

Furthering Perspectives

Anthropological Views of the World



Anthropology Graduate Student Society

Spring 2021

Volume 10



**ANTHROPOLOGY
AND GEOGRAPHY
COLORADO STATE UNIVERSITY**

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Editor's Note

Welcome to the Spring 2021, Volume 10 edition of *Furthering Perspectives: Anthropological Views of the World*! I am honored to present the following collection of articles written by our dedicated students here at Colorado State University. Anthropology is a field that studies all of that which makes us human, and thus, *Furthering Perspectives* invites perspectives from a broad array of disciplines. The following collection of articles present only a few of the many theoretical and applied approaches that contribute to our anthropological knowledge.

Acknowledgements

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Top Left: CSU Students excavating during Summer 2020 Field School, CSU. Photo taken by Carly DeSanto

Top Right: Sugar Factory in Longmont. Photo taken by Morgan Lundy

Bottom: The Muddle in the Middle, CSU. Photo taken by Robert Kaplan

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Feminism on the Frontier: The Materialization of Elizabeth Street in Fort Collins, Colorado

Grace Ellis

Elizabeth Street is one of Fort Collins' original streets laid out in the official city plat designed by Franklin C. Avery in 1873. It is named after a prominent local pioneer woman, Elizabeth "Auntie" Stone, who was one of the town's original founders and the first white woman settler in Fort Collins. Elizabeth Street is the only original street named after a female historical figure and the only street named after a historical figure that runs east-west. Interestingly, all of the other original streets in Fort Collins that are named after historical figures are oriented north-south and named after male figures. This historical biography uses an assemblage framework to explore the unique and complex historical trajectories, actors, and processes that contributed to the materialization and orientation of Elizabeth Street in 1873, particularly focusing on the discourses surrounding gender and city planning in the late 1800s. A brief overview of assemblage theory will be followed by an examination of the agents and processes that contributed to the production and composition of Elizabeth Street, including the historical figure Elizabeth Stone, the emergence of Fort Collins as a city, and late 19th century discourses surrounding gender and city planning. This paper illuminates the entanglement of places, actors, and discourses that materially manifested in the particular form of Elizabeth Street. Additionally, it highlights the usefulness and applicability of assemblage theory for understanding how things gather in various

ways according to the unique historical trajectories and contingent association of things and actors at certain moments in time and space.

Assemblage theory recognizes that spatial forms and processes are brought together, held in place, and experienced in different ways that can open up or close down possibilities (Anderson et al. 2012). The assemblage approach is largely concerned with processes of composition, how things are held together, and how disparate activities become entangled (Anderson et al. 2012; DeLanda 2006; Tsing 2015). The assemblage concept is useful for understanding social formations as complex wholes composed of a diversity of parts and requires a rethinking of agency in terms of non-linear causality. Tsing (2015) argued that assemblages do not just gather lifeways, they make them. This means that both the assemblage and its diverse parts have the agency to transform both the parts and the whole. Anderson et al. (2012) recognized that different agents, including cultural and environmental, human and non-human, material and non-material, within an assemblage may possess different capabilities and resources to act. Therefore, how specific agents interact is important for understanding the composition and articulation of assemblages. This is particularly significant for the purposes of this historical biography, which aims to identify and examine the specific actors and associations through which Elizabeth Street materialized and through which certain forms

of power have manifested and endured, particularly patriarchy.

Three primary agents are relevant to the formation and history of Elizabeth Street. These three agents include Elizabeth “Auntie” Stone, the woman the street is named after, Fort Collins, the city and context for where the street emerged and was constructed, and finally late-19th century discourses surrounding gender and city planning which greatly impacted the materialization and orientation of Elizabeth Street. Each of these actors will be reviewed in greater detail below and their interrelationships with one another further analyzed to understand how these sets of relations assembled in 1873 and culminated in the material form of Elizabeth Street.

Elizabeth “Auntie” Stone was an educated woman born in 1801 in Connecticut and moved to Colorado with her second husband, Judge Lewis Stone, in 1860 after being offered positions as cooks for the military at Camp Collins (Figure 1). “Auntie” Stone, as she was affectionately called by the soldiers, and her husband built the first permanent dwelling in Fort Collins in September 1864. Two years after construction, Judge Stone died, and Camp Collins was abandoned by the military. After the death of her husband and the closure of the fort, “Auntie” Stone decided to stay in Fort Collins and help build the town into what it is today, eventually becoming known as the “Mother of Fort Collins” (Udell 2018; Funke 2020). “Auntie” Stone owned and operated Fort Collins’s first hotel, first mess hall, first schoolhouse and co-operated and owned several businesses with pioneer settler Henry C. Peterson that contributed to the development of the community, including the first water-powered flour mill on the banks of the Cache la Poudre river and the first brick firing kiln (Cress 1963; Kyle 2014; Jennings 2016; Udell 2018; Funke 2020). She broke many barriers placed on women at the end of

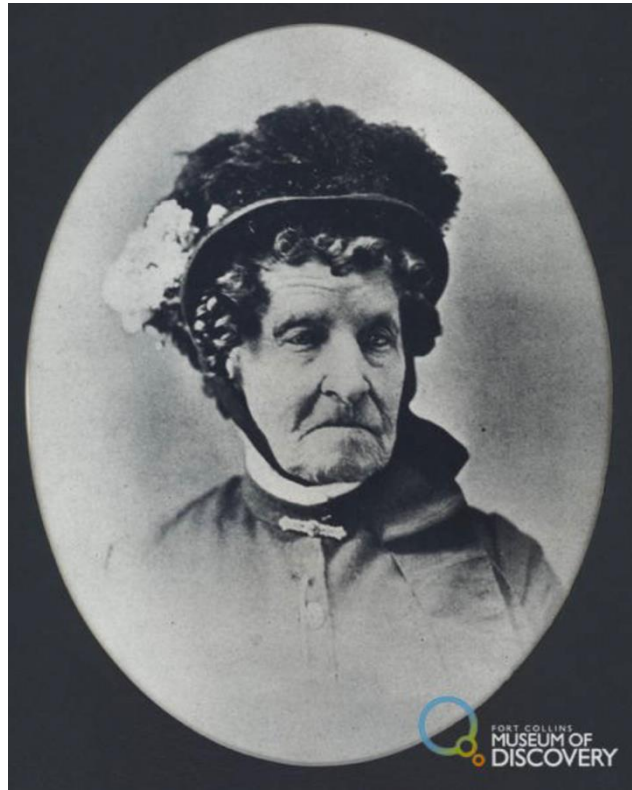


Figure 1. Elizabeth “Auntie” Stone, first permanent white woman settler in Fort Collins, Colorado. Image sourced from the Archives at the Museum of Discovery in Fort Collins, Colorado.

the 19th century by being educated, owning property, and managing her own businesses and remained a prominent and influential woman in Northern Colorado until her death in 1895.

Fort Collins was originally established as a military camp along the banks of the Cache la Poudre River in 1864 to help protect the Overland Stage Line and the Cherokee trail (Udell 2018). Two years later in 1866 the camp was officially abandoned and opened for settlement by presidential order. The town grew organically along the southern banks of the Cache la Poudre river until 1873 when the townsite of Fort Collins was officially surveyed and platted by Franklin C. Avery. In 1873, the entire town was re-oriented along a north-south axis, except for the original “tilted” orientation of Old Town,

creating an orderly and structured grid for the new community layout (Figure 2). Avery named north-south streets after town residents while east-west streets were named after trees and shrubs. Elizabeth Street is the only original east-west street named after a settler, and it is the only original street named after a woman in Fort Collins (Cress 1963; Udell 2018).

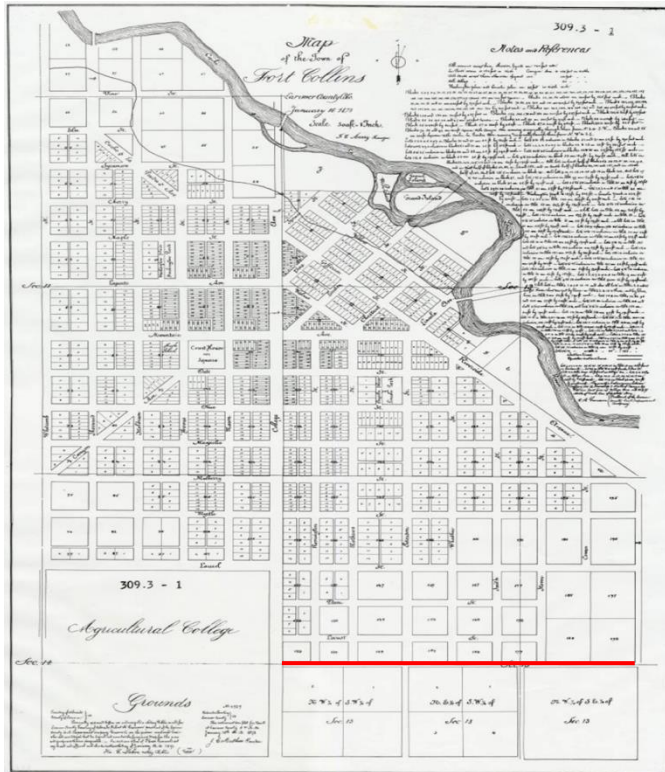


Figure 2. City plat map of Fort Collins. Elizabeth Street is highlighted in red. Scanned map sourced from The Archives at the Fort Collins Museum of Discovery.

