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RESEARCH PAPER

From Cultural Complexes to Complex Social Topography: A History of Spatial Approaches to Native Cultural Landscapes in the Middle Atlantic

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This paper explores the variety of spatial approaches Middle Atlantic archaeologists have used over the last 150 years to depict past Native social landscapes. It argues that the primary model used throughout the early 20th-century, cultural territories and complexes, illustrated past Native societies as isolated, static, and rigidly bound. The paper then explores how Middle Atlantic archaeologists in the last half of the 20th-century and the first decade of the 21th-century have provided alternatives to previous depictions by using different methodological and theoretical approaches and interpretative frameworks when considering variation in Native material culture. These approaches have revealed dynamic aspects of Native social landscapes that were overlooked by previous models. The acknowledgment of social complexity introduces the challenge of how to depict the more intricate social networks of past Native communities. However, a review of regional literature suggests that archaeologists are not using the full variety of maps at their disposal. The conclusion of this paper explores how archaeologists can continue to improve and diversify the cartographic conventions they use to illustrate Native social topography.

Introduction

Maps are significant tools in the archaeological toolbox. Archaeologists rely on a variety of maps not only to conduct research but also to illustrate results and interpretations. The maps archaeologists create often have clear and explicit goals such as providing information about a site's location, the surrounding natural environment, or spatial layout of sites and artifacts. However, implicit goals and influence from external factors can also impact the choice of map types used and the cartographic symbology that is employed. Nevertheless, these goals may not be explicitly discussed and can have unintentional consequences.

This paper considers the history of spatial approaches used by Middle Atlantic archaeologists seeking to map Native cultural landscapes and how these approaches have shaped our views of Native American cultures. It begins by providing a brief review of the recent reflexive movement in cartography and geography that demonstrates how thematic decisions made by mapmakers are influenced by their historical and social contexts. Drawing from these arguments the author demonstrates how influences from cultural historic and processual ideas are reflected in the cartographic symbology of archaeological maps. Because the analysis examines the cartographic visualization of archaeological material through time, it necessarily draws upon cartographic and archaeological texts, reflecting the interdisciplinary nature of archaeological map-making. Next, maps published in the *Journal of Middle Atlantic Archaeology* are examined to investigate whether the shift to post-processualism has altered mapping practices. The results indicate that mapping practices have stayed reasonably consistent through time despite shifts in theoretical orientation. Thus, the paper concludes by considering how recent research of indigenous mapping and technological developments can be utilized to explore and depict the complexities of Native societies and their social networks.

Cartography – a Scientific Art

Similar to debates that have taken place within the discipline of archaeology in the last three decades, there has been a rich and longstanding discussion among geographers and cartographers about the assumption of positivism in cartography. Until the beginning of the 20th-century, cartography[1] was considered to be a detached, objective, and neutral pursuit. Mapmakers endeavored to capture accurate representations of the world. This focus on scientific accuracy delineated the role of the map to be a factual statement about geographical reality (Buisseret 2001: 35).

In the early-to-mid-20th century academic cartographers shifted their focus to understanding how map design impacted the ability of maps to communicate information. As a result map design was heavily scrutinized (Montello 2002: 290). In addition to questioning the objectivity of cartographic choices, map historians

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increasingly highlighted the role of maps as communication devices between cartographers and map-readers (Dent 1999: 12–14; Harley and Woodward 1987; Jacob 1996; Monmonier 1996; Montello 2002: 290–291; Robinson 1952; Robinson and Petchenik 1975). Robinson (1952) in particular argued that systematic testing was necessary to investigate how cartographers' design decisions impacted map users' ability to read and interpret maps.

These researchers acknowledged that certain aspects of decision-making when creating a map were ruled by scientific components (e.g. orienting to a datum, using an accurate scale to depict the area of interest, and ensuring the projection one uses is the best fit for the geographic area and data to be displayed). However, they emphasized that other cartographic choices, such as filtering, translation, classification, and symbology, were more subjective. For example, transforming data into graphic marks on a map is a process of abstraction and involves generalization in the form of selection, classification, simplification, and symbolization (Dent 1999: 13). Moreover, readers of maps are not necessarily aware of how the data have been manipulated during these transformations, which can impact the way they interact with maps. As a result researchers have suggested that cartographers must operate with a greater awareness of the messages they explicitly or implicitly convey through the use of certain symbols.

In the latter half of the 20th century researchers continued to investigate maps' ability to serve as communicative devices. However, the focus shifted to include considerations of the social, political, and historical contexts of cartographers and cartography. The goal of these studies was to bring a more holistic understanding to the production of maps and their role within human societies (Harley 2001; Harley and Woodward 1987; Jacob 1996; Monmonier 1996). Some researchers went so far as to argue that in many cases the selection of map features generally served to highlight what the cartographer views as important and consequently suppresses what they find unimportant (Monmonier 1996: 18). Although some practitioners are hesitant to attribute all the power to cartographers (Buisseret 2001), most have acknowledged that the perception of maps as displays of an objective reality impacts how people read them, making them instruments of power.

The move toward reflexivity has allowed map historians, cartographers, and geographers to explore new areas in the study of mapmaking and the impact of maps on power structures and cultural heritage of past and contemporary societies (Harley 2001; Harley and Woodward 1987). It has also inspired cartographers and geographers to study changes in map symbology over time and consider which social contexts are influencing these changes (Fitzsimons and Turner 2006; Kessler and Slocum 2011; Robinson, Morrison and Muercke 1977). This article draws from the ideas and techniques developed in these studies to investigate the social and historical contexts of archaeological cartography in the Middle Atlantic. It should be noted that this article focuses on maps as communication tools. Undoubtedly, maps serve as data analysis tools for archaeologists to identify and explore patterns and relationships among data. Nevertheless, it is also useful to investigate how archaeologists employ maps to communicate findings and interpretations to others within the discipline and to the broader public.

A Brief History of Archaeological Cartography in the Middle Atlantic

Why the Middle Atlantic?

Although archaeologists debated the boundaries of the Middle Atlantic cultural area for many years (Custer 1994; Hantman and Gold 2002; Kinsey 1971), the region is now generally understood to extend from North Carolina to New York and from the Atlantic Ocean to the Appalachian Mountains (**Fig. 1**). This paper, with its focus on the Middle Atlantic, arose from the author's dissertation research, which examined the distribution of Native prehistoric smoking pipes and their relation to prehistoric social networks in the region. An investigation of the history of archaeology in the region revealed that the spatial approaches used to examine and depict Native American cultures and networks were fairly consistent over time and primarily focused on techniques of simplification and generalization. In particular, researchers tended to consistently use cultural areas/complexes and physiographic provinces as the main methods of visualizing Native societies and networks.

This paper expands on the dissertation research by taking a more critical look at maps and their role in research and interpretation. The following sections provide a brief background on the aforementioned cultural territories and how their representations on maps are related to shifts in theoretical paradigms within the archaeological discipline. The review provides context for the investigation of more recent maps that follows in the next section. It is ordered chronologically and begins with the maps of the cultural historians.

Cultural Historians

The goals of anthropologists and archaeologists working in North America during the early 20th-century were primarily framed by the cultural historical paradigm (Trigger 2006; Willey and Sabloff 1974). Many archaeologists conducting research during this period drew from a conception of culture that stressed continuity over wide geographic areas (Binford and Sabloff 1982: 139–140; Driver 1961; Driver and Massey 1957; Holmes 1903; Kroeber 1939; Wissler 1922). Researchers sought to delineate the territories of Native groups by blocking out larger territories based on generalized similarities of linguistic components, cultural traits (e.g. types of subsistence, social organization, economy) and material culture. Areas that exhibited homogeneity in these traits were considered cultural areas. **Figure 2**, a recreation of a map from Driver and Massey's 1957 work, *Comparative Studies of the North American Indian,* is an example of how these areas were illustrated on maps.

Figure 1: The Middle Atlantic Region. Source: ESRI USA Political Map and Topographic Map.

To depict cultural areas archaeologists tended to use cartographic techniques of selection and simplification. The majority of maps used in the first half of the 20th-century were small-scale maps with cultural territories delineated by solid boundary lines and areas infilled with different patterns. Boundaries for maps like the one pictured in **Figure 2**, were drawn based on a lack of similar cultural traits from one area to the next. However, even while endorsing these maps, a number of researchers noted the fluidity of boundaries and how difficult they can be to delineate (Driver 1961: 18; Driver and Massey 1957: 172; Holmes 1914: 414; Kroeber 1939: 6; Wissler 1922). Nevertheless, the shifts between cultural areas were depicted as abrupt and distinct transitions.

