocked-out model of Fort Charles. (Edward González-Tennant)

Figure 9.5. Textured guard house. (Diana González-Tennant)

cyberarchaeology and new heritage tend to explore immersive and inter-active ways of sharing 3D content. This often involves the creation of con-tent in online worlds (e.g., Second Life) or virtual world environments. The Rosewood Heritage Project is one project specifically using both approaches to bring the history of an African American town in Florida to life. The combination of online worlds, virtual world environments, and other new media technologies (e.g., digital storytelling) tell the tragic history of Rose-wood, a black town that was completely destroyed during a 1923 race riot (González-Tennant 2013).

The use of virtual reconstructions at Fort Charles produces traditional content such as still images as well as immersive virtual world environments. This facilitates sharing the Fort Charles reconstruction using game engines, programs that allow users to rapidly create and deliver video games. Our game engine of choice is Unity 3D (Unity 2018). Our future work seeks to take this a step further and draw on the interactive potentials of virtual worlds to deliver information that archaeologists typically communicate through images and lengthy written reports.

The Fort Charles IQ-GIS

Previous research into the use of virtual world environments for historical archaeology concentrates on the creation of still images and videos or ru-dimentary uses of game engines for heritage visualization (see González-Tennant and González-Tennant 2016 for a review). New heritage work at Fort Charles seeks to more fully use the potential of game engines to de-

liver archaeological interpretations to a wider audience. We are orienting this work to simultaneously draw on a growing tradition of qualitative GIS (QualGIS), which represents a methodological intersection in the use of geospatial technologies for qualitative research (Kwan 2002) and is rooted in a "hybrid understanding of GIS as technology, methodology, and situated social practice" (Elwood and Cope 2009:3). QualGIS requires and represents a mixed methods approach. It treats knowledge as partial and situated, echoing feminist scholars of science (Haraway 1988). QualGIS recognizes that epistemology does not determine methodology and acknowledges how various data are open to multiple interpretations. The perspective of QualGIS practitioners in neighboring disciplines echo ideas of contingency and context at the heart of postprocessual archaeologies (Hodder 1982, 1991; Barrett 1987; Hegmon 2003). In practice, QualGIS situates multiple forms of quantitative and qualitative data alongside one another. This requires a nuanced attention to detail as the act of translating historical knowledge into geospatial formats can result in the loss of qualitative meaning (Schuurman 2009). As such, QualGIS as a methodology provides a useful perspective when thinking about how archaeologists can represent their various data in ways that make sense to nonspecialists.

The use of game engines supports the creation of a new form of GIS, one that is simultaneously immersive and qualitative. Our experimentation with IQ-GIS allows users to explore a reconstructed landscape while interacting with the various lines of evidence informing archaeological interpretation. As one moves through the virtual landscape, a series of menus allows users to access various lines of evidence. For instance, while exploring Fort Charles's guardhouse and armory, users can choose to display historic maps, excavation units, artifact counts by layer, and so forth. The context for much of this interaction is framed with 3D models created using photogrammetry (Figure 9.6). This method of interaction also supports engaging with the location and types of artifacts found across the site. The resulting experience actively translates months of archaeological research into an accessible format that is deployed via a web interface or laptop installed at a local museum.