Soon after Fort Collins was officially platted as a township, articles in regional newspapers confirmed that the Fort Collins of 1873 was very different from the Fort Collins of 1864. The new Fort Collins was advertised as a land of opportunity providing economic promise in manufacturing and agriculture, intellectual growth and engagement at the College of Agriculture, and numerous residential attractions, including churches, bakeries, dry good

stores, printing offices, blacksmiths, and more (“Fort Collins” 1874; “Fort Collins, Colorado” 1878). Fort Collins also offered opportunities for women. A Brief Telegram published in the *Fort Collins Standard* in 1874 describes a woman in the East writing to inquire about opportunities in Fort Collins for women without having to get married (“Brief Telegram” 1874). The paper assures the lady that as long as she is capable of working, there are opportunities for her in Fort Collins. These newspaper publications illuminate the contemporary discourses surrounding Fort Collins around 1873 and reveal the economic potential for both men and women.

The final agents to be examined are the discourses surrounding gender and city planning at the end of the 19th century that greatly impacted the materialization and orientation of Elizabeth Street. Flanagan (2018) has argued that patriarchal discourses about how to reconstruct cities in the wake of industrialization largely shaped urban development from the 1870s to the 1940s. Characteristics of the built environment of cities across the Anglophone world during this time period include separate residential, commercial, and industrial areas, and these distinctions persist today. The concept of the city was primarily driven by men from the United Kingdom and North America who believed in a conceptual and geographical division between public and private spaces (de Certeau 1984; Flanagan 2018). Men viewed the city as a disorderly space that needed to be controlled and made modern, which could only be achieved through the creation of separate spaces (Flanagan 2018). Public spheres were strictly reserved for economic activities, production, and men, while private or domestic areas were distinct spaces for women, reproduction, the family, and the home. Therefore, the structure and form of the patriarchal city promoted and maintained male privilege and mobility,

while stifling the mobility of women and limiting women's access to and participation in economic endeavors.

However, the modern city also offered more freedom to women by providing educational opportunities and the possibility of holding certain jobs deemed appropriate for them, such as teaching (Flanagan 2018). As modern cities emerged, the increasing presence of women in economic and public sectors became a growing threat to men (Flanagan 2018). This is evidenced in numerous local newspaper articles published in 1874 that reveal the growing tensions and gendered discourses that were of major concern to the Fort Collins community. Topics include the increasing concern about the number of women attending universities ("Brief Telegram" April 8, 1874), if women should have the right to vote ("Brief Telegram" April 1, 1874; "Brief Telegram" April 15, 1874; "Brief Telegram" April 22, 1874) if males should be allowed to hold teaching positions ("He School Marms" 1874), if different sexes should be permitted to learn in the same classroom ("Brief Telegram" May 20, 1874), and why it is healthy for women to get married ("It is Healthy to Marry" 1874). The orderliness and management of women's bodies was also a popular topic in local papers during this time with articles and poems focusing on defining the "modern maiden" ("The Modern Maiden" 1874) and the ideal of American womanhood ("American Womanhood" 1874), and why women should continue to wear corsets ("A Word for Corsets" 1874). Although women's movements and bodies were much more policed, these articles reveal that the gendered discourse of the later 19th century affected not only women, but men as well.

The discourses surrounding gender and city planning, the creation of Fort Collins as a city, and Elizabeth "Auntie" Stone are all agents that contributed to the emergence,

materialization and orientation of Elizabeth Street. This last section will focus on analyzing the association and interrelationships of these agents to understand how they became entangled in the process of creation and composition of Elizabeth Street.

Elizabeth Street materialized in 1873 when the town of Fort Collins was reoriented and officially platted. The reorientation of the town to align with true north, the creation of an ordered grid, and the separation of public and private sectors reveals the influence of city planning and patriarchal discourses on the creation and composition of Fort Collins and Elizabeth Street. Elizabeth street was created as part of a newly constructed residential neighborhood. The fact that Elizabeth street is the only street named after a female figure in 1873 when discourses surrounding women's bodies and their economic and educational opportunities were highly patriarchal and contentious demonstrates the power and esteem held by Elizabeth "Auntie" Stone in her community. However, the east-west orientation of the street and location in a residential area reflect the patriarchal structures imposed on women at the time. North-south oriented streets in Fort Collins were named after prominent local male figures and harbored the majority of commercial enterprises, while east-west oriented streets were named after natural vegetation and were largely residential. The orientation of male named streets in Fort Collins likely reflects men's vision of order and the modern city at the end of the 19th century. The fact that north-south orientated streets are named after males and are largely commercial reinforces the separation of women and men in different spaces of the city in name, orientation, and materialization. This is also true for Elizabeth Street, which is named after a female, runs contrary to true north, which is considered disorderly, as were women at this time, and is reserved for

domestic living and residential houses. Additionally, the naming of east-west residential streets after natural vegetation harkens the image of mother nature and women's place as nurturer. The orientation, naming, and materialization of streets in Fort Collins reflect the patriarchal discourses that impacted the lived experiences of the people who inhabited the city at the end of the 19th century.

This historical biography has illuminated the complex historical processes and unique actors that led to the emergence and composition of Elizabeth Street, including Elizabeth "Auntie" Stone, the official creation of the city of Fort Collins, and gender and urban planning discourses of the late 1800s. Elizabeth Street represents a moment in time when patriarchal discourses largely shaped women's experiences in urban environments. However, spaces can become arenas for producing or contesting forms of exclusion (Nightingale 2010). This is true for Elizabeth Street, which carries the name of a prominent local female figure and became a space where patriarchal ideals were challenged.

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The Inclusion of Multiple Perspective: Applying the Sustainability Sciences Framework to Climate Change in Arctic Indigenous Communities

Carly DeSanto

Introduction

With rising sea level, an increase in the Earth's surface temperature, and changes in precipitation and weather events, climate change is a problem which encompasses the entire planet (Murphy et al. 2009). Climate change impacts the ecosystems and well-being of aquatic and terrestrial wildlife, as well as humans (Pecl et al. 2017). Therefore, research pertaining to issues involving climate change must focus on both wildlife and biodiversity conservation and studies involving the well-being of humans. The complexity of climate change has created a unique space within academia that not only encourages multidisciplinary research using natural and social scientific perspectives, but also transdisciplinary work that includes local indigenous knowledge. Researchers can use the sustainability science framework to create a space to bring together these varied perspectives and apply them on a multitude of scales to co-produce knowledge to be used in the fight against climate change. The Arctic and Subarctic regions where climate is changing more drastically than anywhere else in the world is a prime example of where this approach could be applied (or something similar). With so many indigenous groups still occupying this region, it serves as a good location to encourage an approach to climate change that would take into consideration a multiple perspective approach.

The Sustainability Science Framework

The sustainability science framework is a “use-based” framework that helps researchers create realistic solutions to climate change issues based on different perspectives (Kates 2011; Wiek et al. 2011). In the context of this framework, scholars define the much-contested term of “sustainability” as maintaining an equilibrium between humans and the environment, reducing climate change impact on the environment and society, and allowing for the growth of both human and environmental “economies” (Kajikawa 2008). The goal of this framework is to encourage social change by bringing attention to poverty and socioeconomic disadvantages and conservation efforts to preserve natural resources. To accomplish these goals, scholars must research potential long-term impacts of climate change on humans and the environment, develop applicable theories and models, find ways to measure how “sustainable” an ecosystem or society is, and identify the social responsibility of individuals, governments, and corporations in “sustaining” healthy human-environmental interactions (Dao et al. 2011; Kates 2011).