It is not surprising that cultural historians primarily employed the cartographic techniques of simplification and selection. These maps emphasized the aspects of Native societies that were important to research. As Driver and Collins (1975: 7) noted the aims of these maps were mostly descriptive, the goal being to depict the most up-to-date inventories of Native American culture traits that anthropologists had identified. Another important consideration when evaluating symbology is the level of measurement of the data. Cultural historians were primarily measuring data on a nominal level, which meant they were limited in what kinds of symbology they could use.

While the culture area paradigm continued to guide archaeological research and interpretation well into the middle of the 20th-century, archaeologists became increasingly interested in moving beyond the description

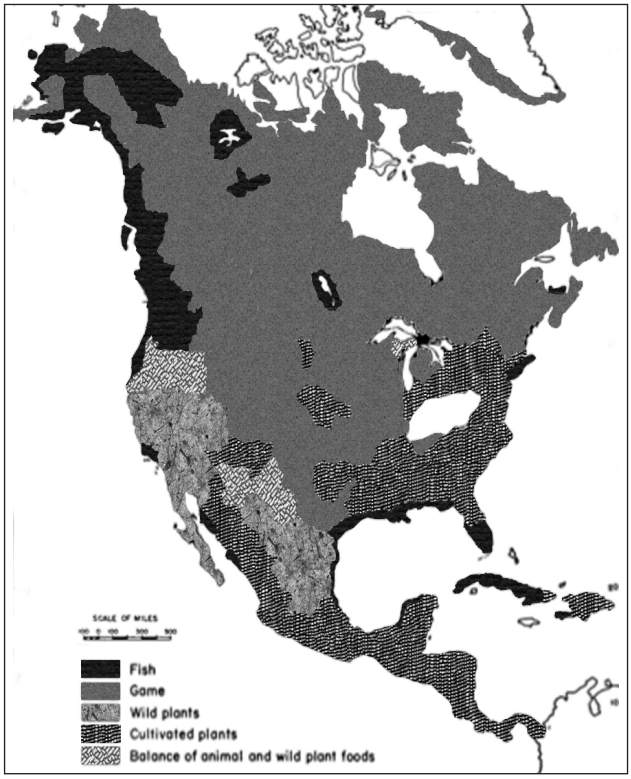

Figure 2: A recreation of one of the qualitative maps from Driver and Massey's article *Comparative Studies of the North American Indian (1957).* The map illustrates the geographic extent of subsistence practices of different Native American groups based on ethnographic and archaeological research.

of generalized culture areas to gain a better understanding of the behaviors of prehistoric and historic groups who inhabited these regions and how they changed over time (Guthe 1952: 11; Willey and Sabloff 1974: 133). As a result, a new paradigm was developed, known as processualism.

Processualism

The rise of processual archaeology in the later half of the 20th-century instigated a movement to push pass descriptions of shared traits to investigate cultures as integrated functional systems. With this movement cultural areas fell out of favor as research foci in North American archaeology. Instead, archaeologists became increasingly interested in discerning the dynamic connections between nature and culture. Archaeologists embraced human ecology studies as they centered their attention on the functional systems of prehistoric groups (Willey and Sabloff 1974: 152). This expanded the focus from cultural traits to include settlement patterns and subsistence studies. To depict this change archaeologists altered the ways they illustrated their results. Rather than using small scale qualitative maps, archaeologists started using diagrams and occasionally flow maps (see **Table 1**) to depict the movement of groups between settlement types during different seasons of the year (Custer 1986; Thomas 1973), or to depict how Native groups moved from different procurement areas to base camps (Custer 1986).

Although the types of maps used during the processual period varied from those used in earlier periods, archaeologists charting Native American material culture in the Middle Atlantic continued to use culture as a basic unit of inquiry, albeit in a different form. A rising interest in human ecology caused the boundaries of these units to shift into alignment with geographic regions called physiographic provinces. A physiographic province is a landform region or area delineated according to similar terrain that has been shaped by a common geologic history. The five physiographic provinces that run north and south through the Middle Atlantic region are, from east to west, the Coastal Plain, the Piedmont, the Blue Ridge Mountains, the Ridge and Valley, and the Appalachian Plateau. The five provinces that pertain to the study area of this project are illustrated in **Figure 3**.

Subdivision	Criteria	Example
Cartogram	A map that distorts real-world geographic distances to reflect an attribute or variable.	A map where counties or cities have been resized by scaling area in proportion to a variable such as population or GDP.
Choropleth	A map in which areas are shaded or patterned in proportion to the measurement of a statistical variable being displayed on the map. The statistical variable is usually collected in previously defined enumeration units, such as counties or states.	Election maps that use different colors to infill state, county, or legislative district areas based on the percentage of voters for a particular political party.
Dot	A map that uses dot symbology. Dots are set equal to a certain **number of observations of a phenomenon** and dots are placed wherever that phenomenon is known to occur.	See **Figure 4a**
Flow	These maps use lines of varying width to depict the movement of phenomena between geographic locations.	Flow maps are commonly used to show the movement of trade goods between different locations or the number of migrating people and the direction of their movement.
Geologic	A map that depicts a bird's eye view of geological phenomena or a map of a stratigraphic profile. These can also be considered a type of qualitative map.	See **Figure 3**
Graduated Symbols	A map that scales symbols in proportion to the magnitude of data occurring at point locations.	See **Figure 4b**
Historic	Maps depicting events or places from the past.	John Smith's *Map of Virginia* depicts the geographic layout of the area's major rivers, the Chesapeake Bay, and Virginia Indian towns in 1607.
Isarithmic	Maps that depict smooth continuous phenomena and use contour or isolines to identify areas of similar data.	Topographic maps
Qualitiative	Maps that use lines or infilling to illustrate the geographic extent of a certain cultural or natural phenomena such as language groups or forested land.	See **Figure 2**

Table 1: Summary of main criteria used to classify thematic maps into different categories and examples of each type of map.

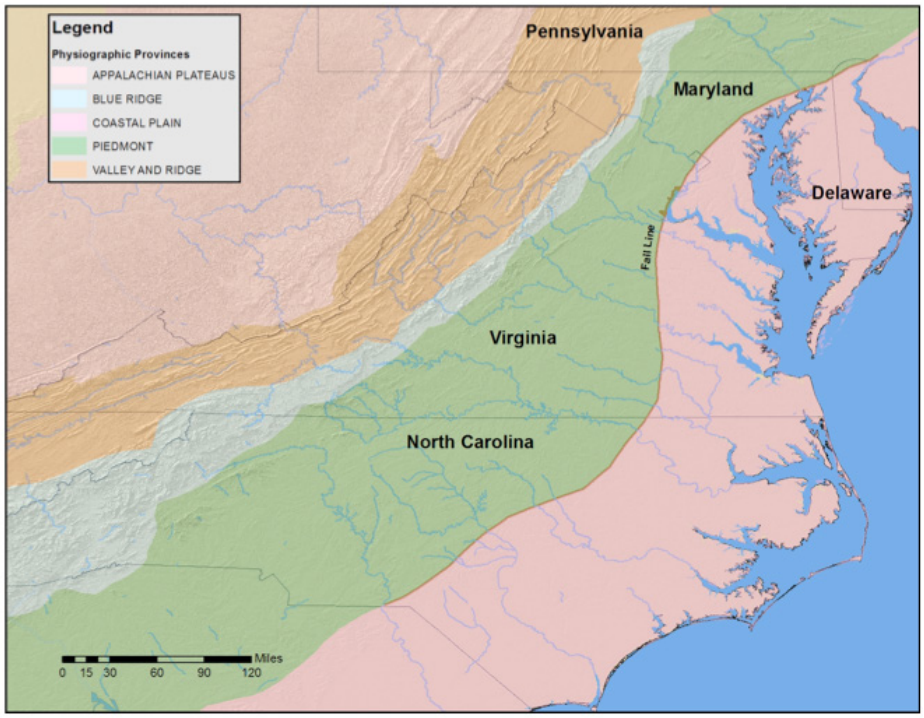

Figure 3: The physiographic provinces of the Middle Atlantic region: Coastal Plain, Piedmont, Blue Ridge Mountains, Ridge and Valley, and the Appalachian Plateau. Source: ESRI Geologic Base Map.

