Specialists and students will find of particular interest the concluding essay of the volume (Chapter 14, "Greater Cahokia—Chiefdom, State or City? Urbanism in the North American Mid-Continent, AD 1050–1250"), in which Thomas Emerson succinctly presents the evidence for Cahokia being an urban center (city) rather than a major town within a chiefdom analogous to those of the late prehistoric Southeast. This broader debate has bedeviled Mississippian archaeologists in Illinois since at least the early 1980s, when some Illinois archaeologists adamantly argued that rather than a city, Cahokia represented a vacant ceremonial center with only a very small year-round resident population. In contrast, Emerson, Pauketat, and their coauthors clearly consider this argument to have now been settled in favor of identifying Greater Cahokia as an urban landscape.

Other notable chapters that further develop concepts of urbanism, neighborhoods, and archaeological precincts include Emerson's "Creating Greater Cahokia" (Chapter 2) and Pauketat's "Thinking through the Ashes, Architecture, and Artifacts of East St. Louis" (Chapter 13). Additional important chapters focusing on these and other concepts that expand on our knowledge of Greater Cahokia include Pauketat's "In and around the Northside and Southside Excavations at East St. Louis Precinct" (Chapter 5); "Community Organization of the East St. Louis Precinct" (Chapter 6) by Tamira Brennan et alia; "The People of East St. Louis" (Chapter 8) by Kristin Hedman; and "Crafting and Exotica at the East St. Louis Precinct" (Chapter 11) by Steven Boles et alia, which deals with the craft production of copper, crystal, galena, pipestone, and other artifacts.

In sum, IDOT and the Illinois State Archaeological Survey should be commended for the publication of this outstanding volume, which will represent a benchmark study in American Bottom archaeology for decades to come. Not often does a summary volume of this type and this caliber about a major archaeological investigation, if completed at all, reach this level of theoretical and substantive importance.

Agent-Based Modeling for Archaeology: Simulating the Complexity of Societies. IZA ROMANOWSKA, COLIN D. WREN, and STEFANI A. CRABTREE. 2021. Santa Fe Institute Press, Santa Fe, New Mexico. xiii + 429 pp. $10.95 (paperback), ISBN 978-1-947864-25-2. $0.00 (PDF), ISBN 978-1-947864-25-2.

Reviewed by Wendy H. Cegielski, Arizona State University

In *Agent-Based Modeling for Archaeology: Simulating the Complexity of Societies*, authors Iza Romanowska, Colin D. Wren, and Stefani A. Crabtree have produced the first agent-based modeling (ABM) textbook designed for researchers studying the human past and educators interested in teaching computational simulation of the past. As an ABM practitioner in archaeology who learned at a time when general ABM textbooks were unavailable, I welcome the addition of a comprehensive, practical, and coherent manual for the instruction and application of ABM in archaeology.

The authors define ABM as "a type of computer simulation that enables investigation of complex phenomena from the bottom up" (p. 6) through the investigation of the behavior of individuals or agents based on user-defined rules. Practically, for archaeologists who wish to become practitioners of ABM, one must become at ease with reading and writing computer code. *Agent-Based Modeling for Archaeology* relies on NetLogo, the ABM software program most used by archaeologists. Readers will find themselves immersed in NetLogo computational simulation examples, fully coded in print and online, based on published models from archaeology. The authors provide sufficient background and tools so that a beginner can reproduce common archaeological models in minutes. Moreover, the book is organized coherently and produced slickly, with a beautiful cover, a useful table of contents, and quality graphics and printed text.

The authors organized the book into three parts. Part I consists of Chapters 1–3 and introduces the reader to NetLogo, the basics of computational modeling, and coding basics. Part II contains Chapters 4–6, addressing computational algorithms behind agent behaviors and model building. Part III, or Chapters 7–9, describes, with detailed code, methods for combining ABM with spatial and relational (network) data and the generation of artificial data for model testing and validation. Throughout the book, the authors draw from published archaeological ABM examples surrounding the three human behavioral themes of movement, exchange, and subsistence. The concluding chapters provide best-practices guidance for ABM, a handy glossary, and an appendix listing all models covered in the book and a guide for producing color-blind models.