Components of the Sustainability Science Framework

Important components present in the sustainability science framework are multiscale questions, transdisciplinary

research and other ways of knowing, and multidisciplinary and interdisciplinary research. Each of these components are outlined below, as well as an explanation of how they are pivotal to outlining and supporting the sustainability science framework approach.

Multidisciplinary and Interdisciplinary Research

Multidisciplinary research involves multiple fields of study working together within one research project (Petrie 1992). Research under this framework comes from natural and technical sciences, such as biology, ecology, engineering, chemistry, environmental science, etc., as well as social sciences, including psychology, history, economics, anthropology, and political studies. Researchers using a multidisciplinary approach can include both natural and social factors in their research when using the sustainability science framework (Kajikawa 2008; Bettencourt and Kaur 2011; Dao et al. 2011). The combination of information from a wide variety of fields allows researchers to evaluate the relationship among climate change impacts on wildlife, biodiversity, and human wellbeing.

Interdisciplinary research goes beyond scientific disciplines working together and integrates different fields within each other (Petrie 1992). The role of interdisciplinary researchers in the sustainability science framework is to help explain how different disciplines incorporated in a project overlap and relate. In the past, the ability for interdisciplinary work to be published was difficult because different fields often have discipline-specific audiences they address. However, the framework of sustainability science includes research from a variety of disciplines as well as institutions including governmental,

educational, and research-based which creates space for researchers to engage in interdisciplinary work (Kajikawa 2008; Bettencourt and Kaur 2011).

Transdisciplinary Research and the inclusion of Other Ways of Knowing

The incorporation of a transdisciplinary approach requires multiple perspectives, or knowledge systems, to be brought together to create a “meaningful whole,” (Petrie 1992, 304). Beyond including information from a variety of disciplines is the addition of information from stakeholders, or people who are going to be affected by the project and/or research at hand, such as indigenous communities. One way this is often done in the sustainability science framework is the inclusion of traditional ecological knowledge (TEK), indigenous/traditional knowledge systems, native science, or “knowledge of the land.” In the past, the Western science community dismissed indigenous knowledge, however the sustainability science framework provides a space for knowledge to be co-produced and co-managed by indigenous communities, scientists, and other stakeholders. These knowledge systems provide holistic, local, community-based knowledge collected over long periods of time that can be applied at a variety of scales, as well as direct the development of research questions (Berkes 2009).

Multiscalar Implications

Researchers using the framework of sustainability science evaluate multiple scales, ranging from local environments and societies to the entire planet. Though research under this framework often looks to address local problems, issues often begin at a global scale that impact smaller scales in a variety of

ways. Evaluating different scales comes with different strengths and weaknesses. Small scale research is often difficult to apply to sustainable development questions about big-picture economic, environmental, and social factors. Large scale research often cannot consider the fine details necessary when studying issues in the local community. The regional scale is a good venue for bringing together local and global scale observations. Therefore, it is important to consider the interaction between local, regional, and global scales to obtain a variety of information about human-wellbeing and health, policymaking, biodiversity, and ecosystem processes and services (Wu 2013).

Research Questions in the Sustainability Science Framework

The sustainability science framework includes a multitude of perspectives, as described above, and as a result, researchers use the framework to address a variety of topics. Early researchers in the field of environmental science began focused on environmental factors such as water, agriculture, forestry, fisheries, and climate. The implementation of the sustainability science framework encouraged inclusivity and resulted in researchers considering more social factors such as economic development, social responsibility, resource management, public health, and lifestyle (Kajikawa 2008; Bettencourt and Kaur 2011).

The Arctic and Climate Change

The Arctic is a region greatly impacted by climate change, with average temperature increases of 2 to 3 degrees C, more than double the average for the rest of the world. The rate at which the Arctic is warming is also faster than any other region in the world (Andrachuk and Smit 2012; Bintanja and van der Linde 2013). While

temperatures increase, sea ice and snow melt, impacting Arctic ecosystems (Nilsson 2009). Arctic winters are warming much faster than Arctic summers, which increases seasonable variability and instability, impacts terrestrial and marine wildlife, and decreases the presence of permafrost (Bintanja and van der Linde 2013; Andrachuk and Smit 2012). Climate change in the Arctic may one day result in the absence of sea ice during the summer, or even permanently, which would have vast effects on the amount of CO₂ input into the atmosphere by air-sea flux in the Arctic Ocean (Nilsson, 2009; Bintanja and van der Linde, 2013; Jutterström and Anderson, 2010).

The Arctic Climate Impact Assessment (ACIA) was an early attempt to understand the impact climate change has on the Arctic. The ACIA was one of the first examples of a report that supported claims of anthropogenic change as a major contributing factor to climate change (Nilsson, 2009). Since then, studies continue to support human impact on the environment as a major force affecting Earth's systems (Nilsson, 2009). Many studies in the past focused solely on environmental and climate factors such as the melting of snow and ice and impacts on wildlife and biodiversity. Socio-ecological studies need to be done on human communities living in the Arctic (Andrachuk and Smit, 2012).

Indigenous Arctic Communities and Climate Change

Climate change impacts indigenous communities all over the world. Indigenous communities often feel the effects of climate change more than non-indigenous communities due to socioeconomic inequality and living in marginalized areas. Indigenous communities living in the Arctic are especially susceptible to climate change because of isolation, limited resources, a

long-held reliance on traditional subsistence methods, and the intensity at which climate change affects the Arctic. Now that climate change is more extreme, indigenous Arctic communities have decreasing health due to the lack of access to traditional resources, shorter hunting and fishing periods, and lack of access to safe travel routes. These communities have responded by continuing to develop sharing networks, adopting modern technology, engaging in mixed-economies, and continuing to use and expand their traditional ecological knowledge (TEK) through localized, qualitative observations of their ecosystems (Pearce, 2015). TEK contributes knowledge about weather predictability, environmental health, and wildlife migration (Weatherhead et al., 2010).

Indigenous communities are often left out of political conversations about climate change, therefore limiting their influence on decisions made about their homeland. Scientific studies of climate change in the past have not included traditional ecological knowledge and often lacked a holistic perspective. Despite these challenges, indigenous communities must deal with exacerbated socioeconomic and socioecological effects from climate change on their own with little governmental support. Global agencies often consider Arctic communities part of “developed countries” and treat them as such, limiting the aid they are eligible for. However, these communities often still practice a “blended economy” which combines traditional subsistence methods (hunting and fishing) with wage labor (jobs with the government, in oil, social and health services, guiding sport hunters, etc.).

Moving forward, future research needs to evaluate what impact the changing Arctic environment has on the social, economic, cultural, and political structures of Arctic indigenous communities. This

research needs to include an evaluation of the driving factors of climate change at a variety of scales, resilience and vulnerability of these communities, adaptations that they have developed, and needed policy changes (Andrachuk and Smit 2012).

Case Studies of Climate Change and the Inuit

The case studies presented below are from three Inuit communities: one in the northwestern portion of the Canadian Arctic in Tuktoyaktuk, NWT, one in the extreme northern area of the Canadian Arctic in Igloolik, Nunavut, and one in the northwestern portion of Alaska in Noatak and Selawik. Each of these communities face a variety of socioeconomic, cultural, political, and socioecological problems exacerbated by climate change and represent three distinct indigenous Arctic communities. These case studies are examples of climate change studies in the Arctic that include the impact climate has on humans alongside the environment. In this section, the sustainability science framework will be applied to each case study. Each article will be evaluated for whether the important components of the framework discussed above are either present or absent in the research conducted and then discussed further to see if it meets the expectations of the sustainability science framework.

Case Study #1, Northwestern Canada: Inuvialuit Community of Tuktoyaktuk

The first case study comes from an Arctic community located in northwestern Canada in Tuktoyaktuk. This community identifies as Inuvialuit, and over the past few decades they faced major impacts from climate change on their subsistence methods, livelihoods, infrastructure, and culture, in turn forcing political, social, and economic changes in their community. For this reason,

Andrachuk and Smit (2012) conducted a vulnerability assessment of the community, which looked at a variety of socioeconomic and environmental changes in the area and assessed both the adaptive capacity and exposure-sensitivities within the community. Specific elements of the community that researchers evaluated were infrastructure and municipal services, livelihood and local economy, and health and wellbeing. The methods used in this project were largely collaborative and community based. After considering the current and future exposure-sensitivities and adaptive strategies of the community, researchers concluded that the Inuvialuit community of Tuktoyaktuk had many short term-resilience strategies. Researchers were uncertain how these strategies would hold up in the long term when faced with more intensive climate change and subsequent shifts in traditional ways of life.