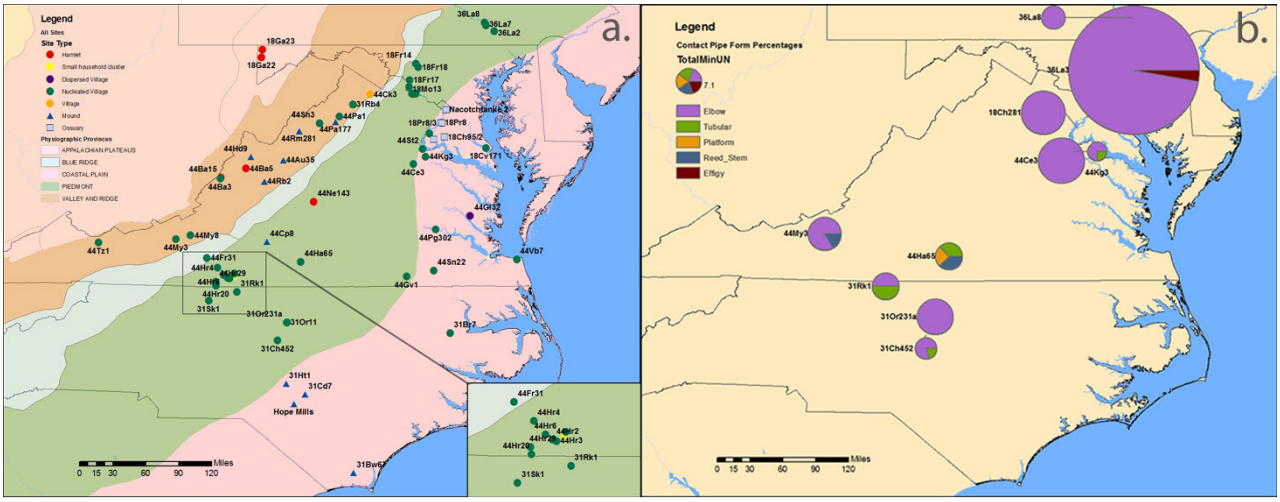

Figure 4: a) Example of a dot map (Bollwerk 2012). Each symbol (dot, triangle, square etc.) represents the approximate location of a single archaeological site. **b)** Example of a map with graduated symbols (Bollwerk 2012). The size of each pie chart is proportional to the size of an archaeological assemblage. The location of the pie chart represents the approximate geographic location of the archaeological assemblage it represents.

A number of Middle Atlantic archaeologists tended to portray physiographic provinces as bounded cultural units, especially during the Late Woodland period (Gallivan 2003: 6). The distribution of artifacts and settlement features, such as ceramic temper, lithic raw material, house shape, storage methods, among others, was compared within a province but also across provinces' borders. It was used to argue that variations in resource availability between the provinces helped foster different cultural units (Custer 1994; Gardner 1987; Mouer 1981). As a result, small-scale maps with solid boundaries continued to be used by archaeologists but the boundaries' positions replicated physiographic provinces. However, in their symbology, some researchers replaced solid lines with dotted lines around territorial boundaries to indicate uncertainty.

In addition to physiographic provinces, entities known as cultural complexes continued to serve as units of interest to Middle Atlantic archaeologists. Although these complexes were originally meant to serve as units to research archaeological cultures as dynamic and integrated systems, in many ways they simply became smaller versions of culture areas. The continued association of 'archaeological cultures' with 'real' units encouraged Middle Atlantic archaeologists to focus on classes of material culture

that could consistently be tied to a 'culture.' Ultimately, as distributions of artifact classes were found to extend outside of 'cultural' boundaries, archaeologists extensively pared down the classes of material culture that could be 'reliably' used as diagnostic traits. In essence, ceramic forms became the only dependable material cultural class for these types of analyses (Dent 2003; Jirikowic 1995; Kavanagh 1982; Potter 1993). Thus, rather than embracing variation, archaeologists began to eschew variability in favor of consistency or continuity in artifact patterning. As a result, maps depicting Native cultural complexes represented groups that were much like the culture areas of the cultural historians. More importantly, the uncertainty inherent to the archaeological rendering of cultural units disappeared. Researchers used similar symbology to depict these units as areas unified with one color or pattern bounded by solid lines.

Post-processualism: Taking it Apart

Despite the persistence of cultural complexes, within the last few decades, archaeologists have drastically changed their view of Native American cultures. The development of post-processualism has encouraged a number of Middle Atlantic researchers to shift their focus. Drawing from Hodder (1982) and Shennan (1989: 11–24) these archaeologists have questioned the utility of drawing direct relationships between material patterning and particular types of social categories, such as cultures. They suggest that archaeologists have done enough to establish and describe the basic units and should move towards 'picking things apart' (Dent 2003; Egloff 1992; Means 2003) and embrace uncertainty.

Additionally there is a growing consensus that archaeologists working in the region should give more consideration to the kind of units they are defining and more attention to the variation within those units. For example, Means (2003) has suggested that the boundaries of cultural complexes are useful analytical tools for looking at variation, but that it is dangerous to perceive them as actual social units. Cultural complexes—while useful for differentiating the spatial and temporal variation of objects—must be explicitly defined as tools: analytical units and not actual representations of Native cultures and communities. Furthermore, there is a growing realization that the depictions of Native culture identified and shared by archaeologists have an impact on the general public and on contemporary Native communities. Thus, illustrating past Native cultures as solely homogeneous and bounded units, rather than dynamic and mobile, suggests Native cultures were static entities in space and time. This has a negative impact on contemporary cultures that are fighting against this kind of stereotype as they work to educate the public about their history and culture.

With the advent of shifting interests in the discipline one might expect maps from more recent years to incorporate different types of symbology or methods of communicating uncertainty in an effort to address the call to break things apart. The next section investigates whether such design changes are actually being incorporated into archaeological interpretation.

A Study of Recent Middle Atlantic Maps

To better understand how Middle Atlantic archaeologists have been using maps in the last few decades, the author undertook a qualitative study of the maps contained within the *Journal of Middle Atlantic Archaeology* (JMAA). The objective of this study was to determine whether the design of maps used in Middle Atlantic archaeology has changed over time and if these changes reflect post-processualist ideas. The analytical methods were adapted from a similar investigation conducted by Kessler and Slocum (2011) that analyzed changes in the design of thematic maps through time in two geographic journals.

Sample

To compose a representative sample of the maps used by Middle Atlantic archaeologists it was necessary to find publications that covered the whole region. Drawing from similar studies of changes in map production over time (Fitzsimons and Turner 2006; Kessler and Slocum 2011) it was deemed preferable to focus on journals as opposed to individually authored books. Ultimately, the *Journal of Middle Atlantic Archaeology* was chosen as the data source. Two factors ultimately led the author to choose this journal. The first was the interest in focusing on the Middle Atlantic region as much as possible while getting a representative sample of current research topics. One limitation of using this journal, however, is that publication did not begin until 1985. This meant that the journal did not cover as long of a timespan as journals like the *Archaeology of Eastern North America,* or the *Bulletin of the Eastern States Archaeological Federation,* which were also considered for the study. However, due to its regional focus, the fact that the journal represents current trends in the region and has had a consistent set of submission guidelines for authors (which could impact whether maps would be included), it was deemed the best possible dataset.

Besides choosing the journal, it was necessary to determine what kinds of articles to include. In addition to research articles, each volume of JMAA contains introduction pieces, correspondence from the editor, editorials, and book reviews. Book reviews, editorials, news and notes, and any correspondence were not analyzed because spot-checking these types of articles showed they did not contain any maps or non-textual materials. Finally, it should be noted that map data was collected from all the articles in a volume no matter what the subject. Although the primary interest was the use of maps to depict Native culture boundaries, the author anticipated that the number of articles focusing on that topic might be too small of a group to make any meaningful observations. Thus the investigation looks at map use more generally while giving special consideration to those articles that dealt with past Native communities.

