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Susan M. Kooiman. *Ancient Pottery, Cuisine, and Society at the Northern Great Lakes.* Notre Dame: University of Notre Dame Press, 2021. Illustrations, tables. 240 pp. $34.99, e-book, ISBN 978-0-268-20147-0.

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Eating and cooking, integral parts of everyone's lives, form an enticing topic for an archaeologist interested in questions regarding relationships among ceramics, cuisine, plants, and the wider society. A myriad of articles on the subject attest to the global interest in the topic.[1] Many who work on the Great Lakes region will welcome a discussion of the relationship between subsistence and food-processing technology.[2] This book examines the changing settlement, substance, and social patterns from the perspective of food-processing technology, food and resources selection, and cooking methods based on ceramics from a pre-European contact Indigenous occupation archaeological site on the shores of Drummond Island, in Lake Huron, in Michigan's Upper Peninsula, in the United States. Susan M. Kooiman uses the Cloudman site (20CH6), dated between AD 50 and AD 1500, which was periodically occupied by Indigenous groups who made ceramics, making it ideal to track a range of variables over 1,500 years. This long occupation, for Kooiman, illustrates that the shifts that occurred were likely to be reflected in the multi-component assemblage left by the Indigenous groups who made pottery, capturing local and regional trends. The book explains how diet, and what she terms "ceramic cooking technologies," changed during the Woodland and Late Precontact periods in the northern Great Lakes and how change can be detected by the application of what are termed "complementary" methodological analytical techniques for ceramics and diet. New insights emerge to inform work on resource intensification, technological adaption, and social transformation in the northern Great Lakes.

Kooiman's book has nine chapters. The first chapter, the introduction, outlines the discussions that follow in subsequent chapters. Here Kooiman discusses some key issues, such as that her primary data set, the ceramics in question from the Cloudman site, is "legacy data." After the site was excavated, the assembled artifacts were "initially analysed" between 1990 and 1995, and the ceramic assemblage remained "untouched" until Kooiman's analysis (p. 4). Such collections, Kooiman argues, are potential sources of data for testing new and collections-based research despite the risks of being lost, mislaid, damaged, misplaced, or improperly cared for, rendering them unusable for subsequent archaeological research, an issue discussed at length elsewhere by other scholars.[3] In her introduction, Kooiman reviews the scholarly debates on regional and subsistence patterns in the northern Great Lakes. She deftly leaves the reader wondering about her standpoint as she observes that most researchers agree that social and adaptive changes occurred in the north-

ern Great Lakes during the Woodland period but disagree over the nature of such changes. She argues that these shifts were documented by changes in the food-processing technologies required to accommodate dietary alterations, cooking methods, and technologies.

Chapter 2's discussion of the larger cultural history of the northern Great Lakes region is balanced, clear, and well written. An impressive achievement, it could easily be a standalone publication on its own merit.

Chapter 3 presents a detailed context of subsistence, settlement, and social interactions during the Woodland period in the local geographical region. Kooiman provides a succinct history of the site and its environmental setting, the research topics covered, and her expectations regarding her investigation. At this point, somewhat belatedly, Kooiman introduces her five lines of inquiry. First, she asks whether differences exist in ceramics regarding their "technical properties," namely, thickness, temper, and rim diameter attributed to the Middle Woodland, Early Late Woodland, Late Late Woodland, and Late Precontact periods (p. 37). Second, were changes in ceramic vessel use and cooking habits evident through time? Third, are diachronic changes in subsistence strategy and "possible changes in cooking habits" detectable through the analysis of lipids, stable isotopes, and microbotanical remains extracted from the pottery? Fourth, she looks at the possibilities of establishing synchronic variation in ceramic vessel use regarding subsistence strategies and cooking habits. Finally, she examines the ethnographic and ethnohistorical accounts of the diet and cooking traditions of Indigenous peoples in the Great Lakes region to "enhance" the varied interpretations of the data from the archaeological record (p. 40).

Chapter 4 tackles the theoretical underpinnings of Kooiman's research. Her approach here is welcome and frank. She insists on its importance as it informs the application of the methodologies chosen, ergo the treatment of the data. She takes "an integrated theoretical framework" so as to structure the application of specific methodological and analytical techniques in a specific sequence (p. 48). Her tactic of applying a multidimensional analysis to extract even more information from a limited body of data is adroit. She argues that the application of multiple and new analytical techniques on the same body of data, in this instance ceramics, enables the extraction of such additional information. This is an advisable tactic, but it would have been useful to be more explicit from the outset rather than leave it to the reader. Kooiman introduces her methodological approach to the ceramics from the Cloudman site, which she argues are both diverse and mutually reinforcing. The methodologies she discusses are functional and typological ceramic analysis; typological analysis; and residue analysis, which Kooiman defines as including microbotanical analysis, stable isotope analysis, liquid residue analysis, and accelerator mass spectrometry radiocarbon dating.