The concept of scale in this case study is central. Early on Andrachuk and Smit (2012) mention how community vulnerability assessments, such as this case study, are important on a global scale because researchers can observe the political, social, and economic impacts of climate change throughout the world. They discuss connections between large-scale phenomenon, such as the global economy, and how they influence national policies, local economies (cost of living livelihood/subsistence activities, etc.), and climate (air temperature, precipitation, etc.). Therefore, Inuvialuit relations with Canada (maintenance of educational, religious, political, and economic institutions) affect small-scale institutions like Inuvialuit culture and local wildlife, resource users in neighboring communities, and local government agencies.

The research approach taken in this project includes transdisciplinary knowledge. The authors discuss the importance of

indigenous knowledge, and their study involved the community throughout the entire research process. Not only were local researchers integrated into the research teams, but there was community consultation before, during, and after researchers conducted the project. Also included were direct interviews with a wide variety of community members and observations of traditional ways of life. Local, indigenous researchers were present during the analysis stage of the project, as well as during the process of collecting interview and participant observation data during which indigenous members offered their interpretation of the research. Researchers integrated the indigenous and scientific understandings of the data.

The research done in this community lacked multidisciplinary and interdisciplinary information. Throughout the case study the authors discuss various challenges that the Inuvialuit face, including socioeconomic impacts on subsistence methods, declining ecosystems affecting wildlife habitats, an increasing participation in extraction jobs that disturb the environment, and community health. However, the methods used were mainly participant observation and interviews, the use of existing data in sources such as journal articles, and data collected by the government. The two authors used anthropological methods and analysis, but included the consideration of factors from a wide variety of fields of study.

Case Study #2, Northern Canadian: Inuit Community of Igloodik, Nunavut

The second case study creates a conceptual vulnerability model for Inuit food systems, which Ford (2009) applied to the Inuit community of Igloodik in the northern Canadian arctic based on an extreme shift in climate experienced in 2006. This shift in the

Arctic's climate resulted in a higher dependence on store-bought, non-traditional foods which decreased food security, availability, and quality. Therefore, the community's vulnerability increased, and their adaptive capacity decreased. The Inuit in this region are especially susceptible to changes in climate due to their severe isolation and lack of permanent, all-weather roads. As a result, when ice is not frozen early in October, as is typical, hunting seasons shorten, the risk and cost to travel increase, and health decreases due to reliance on store-bought foods. The methods in this article mainly consisted of participant observation, interviews (both new and historical ones), and analysis of statistical data from the region about climate change. After applying the conceptual model to the climate events in 2006, researchers identified exposure-sensitives such as a decrease in floating ice, which prevented the creation of habitats for important game such as walrus, and a late freeze up that prevented travel to hunting and fishing grounds. If climate trends continue as they were in 2006, a decrease in the community's adaptive capacity will continue and traditional ways of dealing with food insecurity will not be enough for the survival of the community.

Ford (2009) addresses the implications of evaluating a small-scale community like the Inuit at multiple scales. The model he creates observes the effect of food security/insecurity at multiple scales to better understand underlying causes of food disparities. The influence from the regional and global scales on the community included in the model are the effects of governmental policies, especially those involving hunting and fur-import laws, increase in the price of commodities/food stuffs, and a dynamic, changing context (climate change, biophysical factors, socio-economic-political stress, etc).

While the research using the conceptual model relies on methods that utilize information from the community, it is done in an "ad hoc" way. Indigenous people within the Igloodik community were not involved in the research design or analysis of the data. They were included somewhat in the collection of data, but in a way that emphasized that the research project remained "ethical," and not so much for the sake of including indigenous knowledge (Ford 2009, 91). As traditional ecological knowledge and community input was limited, the incorporation of transdisciplinary research remained partial.

The vulnerability conceptual model created by Ford (2009) considers both social and natural factors. Biodiversity decreases as a result of changing climate, which limits the availability of traditional foods. In turn, the quality of the food available (store-bought food vs traditional food) affects economic, political, and social conditions. The socioeconomic situation created by the effects of climate change impacts the nutritional wellbeing of those in the community, which also affects people psychologically. When unsafe ice condition due to increased temperatures in the region prevents access to traditional foods people in the community who do not have large wage incomes are especially vulnerable. Even community members who can afford store-bought food recognize that their diet lacks in nutrients. However, multidisciplinary or interdisciplinary research beyond the recognition that natural and social factors both contribute to the problem are limited.

Case Study #3, Northwestern Alaska: Inupiaq Communities of Noatak and Selwaik

Moerlein and Carothers (2012) provide a third case study from northwestern Alaska, involving the communities of Noatak and Selawik, which identify as "Inupiaq

Eskimo.” The project looked at how subsistence methods in these communities changed with an increased intensity of climate change over the last 20 to 30 years, though the community acknowledges that these changes started about a century ago. The Iñupaq of the Noatak and Selawik communities perceived climate change with changes in their lifestyle and culture. Researchers used participant observation in community and subsistence activities, such as church, community meetings, and fishing trips. Another method used was interviewing “key informants” which were community members chosen based on their age, how long they had lived in the community, if they participated in fishing and hunting, and willingness to participate. The results of this project show that climate change impacts Noatak and Selawik’s socioeconomic status by limiting the ability for them to conduct traditional subsistence activities, such as hunting and fishing, which decreases their socioeconomic security.

This case study was set up as a community-based, small scale research project. The focus was on how climate change affects individual members of the community, the community itself, and the surrounding environment. Changes in local fish distribution and abundance, travel and access to those resources, and unpredictability of weather patterns affects the Inupiaq’s traditional fish processing methods. However, the authors of the paper acknowledge the implications this study has for the greater Arctic region in Canada and other parts of Alaska, saying research projects like this one should be used to create a better understanding of the impact climate change has on the greater Arctic region, as well as globally. However, an explicit connection to a larger scale was vague and largely absent.

Moerlein and Carothers (2012) include a transdisciplinary approach, demonstrated by

integrating traditional ecological knowledge into their project to create a more holistic picture in conjunction to what Western scientists observed about climate change in the region. When discussing observed changes in the environment, Moerlein and Carothers (2012) used descriptions provided by the indigenous community, such as an understanding of the environment through the condition of the river and when it breaks up. The authors also presented their progress to the community throughout the research process and received community input on whether it was likely their findings were correct or not.

The authors address the need for multidisciplinary and interdisciplinary work throughout the paper, often mentioning that environmental, economic, political, and social factors were all tied together, especially from the perspective of the Iñupiaq community. However, in this case study the only research methods used were that of participant observation and interviewing done by two anthropologists. Much of the information presented was from the perspective of these anthropologists and their key informants. This case study does encourage future multi- and interdisciplinary research with discussion of decreasing mental health of the community relating to climate change. The input of psychologists, environmental scientists, sociologists, and other related fields could contribute to a more holistic understanding of such problems.

Discussion

These three case studies which evaluate climate change impact on Inuit communities in the Arctic demonstrate how research that embodies elements of the sustainability science framework rarely use all its components. All three of the case studies recognize that research involving the impact climate change has on indigenous Arctic communities can be applied to

regional and global scales. Andrachuk and Smit (2012) and Ford (2009) both evaluated vulnerability within Inuit communities and directly identified the links between various institutions at local, regional, and global scales. For example, they discuss how federal and state level policies can influence the socioeconomic status of local, Inuit communities. However, Moerlein and Carothers (2012) were less explicit when identifying multiscale connections, but they acknowledge local-scale problems relating to global scale problems as an important element to research on the topic of climate change and the Arctic. To better incorporate multiscale components, researchers should explicitly outline observed connections between scales, like Andrachuk and Smit (2012, 877: Fig 4) do to provide a visualization of the connections between institutions at different scales.

All the case studies included indigenous knowledge which contributed to a transdisciplinary perspective because indigenous communities are the “stakeholders” represented in these case studies. The first case study is a shining example of a transdisciplinary approach, where stakeholders (in this case, those within the Inuvialuit community) participated in the creation of the project and collection and analysis of data. Indigenous knowledge was well incorporated side by side with Western science to create a holistic understanding of socioeconomic and environment issues the community faced (Andrachuk and Smit 2012). The third case study also included community consultation, collection, and validation of data, as well as direct information from the community. However, contribution to research design and direction was somewhat limited when compared to the first case study (Moerlein and Carothers 2012). The researchers in the second case study interacted with the indigenous community on a limited basis. Ford (2009)

included community members in data collection and indigenous perspectives about climate change, but Inuit interpretations of the data collected, or input on research questions and design, were absent.