Data Collection

In addition to information on maps, data on non-textual elements was collected to provide a more holistic understanding of how maps were used to communicate information in relation to other illustrations. The following

non-textual elements were considered in addition to maps: tables, graphs, photographs, diagrams, drawings, paintings, and forms. Roughly the same qualities as those used by Kessler and Slocum (2011: 297) were used to categorize non-textual elements. Tables were considered to be tabular arrangements of data. Graphs were identified as abstract representations of the relationship of two or more sets of numerical data. Diagrams were considered to be illustrations of how something works or directional flow (as in a flow chart). Photographs were images of objects taken using a camera. Items categorized as drawings or paintings were any illustrations in paint, pencil, or ink that represented cultural or natural phenomena. Forms consisted of copies of site's illustrations or curation forms used in the field or lab.

Maps were divided into two categories: general reference (including locational maps) and thematic maps. A number of sources (Dent 1999: 5; Kessler and Slocum 2011: 297; Muehrcke and Muehrcke 1998; Slocum, McMaster, Kessler and Howard 2005: 2) define general reference maps as maps that provide an overview of a variety of natural and cultural phenomena pertaining to a region with as much locational accuracy as appropriate. In contrast, a thematic map focuses on the distribution of a particular type of social or physical phenomena. It should be noted that the line between these two kinds of maps can be fuzzy (Petchenik 1979) so it was at times difficult to assign a map to one of these two categories. Some maps in the sample seemed to be serving both purposes, i.e. providing an overview of the site or region while showing the distribution of a particular characteristic or attribute. This is not surprising given that authors had limited space. If a map seemed to emphasize one type of phenomena (e.g. the distribution of sites, artifacts, excavation units) even if it provided an overview, it was placed in the thematic category so it could be further studied according to the criteria explained below.

Besides comparing locational and thematic maps, the author was particularly interested in tracking the use of different thematic maps to investigate if the incorporation of post-processual theory increased the diversity in the types of maps archaeologists were using to illustrate cultural and natural phenomena. Within the thematic map category, nine subdivisions were created to capture variation in the types of thematic maps used by archaeologists. The nine categories used were: cartogram, choropleth, dot, flow, graduated symbols, geologic, historic, isarithmic, and qualitative. All of these are either adopted from Kessler and Slocum (2011) and/or are commonly discussed in cartography textbooks (Dent 1999; Slocum, McMaster, Kessler and Howard 2005). The main criteria used to categorize different kinds of maps into these subdivisions are summarized in **Table 1**. Examples of some of these maps are included in **Figures 2, 3, 4a** and **4b**.

In addition to looking at the use of different kinds of thematic maps, information was collected on the use of different kinds of symbols in thematic maps such as solid or dotted lines, infilling, labeling, and symbolization. The occurrence of these symbols within the selected data was recorded to analyze whether solid lines and infill continued to predominate as an illustrative technique.

Hypotheses

A few hypotheses were developed based on the goals of the study to guide data collection and analysis:

Hypothesis 1: There will be a general increase in the use of maps over time and in relation to other types of non-textual elements due to the introduction of computerized cartography.

Hypothesis 2: There will be an increase in use of different kinds of thematic maps through time as archaeologists try to incorporate ideas from post-processual movement. For example one would expect to see an increase in flow maps or cartograms as opposed to the consistent use of qualitative maps.

Hypothesis 3: There will be increased variation in the symbols used in later time periods with introduction of computerized mapping and the incorporation of ideas from post-processualism. For example, the use of solid boundary lines and infill will be minimal.

Results

A total of 310 articles from the JMAA were analyzed to examine how maps were used and if their use changed through time. To analyze change over time, the journal articles were divided into six different periods, each containing five years. The only exception was the last group, which had four instead of five years. The interval of five years was chosen because it divided the articles in the 29 volumes into fairly even groups. These six groups were used as the primary units for analysis. **Table 2** shows the number of articles contained within each five-year interval, which ranges from 45 to 61. It also shows the percentage of articles in each period that contained maps, which did not immediately seem to fluctuate in a consistent manner.

The next step was to analyze the data and evaluate the three hypotheses. All analyses were conducted in R (R Development Core Team 2014) and **Figures 5** through **9** were created with R's ggplot2 package (Wickham 2009). The first analysis examined if the number of maps used in journal articles changed through time. **Figure 5** is a histogram that shows the distribution of maps within each time period. The histograms show that maps were

Years	Number of Articles	% of Articles with One or More Maps
1985–1989	45	44
1990–1994	46	76
1995–1999	55	64
2000–2004	54	46
2005–2009	61	44
2010–2012	49	67
Total	297	

Table 2: The total number of articles and percentage of articles containing maps in each time period.

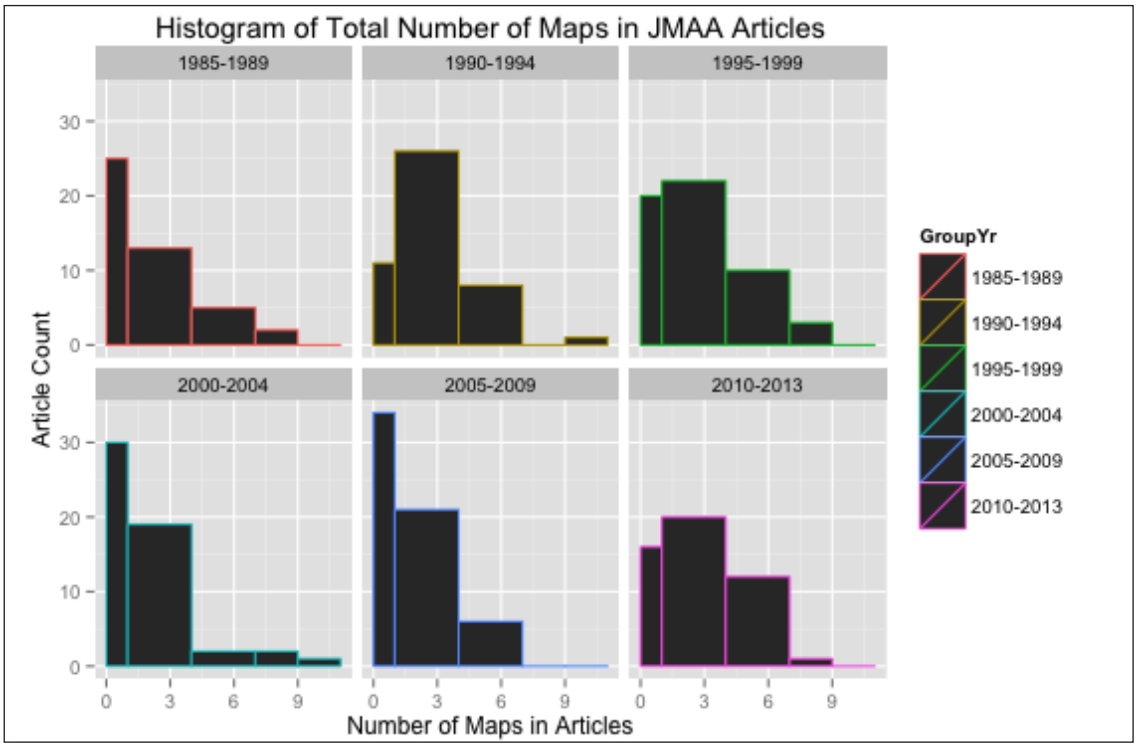

Figure 5: Frequency of maps used in JMAA articles published between 1985–2013, divided into six time periods.

consistently used in the JMAA through time. It is notable that most articles had four or fewer maps. This is likely due to the fact that authors had to keep their papers to reasonable lengths although some contributors did include as many as 11 maps. However, in contrast to the proposed hypothesis there is no indication of a clear trend of maps increasing through time. Instead the histogram suggests that from 1990–2005 the frequency of articles without maps increased.

The decrease in map use through time suggested by the histogram was reinforced when the percentage of articles with maps was compared with the use of non-textual elements in the text (**Fig. 6**). The graph shows that maps were consistently used during all six periods, but there is a marked downward trend in their use from 1990-2005. In contrast, during the same time span, the percentage of articles using tables and graphs increased. However, it should be noted that at the lowest point, maps were still used in 44% of articles.