Concluding Thoughts

The Fort Charles IQ-GIS combines traditional historical archaeological approaches in the Caribbean with new information and media technologies. Archaeological investigations began at the site after consulting with a wide cross-section of members of Nevisian society as part of a collaborative project exploring Nevis's colonial heritage (González-Tennant 2014). The spa-
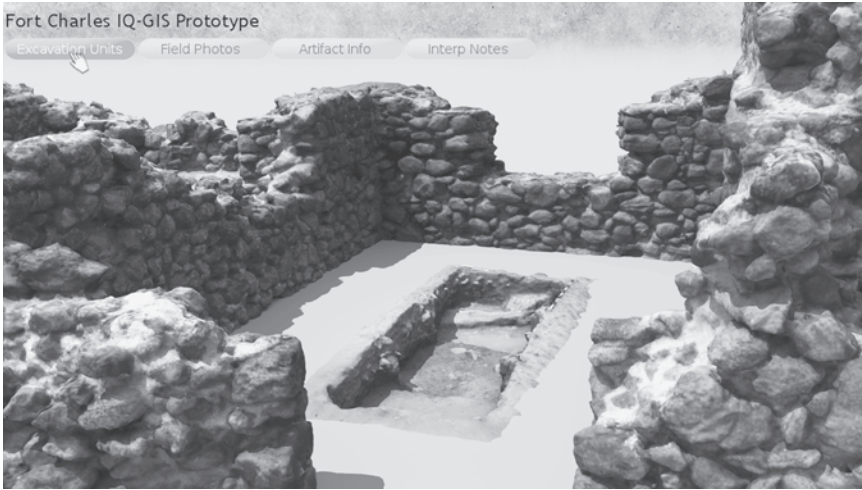
Figure 9.6. Fort Charles IQ-GIS prototype showing interactive elements alongside 3D models of excavations and ruins created with photogrammetry. (Edward González-Tennant)

tial layout of the site is interpreted based on historic documents, archaeological excavations, and field mapping. This information is managed and interpreted using GIS, which provide a starting point to craft an authentic virtual reconstruction of the site. Our ongoing work uses game engines to provide a powerful solution to sharing archaeological work with a wider public by allowing users to interactively explore various datasets within a virtually reconstructed version of the site. The ability to represent a site at various points in time—in various forms and combinations—is a particularly powerful aspect of new heritage and allows researchers to present their findings not only in three dimensions but also across time. This adds an important and often neglected fourth dimension to archaeological interpretation, which often represents static moments in the past as representative of complex histories. This is typically a function of physical reconstruction, a limitation we can escape with virtual technologies.

This chapter began with an outline of four approaches to using digital and virtual technologies for archaeology. While these approaches share a general interest in the use of digital tools to document, interpret, and represent archaeological contexts, they differ in their focus on the application of technologies and their relationships with users. Qualitative GIS provides an additional focus for archaeologists who embrace a mixed methods approach to investigating Caribbean history. This approach situates qualitative information alongside traditional, quantitative information. This approach neatly

intersects the established tradition of documentary archaeology in the Ca-
ribbean. An IQ-GIS allows researchers to deliver information that is typi-
cally displayed via static means (e.g., images, reports). Users of our immersive
virtual experience find themselves situated within a reconstructed landscape
representing historical sites at multiple points in the past. González-Ruibal
(2008) has called for precisely this type of work as part of a larger discus-
sion regarding possible alternatives to archaeological narration. He argues
that while narration and storytelling remain dominant forms of dissemina-
tion among academics regarding their research, archaeologists need to take
seriously the exploration of alternative forms of dissemination. Our ap-
proach to new heritage at Fort Charles allows users to step inside a 3D site
map and access multiple datasets driving archaeological interpretations. In
effect, this allows the public to reveal the onion skin of history in much the
same way as professional archaeologists do.