Researchers largely ignored multidisciplinary and interdisciplinary components. All the researchers used anthropological methods including participant observation and interviewing. Often a variety of problems were identified within the community, including mental health, nutritional deficiency, lack of infrastructure, social inequality and injustice, insufficient trade networks, transportation issues, decrease in wildlife and biodiversity, and so on. However, these individual elements were explained as a part of the overarching “socioeconomic” or “environmental” issues, with few details or analysis provided on specific components. The authors of these papers only numbered one to two.

Conclusion

Climate change heavily impacts the Arctic, therefore creating not only problems for wildlife and biodiversity in the region but the human communities as well. Due to the nature of the Arctic, climate change affects people in this region in very specific ways, especially relating to subsistence methods and health and wellbeing. Starting at a global scale, climate change impacts on the environment affect the socioeconomic security of indigenous communities through federal policy, global climate effects, and the global economy. The actions by people in these large-scale institutions impact regional and local economies, food systems, governments, and culture. Including indigenous knowledge to create transdisciplinary approaches, as well as the perspectives from a multitude of disciplines, are needed to address topics such as food security, decrease in traditional subsistence

activities, health and wellbeing, and social justice and inequality.

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The Functionality of Desert Kites: An Ethnoarcheological Study of the Desert Kite Phenomenon in the Levant

Wyatt Benson

Hunter-gatherer societies are often defined not only by their variability but also by their complexity; this is no different when it comes to technology. The technologies foragers employ depend on a variety of factors including environment, lifestyle, resources, etc. Because of this, technologies can come in all shapes and sizes, as seen with desert kites in the Levant. Although archaeological remains rarely preserve in desert environments, desert kites are one of the few large-scale hunting technologies still on the landscape today. Moreover, while desert kites scatter the Levant, there is still much variability within this technology. Therefore, this paper will focus on the desert kite phenomenon and how these constructed features both symbolize Levant forager behaviors as well as the complexities of forager technologies. To do so, this paper will first outline the desert kite phenomenon in the archaeological record, demonstrating their regional variability as well as their potential functionality as gazelle hunting traps. Additionally, this paper will highlight where the desert kite archaeological record is lacking and propose future research questions to further our understanding of past hunter-gatherer behaviors in desert environments. Finally, this paper will use ethnographic studies from the Levant, Great Basin, and Yukon to support archaeological evidence explaining the functionality and variability within desert kites.

Background of the Technology

General Information and Functionality
Desert kites are a large-scale hunting

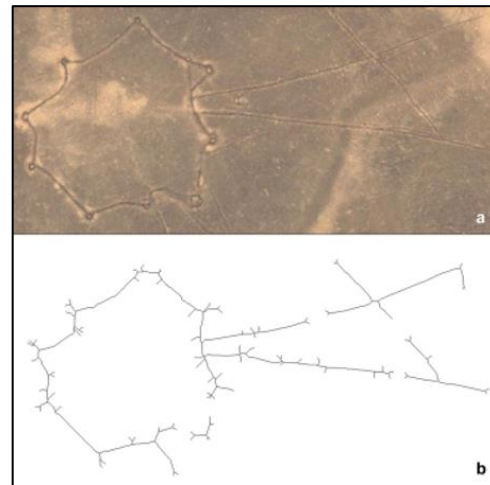


Figure 3: Example of the Desert Kite Structure (Crassard et al. 2015)

technology found throughout the Levant. Interestingly, desert kites got their name from British Air Force pilots flying over Syria and Jordan in the 1920s because the large structures looked like kites from above the ground. Essentially, desert kites are stone constructions made from locally-sourced materials and are comprised of two long guiding walls (antennae) that converge to an enclosure (head) (Figure 1) (Abu-Azizeh et al. 2015; Crassard et al. 2015). In terms of functionality, this technology is proposed to be a hunting tool targeting gazelle. To use the trap, hunters would place the antennae on flat ground at higher elevations in areas where gazelle congregate and then chase the gazelle down the corridor created by the antennae until the gazelle trapped themselves in the enclosure. The enclosure was placed at a lower elevation so that it was hidden so that the gazelles could be driven into the enclosure before they realized what was

happening. From here, the gazelles would be killed in mass quantities. Gazelles were the main target for desert kites as they follow the path of least resistance, preferring not to jump when avoiding a threat (Burckhardt 1831; Crassard et al. 2015). Finally, although it has been difficult to date these desert kites due to preservation and stratigraphy issues, radiocarbon dates from various regions in the Levant have placed these kites in the Bronze Age-Iron Age (Third to First Millenia BC) (Holzer et al. 2015; Chahoud et al. 2016).

Importance to Levant Foragers

These desert kites were important to foragers within the Levant for several reasons. To begin, these hunter-gatherers lived in desert environments where resources were scarce/patchy and managing energy expenditure was crucial. In other words, hunter-gatherers in the Levant needed to maximize the return rate on resources by reducing the amount of energy expended while hunting. Desert kites helped reduce energy expenditure because they allowed Levant foragers to acquire mass quantities of gazelle in a single hunt. Acquiring excess food in the desert was also vital for survival because the food could be saved. Therefore, Levant foragers could stockpile a surplus of food for when resources became scarce (Chahoud et al. 2016). Furthermore, it is argued desert kites were important to hunter-gatherers in the Middle East because there are a number of sites with rock art depicting gazelles trapped in kite structures (Figure 2) (Crassard et al. 2015; Holzer et al. 2015; Chahoud et al. 2016). Therefore, it can be argued that because foragers were spending time creating artwork of this technology that desert kites were of great importance to their livelihood and survival (Crassard et al. 2015).

What Desert Kites Contribute To Archaeology

The desert kite phenomenon is an interesting topic to archaeologists for two principal reasons. First, historically – and prehistorically – pastoralism was the principal livelihood practice for many nomadic groups throughout the Levant (Crassard et al. 2015). Because of this, it was originally hypothesized desert kites were used for animal husbandry because a hunting lifestyle would not be viable given the environmental constraints. However, material culture, rock art, zooarchaeology, and the ethnographic record all suggest hunting in the Levant was possible and often utilized. In other words, studying the desert kite phenomenon is important as it accentuates the intelligence of Levant foragers and the intricate relationship they had with their environment. Finally, while desert kites are a widespread occurrence across the Levant, there is still much variability in terms of form, structure, and size. Therefore, archaeologists can question

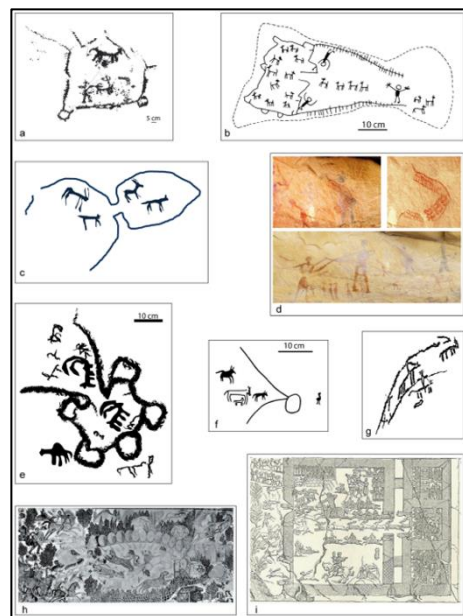


Figure 2: Rock Art and Mosaics of Desert Kites and Gazelles (Crassard et al. 2015)

whether these differences are regional and if the variability impacts the functionality of kites.

The Archaeology of Desert Kites

As mentioned above, there are a number of desert kites scattered throughout the Middle East, and many of the known kites have been documented. However, there is still much variability amongst these kites in terms of structure and construction which can be assessed through the archaeological record. Therefore, archaeological case studies from various regions in the Levant can be compared to question if the similarities and differences in form and structure of kites influence their functionality; this question of functionality in relation to structure is important because it sheds light on whether kite technology is truly related to gazelle hunting.



Figure 3: Intersecting Walls Within Enclosure at Kite in Negev (Holzer et al. 2010)

Negev Desert and Northwest Sinai

The first case study comes from the Negev Desert region in Israel and the NW Sinai region in Egypt. Between these two regions, there are a total of 16 documented desert kites. These kites are made from

locally occurring stone, and the antennae walls are lower than 60cm. The opening of the kite is typically oriented towards a water source or area rich in vegetation, which are areas where gazelle frequent. The enclosure was always found at a point of lower topography, meaning the kites followed natural changes in slope, hiding the enclosure (Holzer et al. 2010). Unlike other kites in the Levant, those in the Negev Desert and NW Sinai often had intersecting walls within the enclosure, potentially to slow animals down, making them easier targets (Figure 3). Additionally, these kites were smaller than other kites throughout the Middle East. It has been hypothesized this is because the species of gazelles in this region, *Gazella gazella* and *Gazella dorca*, travel in smaller herds than gazelles in other regions, *Gazella subgutturosa* (Holzer et al. 2010). However, there are no gazelle remains found at this site to substantiate this hypothesis.