The downward trend in map use from 1990–2005 is interesting given that computerized mapping software was becoming more widely available during this period. A look back at the volumes published shows that at least one focused on a topic that does not necessarily lend itself to mapping: Volume 21 published in 2005 focused on curation. But the focus in one volume certainly does not explain the overall downward trend. A closer look at the volumes published in this 15-year period provided some possible explanations. A number of articles focused on the classification of artifacts, which does not necessarily have a spatial component. Other researchers looked at ethnohistory, and still others dealt with more theoretical topics. If nothing else, this data shows the variety of elements archaeologists use to illustrate their results and their interpretations, and the diversity of topics covered in JMAA.

Besides looking at general trends in the use of maps, the author was curious about the different kinds of maps used by archaeologists. **Figure 7** is a comparison of the two types of maps classified in the study, referential/locational maps and thematic maps. The graph illustrates that thematic maps were used consistently and in a higher percentage of articles than referential maps. This is interesting because it indicates that referential maps were not as important for illustrating or situating archaeological arguments as thematic maps. However, it should be noted that when a map seemed to fulfill the criteria for both referential and thematic it was classified as thematic. Thus, the higher percentage of thematic maps could be due to the way referential vs. thematic maps were categorized.

The next analysis centered on the second hypothesis and considered the use of different types of thematic maps. With the advent of post-processualism, one might expect to see increased variation in the types of thematic maps used over time as archaeologists diversified the types of social phenomena they were interested in. However, as illustrated in **Figures 8** and **9**, the use of different kinds of thematic maps did not change over time. Instead the frequency of thematic maps' use remained fairly consistent and broke down into two distinct divisions. One division included three kinds of maps: historic, dot, and qualitative which typically were used in 20–60% of articles containing maps. The other five types of maps (cartogram, choropleth, flow, graduated symbols, and isarithmic) consistently comprised less than 20% (in all but one case less than 10%) of the maps used in each period.

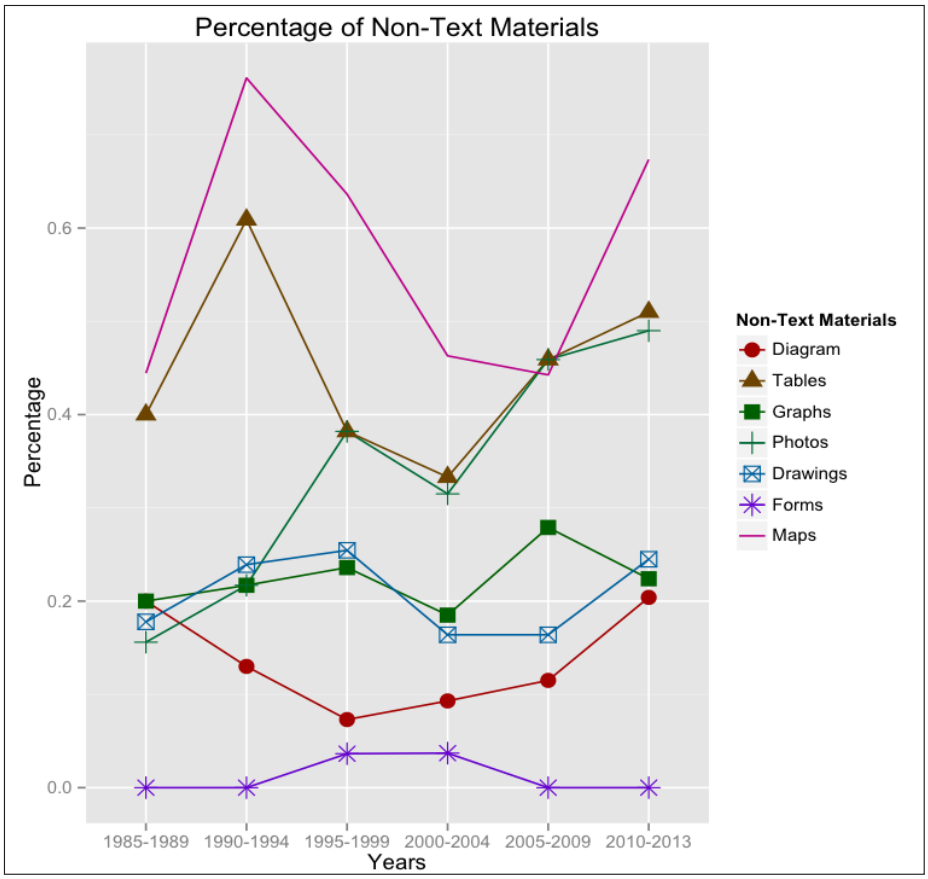

Figure 6: Comparison of non-text materials used in JMAA articles published between 1985 and 2013.

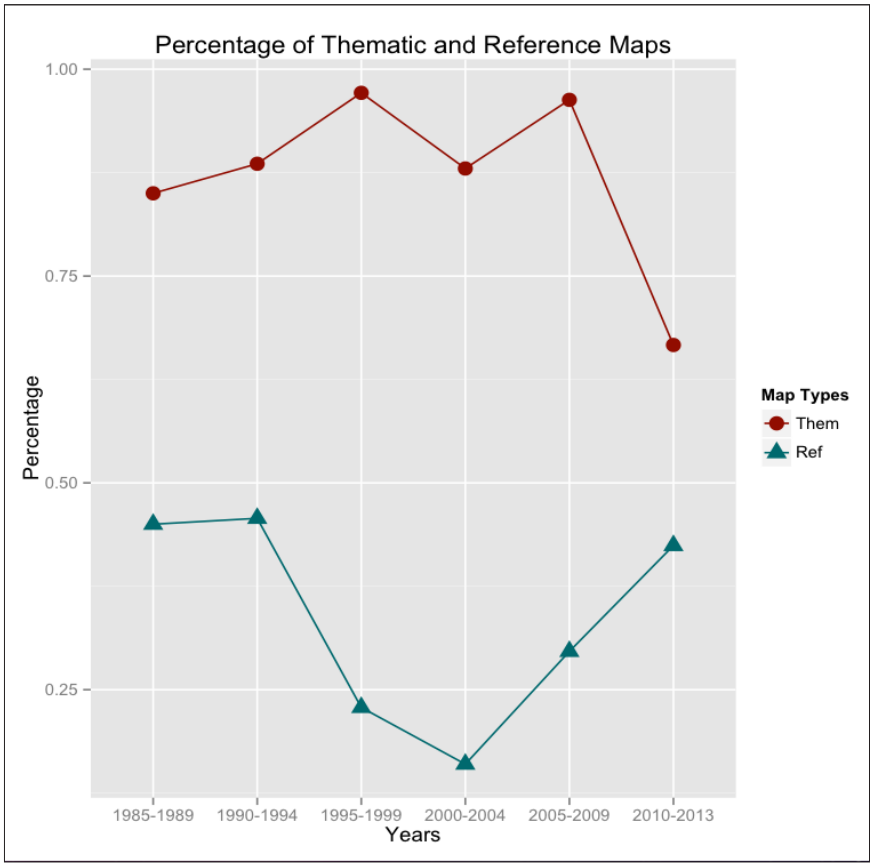

Figure 7: Comparison of referential/locational maps and thematic maps used in JMAA articles published between 1985 and 2013.