Chapter 5 succinctly discusses how an occupational history and chronology of the Cloudman site were established based on analysis of the ceramic record, that is, the taxonomy. Kooiman seeks to enhance the original classifications, undertaken in 1995, using more recent literature in order to obtain "the most accurate portrayal possible" of the history of the site and its inhabitants. She states, in her conclusion of the chapter, that the reevaluation is "largely in accordance with the previous evaluation conducted by [Christine N.] Branstner (1995)" (p. 60).[4] Kooiman's tactic of reevaluating the original classification is prudent given that she needed to create distinct chronologies for regional taxonomies to permit the construction of "solid occupational history supported and detailed by the set of direct AMS [Accelerator Mass Spectrometry] dates" for a framework to exist so that the remaining analytical methods could be deployed (p. 81). This is a sound approach.

Chapter 6 covers the function of the ceramics. Three technical properties are considered: temper size, rim diameter, and vessel thickness. Kooiman argues that it is crucial to undertake "exploratory purpose," consequently the size of the vessel is debated in relation to other technical properties and cooking requirements "to clarify its functional role amongst Woodland vessels" (p. 84). Such exploratory research is beneficial. Some experimental archaeology, whereby new pots using the technical properties established by the study were tested along with various types of heat, as well as the size of the ceramic with food mixtures, which were stewed and boiled, may have been fruitful. The reason for suggesting such a procedure is that Kooiman, in the conclusion, states that smaller vessels were used more frequently in stewing than boiling, which correlated, in her view, to the fact that during the Middle Woodland period vessels were smaller and became larger in size during the Late Late Woodland period, "remaining consistent, there-after." It appears to me that boiling, rather than stewing, was the chosen method of cooking in these ceramics. She states that the signature decrease in the size of the temper is not to be associated with the contemporaneous increase in the processing and consumption of starchy foods, after 1200 AD when there are "observed changes in the size of the vessels and cooking habits" (p. 107).

Chapter 7 discusses the diet and cuisine at the site, as Kooiman assesses the results of the microbotanical analysis, stable isotope analysis, and liquid residue analysis of the residues of both "adhered and absorbed plant residues" on the ceramics (p. 109). This analysis enables Kooiman to conclude that vessels dated to the Woodland and Late Precontact periods were "multipurpose" and were used "to cook a variety of foods either in sequential cooking episodes or together in the form of multi-ingredient soup and stews" (p. 117). These results indicate that maize, wild rice, squash, and aquatic resources were present according to analysis of the microbotanical remains and stable isotopic analysis and that many vessels were used to cook a variety of terrestrial animals. Nuts, acorns, and hazelnuts were, according to lipid analysis, popular foodstuffs in each period of occupation of the site. Berries, roots, greens, and wild grains were revealed by the lipid signature residues, but relatively little meat appears to have been cooked despite these people being hunter-gatherers. The data on the pottery reveals that the site was used seasonally from late August until November. The author concludes, based on the data, that those who lived on the site consumed nuts, acorns, and aquatic resources as key staples over each period of occupation as well as maize, wild rice, and squash but in varied quantities. She asserts that her findings support the results of work by Sean Dunham on starchy foods in the western Upper Peninsula of Michigan.[5]

Kooiman argues that there is no clear evidence to substantiate any claim regarding their increased reliance on deep water spawning fish over the Late Woodland period despite evidence that these resources were relied on throughout the period in which the site was occupied. Insufficient evidence exists to show the proportions of these resources, as the data is not "fine grained enough" for any conclusions to be drawn (p. 127). This chapter is fascinating and reveals the extent to which such analysis can provide increased knowledge regarding the foodstuffs consumed by those living at an archaeological site.

Chapter 8 is intriguing. Kooiman uses analogies rather than homologies from the ethnographic and ethnohistoric records regarding the diet and cooking of foodstuffs. She posits that an examination of the lives of the Indigenous people, the Algonquian and Iroquoian during the historic period in the Great Lakes, could resemble that of the Precontact peoples. While this is a key tactic, it would have been useful to know the dates of this "historic" period; they cannot be assumed.