Southeast Jordan

The desert kites throughout this region make up the *Jibal-al-Khashabiveh* kite chain on the eastern edge of the Jafar Basin. Similar to those in the Negev Desert and Sinai, these kites were made from locally available limestone and had 40-50 cm tall antennae walls. Moreover, the kites themselves also followed natural topography, with the antennae being on flat ground where animals gather (watering holes) and the enclosure at a lower elevation (Abu-Azizeh and Tarawneh 2015). However, there were often gaps in the guiding walls in which stone piles with some organic material were constructed; it has been hypothesized these piles were used to encourage animals to follow a specific guiding line without the need to construct a full wall. Also, these stone piles could have operated as landmarks,



Figure 4: Bifacial Tools Found At JKH06 ((Abu-Azizeh and Tarawneh 2015)

representing the direction in which hunters should guide the gazelle (Abu-Azizeh and Tarawneh 2015). Unfortunately, there is no archaeological evidence to support either of these hypotheses. Finally, unlike most desert kites which have no archaeological material associated with them, one kite in this region – site JKH06 – exhibited a number of bifacial tools and debitage characteristic of blade production (Figure 4) (Abu-Azizeh and Tarawneh 2015). However, like the kites in the Negev Desert and Sinai, there were once again no gazelle remains associated with these kites.

Mount Aragat

The final region focuses on the western fringes of Mount Aragat in Armenia. Similar to the past two sites, the 179 kites within this region are made of locally available materials (basalt), follow the natural topography of basalt flows, and have antennae walls shorter than the enclosure walls. While other kites have been directed towards areas of gazelle congregation, Mount



Figure 5: 'Cells' Around Outside of Enclosure at Mount Aragat Kite (Barge et al. 2015)

Aragat kites are located along gazelle migration routes (Barge et al. 2015). Unlike the past two regions, the kites at Mount Aragat have a unique enclosure structure. These desert kites tend to have 'cells' surrounding the enclosure, or enclosed circles which are at a lower elevation than the enclosure itself (Figure 5). It has been hypothesized these 'cells' functioned as hides or trap pits, but there is once again no archaeological material associated with them to support this conclusion (Barge et al. 2015). Nevertheless, zooarchaeological studies within this region do provide some evidence for the fauna around the kites. Chahoud et al. (2016) discovered that during the Late Bronze Age and Iron Age there was an increased prevalence of *Gazella subgutturosa* remains throughout Mount Aragat. While these remains were not directly related to desert kites, their increased prevalence coincides with the time period of kite construction, so there is an implicit link between gazelle remains and desert kites in Armenia.

Takeaways and Further Questions Arising from the Archaeological Record

While there is some variability amongst the desert kites found throughout the Levant, the majority of these differences are currently understood to still serve a purpose related to gazelle hunting. Also, desert kites universally target gazelles, as evident in their shared orientation towards locations where gazelle herds congregate and in their use of the natural topography. Therefore, it becomes apparent this variability does not take away from the kite's overall function as a gazelle trap. Rather, these differences demonstrate foraging groups in the Levant have their own ways of reading and adapting the kite 'blueprint' to their advantage. This takeaway is interesting because it points towards regional variability as well as communication between foraging populations, and this takeaway could be explored further through additional cross-site comparisons to determine whether certain kite types were related to specific bands/territories or if there is any overlap in variability.

Furthermore, when looking at desert kites in the archaeological record, the only real material evidence is the kites themselves. The lack of material culture is interesting because it raises questions about the validity of kites being gazelle traps, calling for advancements in research. Archaeologists could expand their search outside of the kites themselves, looking for inhabitation evidence – lithic tools, debitage, gazelle remains exhibiting microwear, etc. – within a certain proximity to the kite. These new questions would also be intriguing because they could potentially answer questions about mobility and behavior: these questions could include how far inhabitation sites were from kites, how often are these sites were visited, are gazelle remains brought from the kite to the camp, etc. Thus, the lack of corroborating material evidence in the archaeological

record facilitates new approaches to the study of desert kites which could strengthen the argument that the functionality of desert kites is communal gazelle hunting.

The Ethnography of Desert Kites: A Way Forward

As mentioned above, there is a lack of material evidence – besides the kites themselves – supporting the assertion that desert kites were traditionally used for gazelle hunting. Because of this, archaeologists must rely on other lines of evidence to support the claims that Levant hunter-gatherer used this technology to successfully hunt. Thus, the use of ethnography is vital in this case as ethno-historical accounts of kite use may corroborate with features seen in the archaeological record, supporting the gazelle hunting hypothesis.

While there is little ethnographic evidence for desert kites as contemporary foraging societies no longer exist in the Levant, the documentation which does exist could be used to back the functional argument of kites being gazelle traps. For example, Burckhardt (1831) observed a group of Bedouins in Syria using a desert kite specifically for hunting gazelle. In this recollection, Burckhardt mentions a group of peasants waited for a herd of gazelle on an open plain near a water source, startling the gazelle towards the antennae by making noise. As seen in the archaeological record, the antennae were short, but once the gazelle were startled they would follow the open path outlined by the stones; this shows the antennae were not meant to keep gazelle in, but rather guide them to the enclosure. The enclosure was surrounded by a ditch, catching any gazelle which managed to get out of the enclosure; the function of this ditch could be used to explain the 'cells' found in the kites throughout Mount Ararat. Next, the Bedouins would kill mass quantities of

gazelle in the trap, immediately taking the complete carcasses from the killsite to a habitation or processing site (Burckhardt 1831). This recollection is crucial as it portrays how foragers would not process the gazelles at the kite itself, potentially explaining why gazelle remains are never found at kite features in the archaeological record. Burckhardt's historical documentation of the Bedouins is important as it provides direct evidence for the use of kites in communal gazelle hunting. Likewise, this recollection also explains why gazelle remains are never found at the kites themselves, calling for future survey and investigation of inhabitation sites near kites.

Additionally, ethnographic studies of the Solubba, a foraging group in Arabia, provides ample information to demonstrate the importance of gazelles to Levant hunter-gatherers. The Solubba were one of the last nonpastoral groups in the Levant, and like many past foraging groups, they relied heavily on gazelle. Mirroring the archaeological record, the Solubba also utilized desert kites to hunt large quantities of gazelle at a time, curing and salting the meat to preserve it for later (Betts 1989). This takeaway is crucial because it supports the notion that kites were used to hunt large numbers of gazelle so the meat could be preserved for later use. Therefore, Solubba kite use and the practice of curing gazelle meat matches with the proposed use of kites, demonstrating how desert kites not only functioned as a way to hunt gazelle but also as a way to generate a surplus of food.

Unfortunately, ethnographic accounts for the employment of desert kites are scarce or not readily accessible. However, analogies can also be made to other regions outside the Levant, where similar, corral-like traps are used. Many Southern Paiute tribes in the Great Basin employ a corral-like structure to hunt antelope/pronghorn. While these traps are typically made from sagebrush and other

organic material, rather than rocks, they take on a similar structure to those in the Levant, having V-shaped guiding walls leading to an enclosure. Similarly, these corrals were often constructed in areas with rolling topography (Arkush 1986). Although the corrals in the Great Basin are made from different materials, their structure closely mirrored those in the Levant – in terms of form and topography – making them a good analogy for desert kites.

Furthermore, these Paiute groups often targeted antelope/pronghorn due to their behavioral patterns. Like gazelle, pronghorn move in herds and will always follow the path of least resistance when startled (Steward 1938; Arkush 1986). Thus, since there are similarities in trap form and the type of animals hunted, these Great Basin examples provide evidence to support the use of kites as gazelle traps. Moreover, Paiute groups like the Deep Creek Goshute were known to only utilize these corrals and communal hunting when targeting herds of antelope. However, for animals which do not move in herds – such as deer – communal hunting was avoided (Steward 1938). When looking in the Levant archaeological record, there is evidence for other animals such as deer (Chahoud et al. 2016). However, if we take this Great Basin example into account, it is likely Middle Eastern hunter-gatherers were only using the kites to hunt herding animals like gazelle, not deer. Finally, the Goshute were also known to cure pronghorn meat acquired from communal hunts and save it for times of scarcity (Steward 1938). This behavior is not only similar to the Solubba, but also demonstrates how communal hunting is related to food saving, providing further evidence for the use of desert kites as a way to procure a surplus of food.