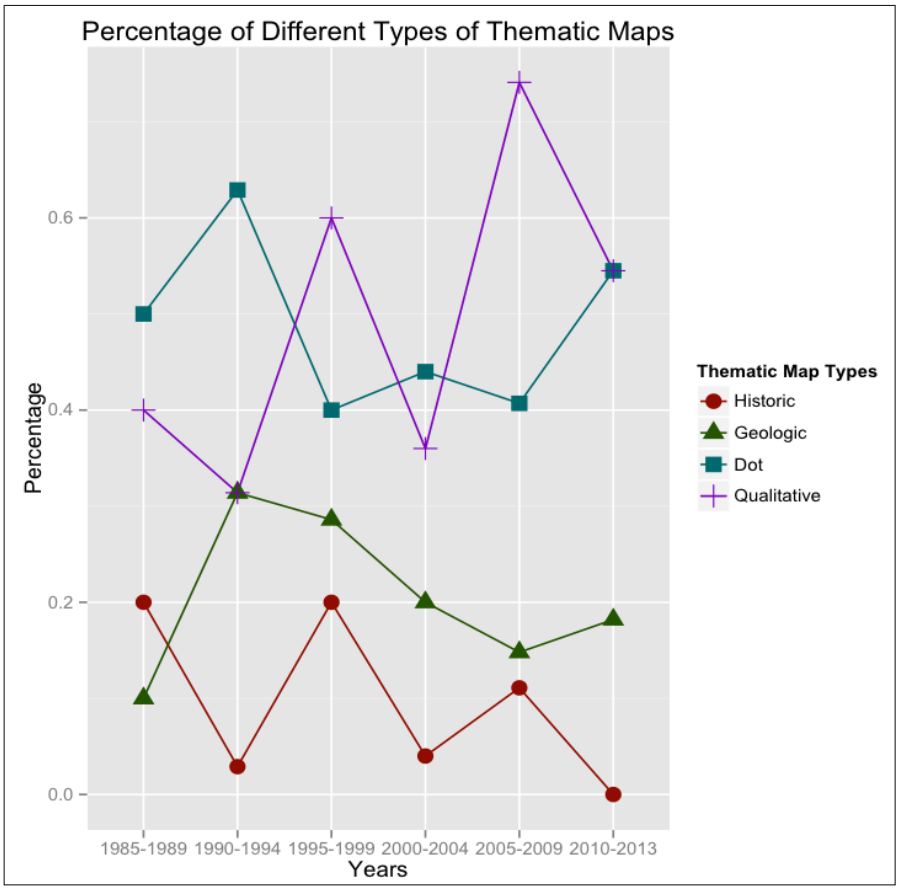

Figure 8: Percentages of historic, geologic, dot, and qualitative maps in the sample of maps from JMAA.

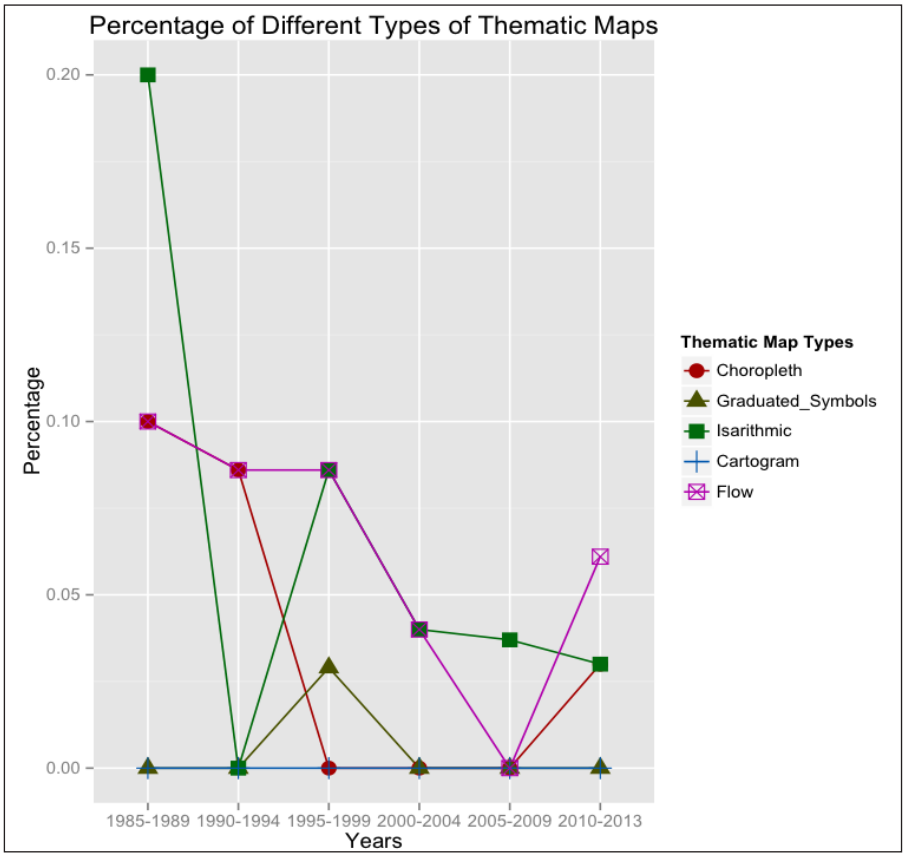

Figure 9: Percentages of choropleth, graduated symbol, isarithmic cartogram, and flow maps in the sample of maps from JMAA. Note the scale for the y-axis is different than **Figure 8.**

Given the persistent use of qualitative maps the final analysis focused on whether the symbology had changed over time. This examination focused on depictions of Native cultures. Out of the 169 thematic maps contained in the dataset, 17 were used to illustrate Native American cultures or linguistic areas. Four maps used solid lines, three used dotted lines, and nine had an area infilled with a pattern with no boundary lines. Although it is a small sample, it is encouraging that the majority of maps (70%) did not use solid lines and indicated that the boundaries of the territories were not discrete or abrupt. However, it is somewhat surprising that qualitative maps continue to be so popular given that there are other methods for mapping territories available.

Discussion

A review of maps' use in JMAA demonstrates that maps have been and continue to be a vital tool for communicating interpretations of data and information about archaeological data. However, the results presented here suggest that Middle Atlantic archaeologists could diversify the types of maps they use to illustrate their points. It should be noted that the trends identified here should be further tested with a larger study that includes articles from journals like the *Archaeology of Eastern North America, Bulletin Eastern States Archaeological Federation,* and *Northeastern Anthropology*.

Nevertheless, archaeologists could use a more diverse array of thematic maps to communicate interpretations of data. Obviously though, this is easier said than done. Although many anthropologists and cartographers know dotted lines and infill patterns don't capture cultural complexity, it can be difficult to find ways to depict it. And to be fair to archaeologists of the past, depicting dynamism and mobility on a two-dimensional plane is extremely difficult. Many archaeologists have focused on discrete and bounded spatial units because they are helpful for analytical purposes. But archaeologists live in a world that is simultaneously discrete and continuous. Moreover, depictions of Native peoples as static and homogeneous have a negative impact on the public's perception of these groups. So how can archaeologists address this challenge? The final section of this article considers a few techniques that might help archaeologists with this dilemma.

Discussion

How can researchers create maps that communicate more complicated concepts to readers? This section provides three suggestions: incorporating alternative views of space and place into maps; shifting the focus from static boundaries to social networks; and using new cartographic methods of illustrating uncertainty.

Alternative Views of Space and Place

Historic accounts indicate that Western explorers were not the only people creating maps in the early Middle Atlantic. In fact, Native peoples drew or provided the data for many of the earliest maps that illustrated parts of North America (Lewis 1998; Norona 1950; Vorsey 1992; Waselkov 2006). Unfortunately most of these maps were often drawn on ground surfaces or organic materials, such as deerskins, and have not survived. The few surviving examples, however, demonstrate that Native people had extensive cartographic capabilities. Furthermore, these maps indicate that Native people used their own cartographic symbology. Researchers have noted that Native maps could provide an extremely accurate bird's eye view of tertian and geographic locales (Lewis 1998). On the other hand, some maps tended to ignore geographic distance and used size and distance as an indicator of cultural factors, such as political influence or the strength of a relationship between two groups (Waselkov 2006). Additionally, the use of simple symbols and a 'variable scale' are also important components of Native cartography.

The research into indigenous mapmaking, and the acceptance of the fact that Native peoples had their own informed and complex view of natural and social topography, has encouraged historians, cartographers, anthropologists and archaeologists to rethink the symbology and themes used in their mapping. While differences in artifacts can be used to show differences and boundaries, they also embody similarities that are material evidence of relationships. Perhaps the most appropriate maps to illustrate relationships are cartograms. Cartograms give up geographic and topographic accuracy by using a variable scale to depict relationships, territories, and networks and travel routes. No cartograms were used in JMAA. Yet their incorporation into research might provide an interesting expansion of the ways archaeologists depict space and place in the past.

Mapping Mobility and Social Networks

Research into Native cartography has demonstrated that many individuals in Native communities were extremely knowledgeable about the geography of their immediate area and, in some instances, of areas well beyond their immediate vicinity. Material culture studies of Native lithics and ceramics have also shown that individuals or groups would travel long distances to procure necessary or important resources. While communities had home territories they were also on the move and created relationships that traversed cultural and even linguistic boundaries. Native people were clearly mobile and this should be taken into account when creating maps.

