Introduction

In 2012, Archaeologist Supreme Ian Hodder published *Entangled: An Archaeology of the Relationships between Humans and Things*. The book went beyond "thing theory" to examine (in a very readable and self-deprecating way) relationships between people and things, seeing them as evolving processes. To make his argument, Hodder reached beyond archaeology to the physical and natural sciences and introduced many readers to complexity theory. He observed—correctly, I think—that these entanglements between people and things emerge and grow more complex and that the complexities of these relationships flow in one direction, moving forward along the arrow of time. This follows on the 1944 observations by Prof. William S. Webb of the University of Kentucky who—trained as both a physicist and an archaeologist—published on how archaeology can benefit from physics and other natural science disciplines. While Webb's practical approach differs from the theory considered by Hodder, there is an established tradition of archaeology returning to the well of physics to borrow new ideas and methods.

One reason I wrote this book is to advance some of these earlier ideas from Webb and Hodder as well as those from classical and quantum physics. Hodder's observation that things are processes is not unlike theoretical physicist Carlo Rovelli's argument that motion makes matter. From classical physics we learn that thermodynamics affect both microscopic and macroscopic things, and that entropy makes motion. These intersecting rules can be applied to archaeological artifacts, sites, and landscapes, which offer new insights into how we can interpret archaeological evidence, context, and data. The practical applications of some of these observations may not yet be readily apparent to some readers, and that's okay. By presenting them here in book form, one can return to these concepts from time to time to see if interpretations have changed, or if archaeology itself has completed another theoretical turn. For those readers tempted to close

this book at the mere mention of physics (quantum or otherwise), fear not. There is other theory at work here, too.

The second reason for writing this book is to further elucidate upon both digital and media archaeologies. The term "digital archaeology" has for years been inclusive of the digital tools and methods adopted and applied by archaeologists. A reflexive practice, digital archaeology continuously evaluates the need and practicality of these tools and methods while also keeping a weather eye on sustainability and data access and preservation (see the collected publications by Jeremy Huggett, the Gandalf of digital archaeology generally and archaeological data specifically).[1] The further we get into the twenty-first century, the more entangled humans become with digital media in all of its forms. This entanglement is consensual for some and nonconsensual for others, affecting everyone in ways that are observable to archaeologists.

This book is divided into seventeen thought experiments (intrusions?) in order to provide multiple perspectives of what digital archaeology can be. These chapters are divided into three parts. The first part addresses the archaeological issues of people in digital landscapes. "Post-Landscape Archaeology" argues for a new classification of human-settled blended landscapes—physical spaces augmented digitally. "Psychogeography of Software and User Interfaces" explores how and why we wander through physical and digital spaces. "Nonplace Cultural Spaces" identifies new kinds of sites and landscapes that exist outside a fixed point, a locality without a set location. "Abandonment" describes human migration from digital places and how archaeology might document that kind of intangible heritage. "Human Archaeology in Persistent Digital Spaces" examines what it means to conduct archaeological fieldwork from within a software application. "Software Citizenship" asks if people can be citizens of software applications and operating systems, and what does digital citizenship require of both the human citizen and the digital governing body?

The second chapter-grouping is largely artifact-driven and looks at mechanisms of digital deposition. "Machine-Created Culture" wonders what might happen if people abdicate conscious decision-making in favor of unconsciously obeying computer-based algorithms. "Digital Drift" applies current research in archaeological drift to digital places and materials with a focus on e-waste. "Technofossils and the Technosphere" continues the discussion of how the physicality of digital media production and consumption affects both people and planet. "Mobile Homes in the Multiverse" looks at some of the benefits afforded to archaeologists of digital manufactured landscapes. "Archaeological Debt" rounds out the more human elements of digital

archaeology with a review of the various kinds of debt experienced by principal investigators and ways to overcome the information avalanche.

The final part integrates physics with archaeology to create additional ways of interpreting archaeological material, both physical and digital. "Quantum Archaeology" reclaims the term from the transhumanists who are in search of technology-facilitated immortality, refocusing it to describe how observing the relationships of tiny things coalesce into understanding big-picture questions. "Archaeological Time" adds another way of looking at artifacts, sites, and landscapes outside of chronology and culturally derived notions of the future, present, past, and distant past. "Archaeology and the Singularity" asks whether the Singularity has already happened and if so, can archaeology help to identify what occurred and when. "Archaeological Complexity, Anticipation, and Retrocausality" analyzes how time and entropy affect the archaeological record. "Archaeological Noise" offers a suggestion on how to identify things of research significance both large and small. "More Technology, More Problems" is an examination of the iterative, endless nature of technological development from 10,000 BCE to the present to address unchanging human needs and ever-evolving human wants.

As you read, you will notice three emerging themes. I was unaware that this was happening until I was well into the first draft of this book; the kismet delighted me, but I should not have been surprised. Archaeology contains a wealth of entanglements and writing about the digital side of things made some of those relationships pop. The first major theme? Similarity. Even though my own work keeps me in digital spaces, the questions I am asking are not all that different from those I asked when excavating in Italy and Greece some thirty(!) years ago. It's not that I haven't learned anything between then and now, only that digital spaces are also human spaces. The places we choose to inhabit change over time, but the human need to have a space of one's own, a place for community, has not. Software—especially during the COVID-19 pandemic—has proven to be an affordable, accessible way to have that vacation home while also having space to work, to create.