Ethnographic analogies from reindeer hunting in the Yukon could even be used to explain some of the variability seen amongst desert kites. The Chipewyan would construct a similar corral-like structure to those seen in the Levant and in the Great Basin, showing the widespread use of this trapping

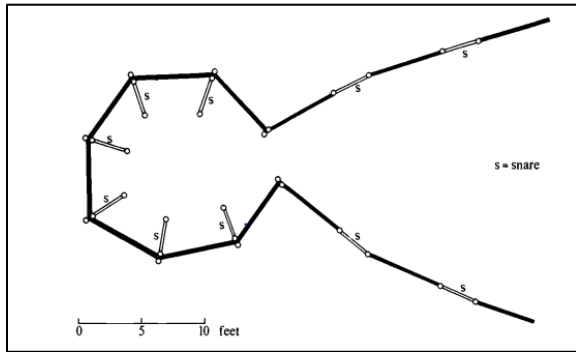


Figure 6: Chipewyan Corral. In Figure, S = “Snare” (Ingold 1980)

technology. However, these corrals would often have snares and hedges within the enclosure, hindering the reindeer’s movement and making them easier to shoot (Figure 6) (Ingold 1980). This use of obstacles within the corral is similar to the intersecting walls within the enclosures at kites in Negev and Sinai, meaning these walls were potentially used for a similar purpose. Additionally, Caribou Eskimo would often construct stone cairns in areas where the guiding walls were not prevalent, likely due to a lack of wood in regions like the tundra (Figure 7). While there were gaps in the wall, these stone piles were then dressed using hides to mimic humans, startling the caribou in a specific direction towards the corral (Ingold 1980). These stone cairns mirror those in the desert kites of SE Jordan, demonstrating how these stone piles served a specific purpose of guiding prey. By using ethnographic records, both in the Levant and from different regions, we can construct analogies, allowing us to further explain and repute not only the functionality of desert kites but also the functionality of regional variability amongst kite structures.

Future Research on Desert Kites

There is still much to be done to further an archaeological understanding of the desert kite phenomenon. By informing ourselves from the ethnographic record, we now know to expand archaeological research to inhabitation sites, searching for secondary material evidence which can strengthen the argument that past Levant foragers used kites for communal gazelle hunting. However, the ethnographic record also sheds light on certain anthropological topics of interest, such as gendered labor. For example, communal hunting amongst the Chipewyan and Bedouins was often the role of both men and women (Burckhardt 1831; Ingold 1980). However, other groups like the Deep Creek Goshute attributed communal hunting to solely men (Steward 1938). When looking at the ethnographic record for communal hunting, we see variability within the sexual division of labor, particularly when using corral-like traps/game drives. This means there was likely variability regarding the gender roles of past Levant foragers in terms of communal hunting using kites. In order for this research to be conducted, there would have to be ample archaeological evidence, but the archaeological signature in the Levant for foragers is already low. Subsequently, methodologies and anthropological theory would have to develop further in order to explore something like gender roles in relation to communal hunting and the use of desert kites.

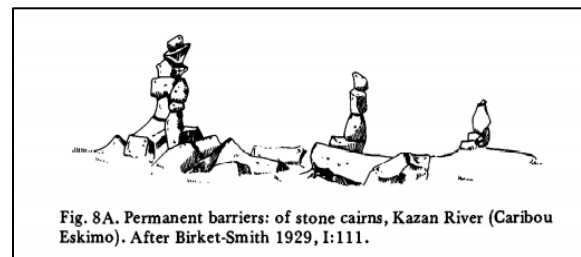


Figure 7: Caribou Eskimo Stone Cairn (Ingold 1980)

Conclusion

The use of desert kites in the Levant has been a pivotal technology for hunting. As seen in the archaeological record, this technology spans throughout the Middle East, but there is much regional variability amongst kite forms. However, they all share one thing in common; they are likely used to communally hunt gazelles. Although archaeological signatures in relation to kites are low, this also facilitates opportunities for future research as archaeologists can look in regions surrounding kites for material evidence, further explaining the functionality of these features. Additionally, the ethnographic record sheds light on the functionality and variability of desert kites. Ethnographic recollections from the Levant support the notion that gazelles were not only important to nonpastoral groups, but also hunted using kites. However, since ethnography of Middle Eastern foragers is scarce, the employment of ethnographic analogy to other regions such as the Great Basin and Yukon, where similar traps are used, can also be employed to better describe the variability and functionality of desert kites. Finally, the ethnoarchaeological record not only highlights the complexity and importance of desert kites, but also demonstrates where research can develop next.

Finally, hunter-gatherers are often oversimplified and overlooked as being noncomplex, resulting in biased interpretations from both academics and the public. However, it is important to remember these foraging populations are incredibly complex. For instance, in order for Levant foragers to thrive in a desert environment, they had to understand the behaviors of animals in the region and know how to effectively hunt in their given environment. Desert kites are crucial features on the landscape as they demonstrate Levant foragers' knowledge of gazelle behavior and

the need to hunt animals in mass to create a surplus of food in an environment where sustenance is relatively scarce. Moreover, the regional variability within the desert kite phenomenon illustrates how Levant hunter-gatherers possibly communicated with one another, sharing their knowledge of the technology but adapting it to their given environment. Therefore, understanding the variability and functionality of desert kites is vital because it not only portrays the activities and behaviors of Levant foragers, but also emphasizes the intricate and intelligent relationships hunter-gatherers had with their surrounding environment, portraying foragers as the complex individuals they truly are.

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Geoarchaeological Methods And The Intentionality of Neanderthal Burial

Mary Shirley Mitchell

Introduction

Intentional burials are of interest to paleoanthropologists because they provide vast insights into the cognitive and symbolic capabilities of extinct hominins and offer a peek into the human development of those attributes. Determining if a burial was intentional or not has been the topic of much debate in paleoanthropology and nowhere has that debate raged more intensely than in the case of Neanderthals. This paper aims to explore how the addition of geoarchaeological analysis at a site can provide vital information about the burial of remains and the intentionality behind them. We will look at three case studies of Neanderthal burials: Roc de Marsal and La Ferrassie in France, and Shanidar Cave in Iraq, and explore how geoarchaeology has shaped the interpretations of the remains over time at these famous sites.

Geoarchaeology focuses on the natural, geological processes that impact archaeological sites and artifacts post deposition. The intentionality behind burials is of interest to archaeologists because it indicates a capacity for ritual behavior and spirituality, which is often associated with increased cognition (Sommer 1999). In an archaeological context, intentional burials create recognizable burial features which are taphonomically distinct as mortuary behavior (Stutz & Stutz 2018).

The basic tenets of grave stratigraphy are used by forensic anthropologists to locate and unearth remains, as well as

archaeologists looking to understand past burial practices (Evas et al. 2016). Burials cut through the existing strata. The act of digging a burial hole will cause intermixture of the sedimentary layers (often used to refill the burial hole as backfill) and stir up vegetation on the surface as well as the roots down below. This act produces a burial wall past which will have uniform and distinct sedimentation, compaction, and chemistry from the surrounding stratigraphic sequence. As soft tissue decomposes, the space it used to occupy will be filled by the sediment above, often creating a noticeable depression at the surface (Ubelaker 1997).

As time goes on, taphonomic processes begin to act upon a site and its remains. Paleoanthropologists contend with hundreds of thousands, if not millions, of years of modification and destruction before remains are discovered. Without a thorough understanding of these processes in the context of the individual site i.e. rock spalling events, geochemistry, water movement, and percolation, their impacts can be misinterpreted or overlooked entirely and the interpretations of a site can be incorrect (Ubelaker 1997).

Taphonomic processes can create features that, at first glance, may appear anthropogenic through lack of any other explanation. Effects like post depositional sliding can make remains appear to have been deposited intentionally when they were not (Baumgardner and Shaffer 2015). Concretions can look like massive marbles of the Gods (Boles et al. 1985). Geochemical

weathering can make it look like there is a face on Mars (Pieri 1999). The human mind is programmed to see patterns and intentionality where it may not exist.

Even the most steadfast researcher has a theoretical paradigm and a set of beliefs through which they are conditioned to interpret data. When faced with unexplained phenomena, it is all too easy to make interpretations that reinforce those biases if the explanation is plausible. Geoarchaeology offers insight into how those phenomena may have otherwise formed. While it rarely can make absolute statements, it does contextualize finds and offer competing explanations. In order to better illustrate how geoarchaeology can illuminate the taphonomic context behind remains, three distinct sites will be investigated as intentional Neanderthal burials.