Kooiman infers culinary habits from the archaeological data and subsequently compares and

"reassesses" them with "behaviors in the ethnographic and ethnohistoric contexts" (p. 130). Lipid analysis on the ceramics reveals that nuts, which were subseqently identified as acorns, were processed for consumption at the site. In her ***Chippewa Childlife and Its Cultural Background*** (1951), Sister M. Inez Hilger observed that acorns were not key staples, but prior to consumption, on their own or as thickeners, they were cooked to remove tannins. Microbotanical analysis reveals a "long history of maize consumption at the Cloudman site," which is supported by the ethnohistoric sources that indicate that boiling was the preferred method of cooking the grain prior to consumption. Kooiman draws on her earlier dissertation to state that maize "always co-occurs with another food or food group," as all of the "sixteen total vessels" had residues containing maize remains.[6] This is an interesting observation and reminds one that it is important to be aware of the differential survival of native starch during cooking, as noted by Alison Crowther.[7] Squash was a surprising discovery for Kooiman, because "the antiquity of its use in the Northern Great Lakes is relatively unknown and rarely discussed" (p. 132). Historic evidence of its use exists in the ethnographic and ethnohistoric records, but Kooiman asserts, based on archaeological evidence, that squash was not cooked on its own in any of the sampled vessels from the Cloudman site. Regarding wild rice Kooiman states that it was discovered that it adhered to carbonized food residues at the Cloudman site with the remains of squash and maize, suggesting that these foods were cooked together. She concludes that Late Woodland and Late Precontact ceramics were likely used for processing, that is, cooking, the rice, given their "sufficient heating effectiveness and thermal shock resistance" (p. 135). She notes that ethnographic sources strongly suggest that wild rice may not have been cooked independently as it is today. These last few words indicate the need for experimental archaeology to develop the point. Foodstuff called "aquatic resources," aquatic plants and fish, was identified based on N isotopes in the adhered pottery residues. Kooiman posits, based on ethnographic and ethnohistoric literature, that such fish were likely processed but not cooked in pots; they were fried, eaten fresh, spit roasted, or packed with sugar. Kooiman asserts that ethnographic evidence indicates that aquatic plants were consumed by the Indigenous peoples in the Great Lakes region. However, this evidence "informed but" did "not clarify" why pottery fom the site has high nitrogen values. Meat, berries, some vegetables, and maple sugar were components of both Ojibway and Iroquoian diets, but the extent to which these were found in food residues is "variable." Most vegetables that included aquatic plants, which were low fat content plants, could not be identified to a "more specific level." She observed that vegetables were "not emphasized" in the ethnographic literature, but berries were also found in the ethnographic literature (p. 137). Kooiman asserts that a signature for maple syrup has yet to be identified despite the fact that it is present in the ethnohistoric and ethnographic literature.

Kooiman concludes that shifts in cooking techniques occurred over time. Her finding is based on diachronic variation in the carbonized food remains. Analysis of the microbotanical evidence reveals a "diachronic shift" in maize and wild rice processing but Kooiman was unable to draw any firm conclusions about shifts in diets and types of cooking. Analysis of food residues does not indicate the existence of any "recipes or dishes" (p. 139). She concludes that boiling has its roots in cooking traditions dating from the Middle Woodland period and that it became popular during the onset of the Late Woodland period. Stewing, in contrast, was used throughout the occupation of the site but mainly during the Middle Woodland period. The adoption of metal cooking pots is understood as "following the establishment of trade with the Europeans," possibly leading to an "overrepresentation of boiling in the ethnographic record," but analysis of the carbonization patterns

on the interior of the vessels at Cloudman indicates that boiling was used from the Middle Woodland period onward. She concludes that ethnographic and ethnohistorical data both support and enhance the archaeological analysis of the ceramics. This is striking because Kooiman posits that experimental archaeology applied in conjunction with ethnographic observation of cooking behavior promised to "inform and enhance inferential connections between diet and cuisine" (p. 140).

Chapter 9 is the conclusion. This chapter sprawls and would have been more effective had the author created chronological subdivisions. At the outset, Kooiman reminds the reader that the data set under study is the largest of the Great Lakes region subjected to such a range of analytical techniques and that the results, "exchanged by ethnographic analogy," provide valuable insights into longstanding questions about the northern Great Lakes (p. 143). The temper is deemed the most valuable property of the ceramic record at the site while the average thickness of the vessels' walls does not follow the established trend of thickness decreasing over time. Change and consistency, for Kooiman, characterizes the site's ceramic record and the cooking techniques.

The northern Great Lakes and the region north of it clearly experienced a long history of occupation by various groups of Indigenous peoples over several millennia. Kooiman debates the possibility that the selection of food was connected to the identity of a specific group of occupants. Her tactic of taking "an integrated theoretical framework" structuring specific methodological and analytical techniques in a specific sequence is to be applauded (p. 48). It has enabled her to combine various methodologies (functional and typological ceramic analysis, typological analysis, and residue analysis), allowing her to squeeze as much information out of her data as possible. This is particularly the case in a body of legacy data, with the problems that it invariably entails. It would have been even more beneficial to have a discussion of the advantages and disadvantages and strengths and weaknesses of this type of analysis to understand why Kooiman chose these methodologies. In that way, readers, both archaeologists and nonspecialists, would have been able to comprehend precisely why each was selected.[8] But Kooiman's overall tactic—to "squeeze" the maximum from the archaeological data and, in this instance, "legacy" data, which can offer tricky and sometimes insurmountable challenges—in structuring methodologies according to a theoretical framework is one that I know the late Bruce Trigger would have applauded. These niggling weaknesses do not detract from this valuable and innovative study, a timely contribution to the field.