I can understand the skepticism some of my colleagues have about conducting archaeological work within digital built environments, and it happens that many have not played a modern digital game or visited a virtual world. I wouldn't know where to begin if they dropped me in the middle of a site settled by a culture I had never studied surrounded by a language I could neither read nor speak. But I could appreciate the work being done there. I invite those archaeol-

ogists unfamiliar with interactive digital places to try one in an effort to understand the great human migration from the physical to the digital and what we can learn there.

The second major theme in this volume is entropy. I can hear you quoting Yeats now: "Things fall apart. The center cannot hold." Somewhere an archaeology student is making the evergreen joke for the first time: "my future is in ruins." Entropy is change and its physical effects give evidence to time's passage. It takes effort—work—to keep a system in balance, and should that effort lessen, the system will change. This is as true for thermodynamics as it is for a society, a relationship, an artifact. People and technology blend, and those entanglements reveal themselves in closed and semi-porous systems. Archaeologists are not observing the infinite expansion of the universe leading to its ultimate heat death and whatever comes after, but rather they are reconstructing how things might have been, which leads to an understanding of how things are. We can document that change—entropy—through the evidence we collect. Jetsam's entropy.

Entropy leads naturally to this book's third major theme: emergence. One might think that emergence is the opposite of entropy, growth instead of decay. This is partially true. But as the following chapters hope to demonstrate, entropy bridges gaps between events scattered along a timeline. I borrow the concepts of microstates and macrostates from physics, which uses them to describe what happens when microscopic particles combine/converge/interact to become an observable macroscopic state. The rules governing the tiny particles and their interactions give rise to something new that has its own rules and characteristics yet remains faithful to the original rule set governing the atomic and subatomic realm. We can extrapolate outwards then into all manner of things: a tree and a forest, a molecule of water and an ocean, a letter and an epic poem, a brick and a building, an artifact and a site, a voxel and a 3D virtual world, and so on. All of these obvious examples demonstrate emergence and are true to the physics underpinning these systems. An ocean has its own ocean-like properties, but these do not go against the properties of the water molecules composing it. Archaeologists work at every scale, from the smallest grains of pollen to the remnants of entire empires. We study the static artifact, and we study the changes that precipitated its creation and use, and then its afterlife, something new emerging during each period of transition and then resetting entropy's baseline for the next transition from which something new will emerge.

Physical or digital, entropy and emergence are present in every medium, pausing but never stopping, and they are predictable at the

macro level given enough data points. This idea is not too far off from Isaac Asimov's notion of "psychohistory," or the ability to predict future behavior of human systems through mathematical modeling while admitting that it cannot predict the agency of a single human being. The actual discipline of cliodynamics approaches what Asimov imagined, converting historical events into models for analysis and a greater understanding of collective human behavior over time given certain sets of stimuli and circumstances. Archaeology can apply a similar approach to teasing out trends through the analysis of sites and artifacts and the people who created them, something especially valuable and timely when conducted in digital space.

To make these themes more accessible—and more human(e)—it's time to introduce you to my (and soon to be your) imaginary friend, Charlie.

This Book Has a Guide (But Is Not Itself a Guidebook)

You will encounter a somewhat reluctant and occasionally befuddled guide in each of the seventeen shortish chapters following this introduction. Charlie, a recent postgraduate with one foot in the United States and another firmly planted in the UK, works as an archaeologist of traditional materials from very old places placed inconveniently underneath very new ones. Charlie regularly uses a mix of physical and digital tools. Almost daily (as this book would have you believe), Charlie continues to confront (or be confronted by) contemporary material culture, digital things and places, and occasionally scary, theoretical bits and bobs that involve invisible things with very observable consequences. The more Charlie works in the physical world, the more present digital things and places become until it is close to impossible to inhabit one without crashing into the other.

Charlie's curiosity leads to a number of rabbit holes that all seem to connect far underground regardless of how far apart they started. Feeling far from hapless, however, Charlie tries to take these theoretical wanderings to their logical conclusions, not afraid to ask some very basic questions while furrowing the brow in anticipation of receiving complex answers, some of which require melatonin—or at least a tumbler of gin (or ginseng)—to remedy. Like any good archaeologist, that mix of curiosity and skepticism serves Charlie well even though sometimes the thread of evidence and argument seem frustratingly just out of reach. Archaeology continues to change not because of the entanglement of past people, artifacts, sites, and landscapes, but

because of the evolution of the archaeologists who choose to engage with those people, materials, and places. They bring new(er) ways of looking at old(er) things.

A first draft of the themes in this book yielded impersonal results. Because archaeology is conducted by people and deals with people's interactions through (and with) time, I decided to attempt to humanize each chapter as a narrative; archaeology is arguably, at its core, about telling stories. We see digital archaeological problems through Charlie's eyes, just as we might through our own—with feeling, intellect, and sometimes confusion. Just because something is digital does not mean that it is free from emotion.

As one peer reviewer of this book wrote: "A key element of digital humanities' scholarship is the idea of 'deformation,' a portmanteau of 'deform' and 'performance'; it is an artistic practice that invites us to use digital tools to change things that are familiar, to make things seem strange again so that we can know the place for the first time (as the poet had it)." This is exactly my intent, and the attempt of trying something new is not without risk. At the very least, I hope that Charlie's (mis)adventures related here will offer you something to contemplate in your bath—either the one full of bubbles at home, or the one beneath tons of overburden in a Roman town awaiting your spade, trowel, and brush.

Note

1. See https://introspectivedigitalarchaeology.com/ (accessed 18 April 2024).