The authors hope to normalize the use of ABM in archaeology by lowering the most substantial barrier to entry for most social scientists—coding. Collecting and publishing code relevant to archaeology in one place, such as this textbook, is immensely practical in this sense. However, the authors' reliance on NetLogo requires them to expend text throughout the body of the book on the programming vagaries specific to NetLogo. At times, the book can read like a NetLogo manual rather than a volume about the art

and science of the application of ABM in archaeology. As noted by the authors, NetLogo is among several software packages available for ABM. *Agent-Based Modeling for Archaeology* is a timely work *right now*, but as developers update NetLogo, hopefully the sole reliance on popular software of the day will not consign this book to the back bin in a few years. The authors chose NetLogo because of its ubiquity in archaeological ABM practice and low barriers to entry, but other considerations are important—namely, broad scientific usability, robust algorithmic development and advancement, and the long-term availability of expert and peer support.

Overall, the book will be most useful to two groups of people: instructors of computational social simulation and the beginning learner. Instructors will find code needed for practical lessons as well as suggested exercises at the end of chapter. For the beginner practitioner, this textbook is the necessary "all-in-one" manual for ABM and archaeological application. Most archaeologists should appreciate Chapters 3 through 6 —arguably the strongest portions of the work—in which an array of behavioral algorithms describing movement (e.g., random walks and targeted walks), exchange (e.g., price setting and content bias), and subsistence (e.g., Lotka-Volterra and patch choice) are modeled through coding in ABM. However, new theoretical and methodological developments in ABM and archaeology are out of the scope of this book. For example, Chapter 8 relies on NetLogo's underdeveloped algorithms for relational or networked data, resulting in the weakest chapter in the work. Chapter 4 mentions machine learning (ML) briefly in relation to the use of ML for model selection. The incorporation of both network science and ML into ABM is transforming computational social simulation, and although deep treatment of these topics may be out of scope of the current textbook, the field looks forward to a possible second volume discussing advanced methods in ABM and archaeology.

Bronze Age Worlds: A Social Prehistory of Britain and Ireland. ROBERT JOHNSTON. 2021. Routledge, London. xv + 374 pp. $160.00 (hardcover), ISBN 978-1-13803-787-8. $46.95 (paperback), ISBN 978-1-13803-788-5. $46.95 (e-book), ISBN 978-1-31517-763-2.

Reviewed by Matthew J. Walsh, National Museum of Denmark

Robert Johnston's *Bronze Age Worlds: A Social Prehistory of Britain and Ireland* provides a fascinating and accessible exploration of the late prehistory of Britain and Ireland, focused on the pivotal transition from the Late Neolithic into the Chalcolithic and Bronze Ages (ca. 2500–700 BC). Notably, Johnston situates his overview of this transformative period in a novel framework emphasizing kinship, as it is reflected at varied scales of social interaction and dynamics that can be glimpsed in the archaeological record through objects, features, sites, site complexes, and landscapes. It is a lofty assertion that one might draw anything but speculative (or flatly unfounded) conclusions about the complexities of kinship and social relationships that generate them from the archaeological record, and yet Johnston succeeds at doing so cohesively and provocatively.

Rather than dwelling too long on precisely *what* "kinship" can or should be, Johnston takes for granted that however defined, kinship is first and foremost relational—it reflects social relationships in which some form of mutual identity is understood, constructed, and articulated. Of course, kinship goes well beyond consanguinity (Joanna Brück, "Ancient DNA, Kinship and Relational Identities in Bronze Age Britain," *Antiquity* 95:228–237, 2021; Catherine Frieman and Joanna Brück, "Making Kin: The Archaeology and Genetics of Human Relationships," *Journal for Technology Assessment in Theory and Practice* 30 [2]:47–52). It also encompasses the forming and forging of relationships and identities through gift giving, communal engagements, and shared spaces. Thus, he sets out his discussion by formulating and then following through with illustrating five key observations about kinship as a concept that

> creates personhood and collective belonging . . . associates people with nonhuman beings, things and landscapes . . . is historically constituted, territorialized and codified . . . is made through the sharing of substances and presences . . . is creative, performative and political [pp. 15–18, italics in original].

Given that this perspective situates kinship as a relational ontology, in many ways this book can be seen as an equal companion to Joanna Brück's insightful book *Personifying Prehistory: Relational Ontologies in Bronze Age Britain and Ireland* (2019). Both works call for prehistoric archaeology to explore more anthropological theories of personhood, identity, and diverse ontologies in the past. Brück's *Personifying Prehistory* and other works explore subjects such as personhood, gender, and identity (see also Chris Fowler, *The Archaeology of Personhood: An Anthropological Approach*, 2004), as well as