At Fort Charles, virtual technologies allow us to position alternative in-
terpretations of the site alongside one another, even in the same virtual world
environment. This is accomplished by providing users the ability to choose,
in real time, various reconstructions of the site. These alternative interpre-
tations replace one another in the virtual world environment or are super-
imposed as partially transparent or outlined structures on the reconstructed
landscape. This approach allows archaeologists to address the political na-
ture of their work. Multiple interpretations of a site through time aid ar-
chaeologists in the creation of a more inclusive interpretation of the past.
The number of British export ceramics in relation to the number of to Afro-
Caribbean ceramics at Fort Charles suggests a nonplantation context, an as-
pect of Caribbean historical archaeology receiving increasing attention (as
evidenced by the chapters in this volume) (Ahlman et al. 2008; Ahlman et
al. 2009; Armstrong 2001, 2003, 2006; González-Tennant 2014; Goucher
1999; Meniketti 2006, 2009; Schroedl and Ahlman 2002). Whether these ar-
chaeologists explicitly frame their work as political or not, they do share a com-
mitment to expanding the archaeological investigation of Afro-Caribbean
life to include nonplantation contexts. In the British Caribbean, many colo-
nies began importing African slaves in the 1600s, who were freed by eman-
cipation in 1834. This was often followed by a period of apprenticeship in
some colonies. As such, in the second decade of the twenty-first century,
many Afro-Caribbean communities have been free for as long if not longer
than they were enslaved. The creation of projects exploring the ever-growing
postemancipation period will become increasingly important if historical ar-
chaeologists wish to fully represent the breadth and width of Afro-Caribbean
experiences. IQ-GIS translates this type of work for a broader audience. In
this way, nonplantation sites that reveal important insights into Afro-Caribbean

lifeways can be explored by various stakeholder communities across the region and beyond. This supports a more inclusive archaeology.

New heritage holds great potential for Caribbean historical archaeology, but these technologies thus far have received relatively little attention in the region. Our work at Fort Charles was designed to center these interests. A dedication to technological experimentation must begin during the planning stages of a new project. If they are not, vital opportunities are lost. While traditional archaeological methods often produce sufficient data to virtually reconstruct most contexts, the 3D recording of excavations is impossible once units have been backfilled. Moreover, without a dedicated research plan incorporating new heritage approaches from the beginning, vital information may not be recorded. As a majority of historical archaeology in the Caribbean is still undertaken by international teams, not identifying sufficient data collection strategies may result in unnecessary delays to sharing archaeological investigations.

The investigation of new heritage at Fort Charles situates emerging digital technologies within a growing tradition investigating nonplantation contexts for historic Afro-Caribbean communities. Historical archaeologists are increasingly moving away from the region's plantation contexts. This trend will continue as Afro-Caribbean communities seek to gain additional knowledge and recognition for postemancipation experiences in the region. New heritage provides a method supporting the public engagement and a more intuitive exploration of archaeological interpretations. In closing, we are not positioning the Fort Charles Archaeological Project IQ-GIS as the central, reproducible model of new heritage in the Caribbean but rather encourage others to experiment with these technologies. Ultimately, a diversity of approaches will result in the most productive application of new heritage to the region.

The process of experimentation is crucial to the successful implementation of new technologies. Although archaeologists tend to be early adopters of new digital technologies, failure to share results retards the process of implementing them. This is regrettable and avoidable. This chapter represents an early attempt at incorporating new heritage techniques within a traditional archaeological investigation. It draws on previous research carried out by the authors at sites in the United States and offers a novel approach to investigating, recording, and interpreting the region's cultural heritage. The time investment required to bring these approaches into a project is not so significant as to overwhelm the traditional goals of archaeological investigation. The additional field time required to digitally document sites is nominal. Ten to 20 minutes is sufficient to photograph an excavation unit for photogrammetry. Standing ruins and structures can also be documented

in a matter of hours. The processing of these data is straightforward, and typically 10 minutes are needed to complete a unit or structure. The greatest time investment required is the construction of 3D models representing vanished contexts and structures, and the construction of the virtual world environment.

Incorporating new heritage within archaeological practice opens new collaborative abilities with students as well. It represents a powerful way for academics to engage students who are more familiar with new media technologies. This may take the form of partnerships with computer science, graphic design, and digital art faculty and students, or it may entail simply encouraging archaeology students who are drawn to these technologies and providing them with increased opportunities to explore those interests. This speaks to much broader concerns regarding training and professionalization for a discipline that regularly comes under public scrutiny. To realize the potentials of new heritage for the Caribbean, it is necessary for others to incorporate these methods within their research. We look forward to such work with anticipation and await the impressive results it will surely produce.