In addition to movement, social and exchange networks were an important part of Native culture. Ethnohistorical evidence from maps created in large part from Native informants even suggests that Native people used solid boundaries to delineate territories to illustrate the networks that bound them together (Lewis 1998; Waselkov 2006). Thus, networks were just as important as boundaries.

Flow maps provide a means of illustrating or depicting movement. Recent developments in mapping programs, such as ArcGIS, have made it easier to depict networks and movement of goods and people using flow maps (Gegit 2013). A total of 11 flow maps were present in the JMAA dataset and **Figure 8** demonstrates that their use increased slightly in the last five years. Cross's (2012) article in particular demonstrates that new applications, such as cost path analyses, can help researchers determine which pathways Native peoples most likely used while

also illustrating them for readers. Again, cartograms can also be employed to illustrate relationships or networks. Finally, the recent development of visualization programs like Neatline software allows archaeologists to create animations that can help audiences to actually visualize the movement of past individuals and groups through landscape. These types of illustrations help reinforce the idea that Native peoples were dynamic and mobile, not static cultural entities.

Depicting Uncertainty

Perhaps one of the most difficult aspects of depicting social landscapes is the uncertainty of any social entity's boundaries. Archaeology is not the only discipline to struggle with the depiction of uncertainty (MacEachren, Robinson, Hopper, Gardner, Murray, Gahegan and Hetzler 2005). Geographers, geologists, and cartographers have also struggled to communicate this concept on maps in an effective way for centuries. MacEachern (1992) and Slocum, McMaster, Kessler and Howard (2005) have suggested that transparency, crispness, and differing resolution provide ways of illustrating uncertainty to map-readers. By thinking of cultural and linguistic boundaries as smooth continuous phenomena and delineating interaction or uncertainty with transparency one can communicate a more nuanced view of Native cultures and community boundaries.

Figure 10 provides an example of depiction of uncertainty. Using the ring buffer tool in ArcGIS, the boundaries of Middle Atlantic cultural complexes can be depicted as 'fuzzy', indicating uncertain boundaries. Adding transparency to the buffer lines also allows them to overlap without canceling each other out. This is just one way for archaeologists to communicate or illustrate the spatial dimensions of our analytic units but also show that Native cultures were not bound entities.

In conclusion, this article has sought to better understand how archaeologists have used and continue to use maps. It has demonstrated that the cartographic decisions used in making maps are impacted by the introduction of different theoretical paradigms in the discipline. Despite the introduction of post-processualism, the types of maps used by archaeologists have not necessarily changed. Hopefully the ideas presented here will encourage fellow archaeologists to be aware of how the units and symbols have a broader impact and to experiment with different kinds of maps to communicate ideas.

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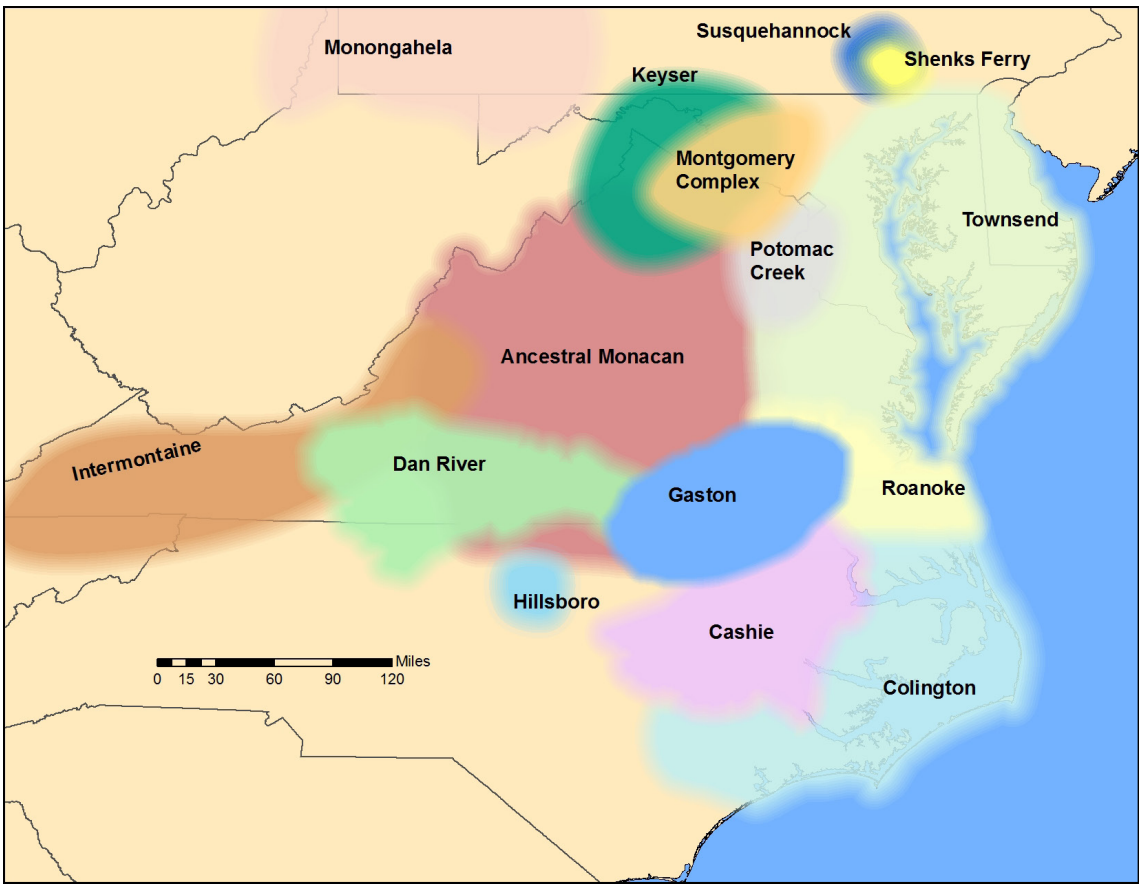

Figure 10: Cultural Complexes of the Middle Atlantic depicted with 'Fuzzy Boundaries'.

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Notes

[1] This article uses the International Cartographic Association's definition of cartography: 'the discipline dealing with the art, science, and technology of making maps' (International Cartographic Association, 2003).

[2] Map symbology refers to the symbols used on maps to depict a location, characteristic, or element of data. Symbols include graphic representations such as circles, stars, or characters. Changes in the color or size of symbols can be used to indicate variations in the data being displayed.

[3] A map is defined as a spatial or symbolized representation of the environment that is portrayed graphically (Dent 1999; International Association of Cartographers 2003).

References

Binford, L and **Sabloff, J** 1982 Paradigms, Systematics, and Archaeology. *Journal of Anthropological Research* 38(2):137–153

Bollwerk, E 2012 Seeing What Smoking Pipes Signal(ed): An Examination of Late Woodland and Early Contact Period (A.D. 900–1665). Native Social Dynamics in the Middle Atlantic. Charlottesville: University of Virginia (unpublished PhD dissertation).

Buisseret, D 2001 Texts and Contexts in the Interpretation of Early Maps. In: Harley, B J (ed.) *The New Nature of Maps.* Baltimore: Johns Hopkins University Press. p. 33–49.

Cross, K 2012 Least Resistance? Cost-Path Analysis and Hunter-Gatherer Mobility in the Virginia Blue Ridge. *Journal of Middle Atlantic Archaeology* 28: 1–10.

Custer, J 1986 *Late Woodland Cultures of the Middle Atlantic Region.* Newark: University of Delaware Press.

Custer, J 1994 Current Archaeological Research in the Middle Atlantic Region of the Eastern United States. *Journal of Archaeological Research* 2(4): 324–360. DOI: http://dx.doi.org/10.1007/BF02231483

Dent, B D 1999 *Cartography: Thematic Map Design.* 4th ed. Chicago: Wm. C. Brown Publishers.

Dent, R J 2003 Excavations at a Late Woodland Village in the Middle Potomac Valley: Theory and Practice at the Winslow Site. *Journal of Middle Atlantic Archaeology* 19.

Driver, H E 1961 *Indians of North America.* Chicago: University of Chicago Press.