Notes

[1]. See Dorian Q. Fuller and Lara Carretero Gonzalez, "The Archaeology of Neolithic Cooking Traditions: Archaeobotanical Approaches to Baking, Boiling and Fermenting," ***Archaeology International*** 21, no. 1 (2018): 109–21, https:// doi.org/10.5334/ai-391; Juan José García-Granero, Eleni Hatzaki, Evgenia Tsafou, Gianna Ayala, Ioana Serpetsidaki, and Amy Bogaard, "From Storage to Disposal: A Holistic Microbotanical Approach to Domestic Plant Preparation and Consumption Activities in Late Minoan Gypsades, Crete," ***Journal of Archaeological Method and Theory*** 28 (2021): 307–31, https://doi.org/10.1007/s10816-020-09456-9; Sarah R. Graff, "Archaeological Studies of Cooking and Food Preparation," ***Journal of Archaeological Research*** 26 (2018): 305–51, https://doi.org/10.1007/s10814-017-9111-5; and Kathryn Twiss, "The Archaeology of Food and Social Diversity," ***Journal of Archaeological Research*** 20 (2012): 357–95, https://doi.org/10.1007/s10814-012-9058-5.

[2]. For example, see Matthew Boyd, Clarence Surette, Andrew Lints, and Scott Hamilton, "Wild Rice (Zizania Spp.), the Three Sisters, and the Woodland Tradition in Western and Central Canada," ***Midwest Archaeological Conference Inc.***, no. 1 (2014): 7–32, https://www.lakeheadu.ca/sites/default/files/uploads/53/outlines/2014-15/

NECU5311/Boyd%201.pdf; Matthew Boyd, Tamara Varney, Clarence Surette, and Jennifer Surette, "Reassessing the Northern Limit of Maize Consumption in North America: Stable Isotope, Plant Microfossil, and Trace Element Content of Carbonized Food Residue," ***Journal of Archaeological Science*** 35 (2008): 2545–56, https://doi.org/10.1016/j.jas.2008.04.008; Alexandra Burchill, "Plant Microfossil Analysis of Middle Woodland Food Residues, Northern Minnesota" (master's thesis, Lakehead University, 2014); and Sean Dunham, "Late Woodland Settlement and Subsistence Patterns in the Eastern Upper Peninsula of Michigan" (PhD diss., Michigan State University, 2014).

[3]. See Stuart Karrow, "Ontario's Archaeological Curation Crisis - Twenty Years Later" (master's thesis, University of Waterloo, 2017), https://core.ac.uk/download/pdf/144149992.pdf; and Ronald F. Williamson, "Planning for Ontario's Archaeological Past: Accomplishments and Continuing Challenges," ***Revista de Arqueología Americana*** 28 (2010): 7–45.

[4]. She cites Christine N. Branstner, ***Archaeological Investigations at the Cloudman Site (20CH6): A Multicomponent Native American Occupation on Drummond Island, Michigan, 1992 and 1994 Excavations*** (East Lansing: Consortium of Archaeological Research, Department of Anthropology, Michigan State University, 1995).

[5]. Dunham, "Late Woodland Settlement."

[6]. Susan M. Kooiman, "A Multiproxy Analysis of Culinary, Technological and Environmental Interactions in the Northern Great Lakes Region" (PhD diss., Michigan State University, 2018).

[7]. Alison Crowther, "The Differential Survival of Native Starch during Cooking and Implications for Archaeological Analyses: A Review," ***Archaeological and Anthropological Sciences*** 4 (2012): 221–35, https://doi.org/10.1007/s12520-012-0097-0.

[8]. For example, on the importance of complexities and intricacies of multi-isotope interpretation, see Richard Madgwick, Angela Lamb, Hilary Sloane, Alexandra Nederbragt, Umberto Albarella, Mike Parker Pearson, and Jane Evans, "A Veritable Confusion: Use and Abuse of Isotope Analysis in Archaeology," ***Archaeological Journal*** 178, no. 2 (2021): 361–85, https://doi.org/10.1080/00665983.2021.1911099; and on the difficulties of dealing with starch, see Crowther, "Differential Survival of Native Starch."

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