Driver, H E and **Collins, J L** 1975 Classification and Development of North American Indian Cultures: A Statistical Analysis of the Driver-Massey Sample. *Transactions of the American Philosophical Society* 65(3): 1–120. DOI: http://dx.doi.org/10.2307/1006264

Driver, H E and **Massey, W C** 1957 Comparative Studies of North American Indians. *Transactions of the American Philosophical Society* 47(2): 165–456. DOI: http://dx.doi.org/10.2307/1005714

Egloff, K T 1992 The Late Woodland Period in Southwestern Virginia. In: Hodges, M.E. and Reinhart, T (ed.) *Middle and Late Woodland Research in Virginia: A Synthesis*, Special Publication. Richmond: Archaeological Society of Virginia. p. 187–223.

Fitzsimons, D and **Turner, E** 2006 The Changing Look of Maps Within Geography Journals. In: *Proceedings of AutoCarto 2006*. Vancouver: The Cartography and Geographic Information Society. [online]. Available at http://www.cartogis.org/publications/proceedings.php?year=2006 [Accessed 4/2/2015].

Gallivan, M 2003 *James River Chiefdoms: The Rise of Social Inequality in the Chesapeake.* Lincoln: University of Nebraska Press.

Gardner, W M 1987 Comparison of the Ridge and Valley, Blue Ridge, Piedmont, and Coastal Plain Archaic Period Site Distribution: An Idealized Transect (Preliminary Model). *Journal of Middle Atlantic Archaeology* 3: 49–80.

Gegit, B 2013 Distributive Flow Maps – More Raster, More Faster. [online]. Available at http://blogs.esri.com/esri/apl/author/Bob-68/ [Accessed 11/1/2014].

Guthe, C E 1952 Twenty-Five Years of Archaeology in the Eastern United States. In: Griffin, J B (ed.) *Archaeology of the Eastern United States*: 2-12. Chicago: Chicago University Press.

Hantman, J L and **Gold, D L** 2002 *The Woodland in the Middle Atlantic: Ranking and Dynamic Political Stability*. In: Anderson, D G and Mainfort, R C (eds.) *The Woodland Southeast.* Tuscaloosa: University of Alabama Press: 270–291.

Harley, J B (ed.) 2001 The New Nature of Maps: Essays in the History of Cartography. Baltimore: Johns Hopkins University Press.

Harley, J B and **Woodward, D (eds.)** 1987 *The History of Cartography, Volume 1. Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*. Chicago: University of Chicago Press.

Hodder, I 1982 *Symbols in Action: Ethnoarchaeological Studies of Material Culture.* Cambridge: Cambridge University Press.

Holmes, W H 1903 *Aboriginal Pottery of the Eastern United States.* 20th Annual ed. Washington: Smithsonian Institution, Bureau of American Ethnology.

Holmes, W H 1914 Areas of American Culture Characterization Tentatively Outlined as an Aid in the Study of the Antiquities. *American Anthropologist* 16(3): 413–446. DOI: http://dx.doi.org/10.1525/aa.1914.16.3.02a00020

International Cartographic Association 2003 *Mission.* [online]. Available at: http://www. http://icaci.org/mission/ [Accessed 22 December 2013].

Jacob, C 1996 Toward a Cultural History of Cartography. *Imago Mundi*, 48: 191–198. DOI: http://dx.doi.org/10.1080/03085699608592842

Jirikowic, C 1995 *The Hughes Village Site: A Late Woodland Community in the Potomac Piedmont*. (Unpublished Ph.D. Dissertation) Department of Anthropology, American University.

Kavanagh, M 1982 *Archaeological Resources of the Monocacy River Region, Frederick and Carroll Counties.*

Baltimore: Maryland Geological Survey, Division of Archaeology Field Report No. 216.

Kessler, F C and **Slocum, T A** 2011 Analysis of Thematic Maps Published in Two Geographical Journals in the Twentieth Century. *Annals of the Association of American Geographers* 101(2): 292–317. DOI: http://dx.doi.org/10.1080/00045608.2010.544947

Kinsey, W F 1971 The Middle Atlantic Culture Province: A Point of View. *Pennsylvania Archaeologist* 41(1–2): 1–8.

Kroeber, A L 1939 *Cultural and Natural Areas of Native North America*. Vol. 38. Berkeley: University of California Publications in American Archaeology and Ethnology.

Lewis, G M (ed.) 1998 *Cartographic Encounters: Perspectives on Native American Mapmaking and Map Use*. Chicago: University of Chicago Press.

MacEachren, A M 1992 Visualizing Uncertain Information. *Cartographic Perspectives* 13: 10–19. DOI: http://dx.doi.org/10.14714/CP13.1000

MacEachren, A M, Robinson, A, Hopper, S, Gardner, S, Murray, R, Gahegan, M, and **Hetzler, E** 2005 Visualizing Geospatial Information Uncertainty: What We Know and What We Need to Know. *Cartography and Geographic Information Science* 32(3): 139–160. DOI: http://dx.doi.org/10.1559/1523040054738936

Means, B K 2003 Deliver Me From Mononga-hell: Thinking Beyond the Culture History Paradigm to Examine the Temporal and Spatial Parameters of Somerset Monongahela Village Settlements. *Journal of Middle Atlantic Archaeology* 19:

Monmonier, M 1996 *How to Lie With Maps*. Chicago: University of Chicago Press.

Montello, D R 2002 Cognitive Map-Design Research in the Twentieth Century: Theoretical and Empirical Approaches. *Cartography and Geographic Information Science 29(3): 283–304.* DOI: http://dx.doi.org/10.1559/152304002782008503

Mouer, L D 1981 Powhatan And Monacan Regional Settlement Hierarchies: A Model Of Relationship Between Social And Environmental Structure. *Quarterly Bulletin of the Archaeological Society of Virginia* 36(1–2): 1–21.

Norona, D 1950 Maps Drawn by Natives in the Virginias. *West Virginia Archaeologist* 2: 12–19.

Petchenik, B B 1979 From Place to Space: The Psychological Achievement of Thematic Mapping. *American Cartographer* 6: 5–12. DOI: http://dx.doi.org/10.1559/152304079784022763

Potter, S R 1993 *Commoners, Tribute, and Chiefs: The Development of Algonquin Culture in the Potomac Valley*. Charlottesville: University Press of Virginia.

R Development Core Team 2014 *R: A Language and Environment for Statistical Computing. Vienna:R Foundation for Statistical Computing*. [online]. Available at: http://www.R-project.org [Accessed 22 December 2014].

Robinson, A H 1952 *The Look of Maps*. Madison: University of Wisconsin Press.

Robinson, A H, Morrison, J L, and **Muercke, P C** 1977 Cartography 1950-2000. *Transactions of the Institute of British Geographers* 2(1): 3–18. DOI: http://dx.doi.org/10.2307/622190

Robinson, A and **Petchenik, B** 1975 *The Nature of Maps: Essays Towards Understanding Maps and Mapping.* Chicago: Chicago University Press.

Shennan, S 1989 *Archaeological Approaches to Cultural Identity*. Oxford: Routledge. DOI: http://dx.doi.org/10.4324/9780203163740

Slocum, T A, McMaster, R B, Kessler, F C and **Howard, H H** 2005 *Thematic Cartography and Geographic Visualization*. 2nd ed. Upper Saddle River: Prentice Hall.

Thomas, R A 1973 Prehistoric Mortuary Complexes of the Delmarva Peninsula. In: Thomas, R A (ed.) *Proceedings of the 1973 Middle Atlantic Archaeological Conference*. Penns Grove: Middle Atlantic Archaeological Research Inc. p. 50–72.

Trigger, B 2006 *A History of Archaeological Thought*. New York: Cambridge University Press.

de Vorsey, L 1992 Silent Witnesses: Native American Maps. *Georgia Review* 46: 709–726. DOI: http://dx.doi.org/10.1017/CBO9780511813016

Waselkov, G A 2006. Indian Maps of the Colonial Southeast. In: Waselkov, G A, Wood, P H and Hatley, T (ed.) *Powhatan's Mantle: Indians in the Colonial Southeast*. Lincoln: University of Nebraska Press. p. 435–502.

Wickham, H 2009 *Ggplot2: Elegant Graphics for Data Analysis*. New York: Springer. DOI: http://dx.doi.org/10.1017/CBO9780511813016

Willey, G R and **Sabloff, J A** 1974 *A History of American Archaeology*. London: Thames and Hudson.

Wissler, C 1922 *The American Indian: An Introduction to the Anthropology of the New World*. New York: Oxford University Press.

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