Roc de Marsal

The first of these sites is the Roc de Marsal, located in Dordogne, Southwestern France which dates from 39 ± 3 ka to 57 ± 4 ka via thermoluminescence (Guérin et al. 2017). Discovered in 1953 and subsequently excavated by Jean Lafille and François Bordes in 1961 (Bordes and Lafille 1961), Roc de Marsal has become synonymous with Neanderthal behavioral complexity. Neanderthal burials in the cave date to roughly 70 ks, although it has been consistently occupied throughout time. Inside Lafille and Bordes (1961) found evidence of stone tools, fire pits, and the remains of a Neanderthal child estimated to be around two or three years old, which remains the most complete Neanderthal child remains ever discovered. The remains were removed from the site in one large block and the sediment was removed at a second location. Lafille and Bordes (1961) published very little on their findings and outlined only slightly more in their field notes about the geological context

in which the remains were found. Subsequent publications credited the Roc de Marsal child as a classic example of intentional Neanderthal burial (Sandgathe et al. 2011; Goldberg et al. 2017).

This assumption was not unfounded. The remains were unusually complete and articulated, missing only the feet and left tibial and fibula which, given the position of the body, would have been the most upward facing elements. This degree of preservation led researchers to believe that the body did not sit on the surface long enough to be scavenged and disarticulated but instead was covered quickly with sediment after death (Rendu et al. 2014). The body also seemed to be interred in a pit, with the skull lying on bedrock and most of the body associated with a blackish sedimentary layer with the skull projecting upward into a sandy yellow-orange layer. This disconnect could be explained by either the body not being completely covered over at the time of burial or post depositional erosion of the black sediments above the skull with subsequent refill of the sandy yellow-orange sediment.

At the time of discovery and excavation of the Roc de Marsal child, geoarchaeology was not a field of consideration. As a result, the record of the geological context in which the remains were found is limited. Personal notes are very brief, only a few photographs were taken at the site, and only a few paragraphs were published on the geological context of the find at the time, in part due to Lafille's untimely death. Problematically, as the remains were removed in a block of sediment, all adjacent strata were also removed and deconstructed as they were retrieved and are therefore lost to further investigation (Sandgathe et al. 2011).

Sandgathe et al. (2011) revisited the site in an effort to flesh out the unique, geological history of the cave and illuminate some of the questions surrounding the

context of the remains. Because Bordes and Lafille (1961) did not attempt to associate the geological layers around the remains with those in the rest of the cave, Sandgathe (2011) attempted to do so based on the original descriptions of the layers and their own observations of color and texture as well as the lithic types originally described in association with the layer of the remains and their distribution throughout the cave (although it could be problematic if one location in the cave were designated primarily for lithic production over the others). They developed their own, independent stratigraphic sequence in the Western part of the cave adjacent to where the remains were originally discovered and then compared it to that described in Lafille's original field notes to attempt to find correlative strata that would offer further information about the life history of the cave.

They use this information to investigate questions related to intentionality. First, was the pit anthropogenic or naturally formed? The cave itself is part of an endokarstic system which forms natural fissures in the bedrock over time due to chemical dissolution, which do not have the same overall shape that an intentionally dug pit may have. Karst caves form slowly over millions of years as water leeches from the surface level and dissolves the carbonate minerals of soils and bedrock, sometimes forming acidic solutions that further degrade the bedrock. Cavities and voids form and grow, which eventually form dissolution holes and sinkholes as they collapse in on themselves (White et al. 1995).

Although the shape of the pit the remains were found in was not recorded, several linear karsts still exist within the cave and share the slight downward inclination described in the original positionality of the remains. These karsts are located within the bedrock and cut through the length of the cave. The remains were described as being

enclosed by bedrock on three sides with the skull resting on bedrock and it was made clear the remains, particularly the skull, sat in two separate stratigraphic layers in the soft sediments above the bedrock.

Sandgathe et al. (2011) partitioned the possible layers in their own stratigraphic sequence that would have matched Bordes and Lafille's (1961) description. They then cross referenced these layers with the description of lithics found at the level of the remains, which had a moderate number of scrapers. Only two of their independent layers, layers 5 and 6, fit that description. They describe that layers 5 and 6 as well as 9 were part of the subsequent infill of the natural karsts found throughout the cave, one of which was located very near where the original remains were found (Figure 1). The infill of these karsts is clearly the result of natural sedimentation because of their stratified nature, and the original descriptions of the sediments around the Roc de Marsal child fit with the contemporary observations of the karsts, suggesting that the deposition of the body happened in the same manner.

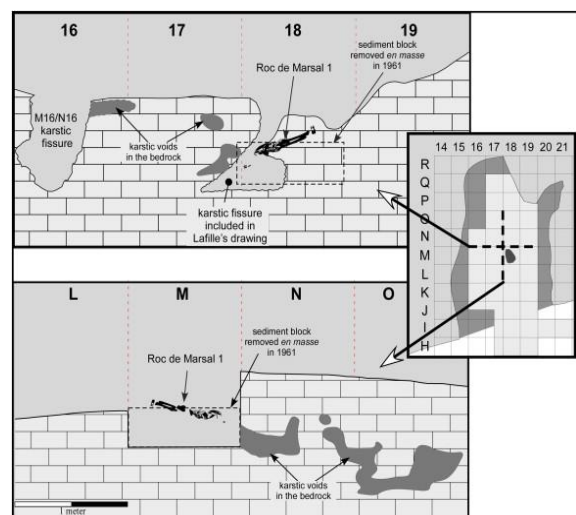


Figure 1. “Transverse (above) and longitudinal (below) cuts through the bedrock floor of the cave adjacent to the location of Roc de Marsal 1 (based on both Lafille's original drawings and our recent excavations). Note the extent and orientation of the endokarstic features in the bedrock” (Sandgathe et al. 2011).

This was supported by subsequent research done by Goldberg et al. (2017) who used the stratigraphy of nearby karst fill as an analog for the Roc de Marsal child's context and found that the original descriptions and contemporary observations match a closed cave system and gradual sedimentation over the body, specifically the darker sediments described to have surrounded most of the remains with the lighter, yellow-orange sandy layer over the top of the skull. They also conclude that the natural slope of the karst and cave, observable in the contemporary karsts and suggested by the descriptions of the position of the body *in situ*, wouldn't allow for localized erosion over the skull as it sat deeper than the postcrania over which sediments would have eroded first. These findings suggest, although can never confirm, that naturally occurring deposition of sediments in an existing karst better explains the geologic context described by Bordes and Lafille than does intentional infill and subsequent erosion.

The second question addressed by Sandgathe et al. (2011) is the articulation of the remains. While the most complete Neandertal child ever discovered, the Roc de Marsal infant was not complete. It was described as lying face down on its right side, with the missing elements being the left tibia and fibula, and both feet. The positionality of the body does not suggest a deliberate placement at the time of burial. Furthermore, those missing are the elements that would have been most upward facing and therefore most vulnerable to scavenging in the event that it was not immediately covered over at the time of internment. They point out that the remains were adjacent to but away from the flat part of the cave that would have been suitable for living activities, meaning trampling most likely would not have been a factor. There is a lack of rodent burrows in the site, suggesting rodent activity did not

play a significant role in taphonomic processes.

Goldberg et al. (2017) also address this question by pointing out that the yellow-orange sandy layer that presumably covered the skull shows evidence of ice lensing and dating shows instrument would have happened around OIS stage 4, suggesting a cold climate that may have frozen the remains and kept it from attracting carnivores. They further note that deposition inside a natural pit flanked by bedrock on both sides would have made it exceedingly difficult for scavenging by large carnivores to take place. They do note the possibility that this may have been an intentional act, taking advantage of an existing pit rather than digging a new one but still indicative of mortuary behavior, and acknowledge that the intentionality cannot be proved or disproven in that case.

These two studies and their rigorous revisiting of the Roc de Marsal site with an eye to geoarchaeology call into question the narrative of an intentional burial for the Roc de Marsal child by offering alternative explanations for observed phenomena assumed to be intentional. While some remain convinced of the intentionality behind these remains (Rendu 2014), the weight of the evidence supplied using geoarchaeological methods is hard to explain away. The original geological context in which the Roc de Marsal infant was found is gone and cannot be replaced, therefore a definitive conclusion can never be reached and the best that can be done is offering competing hypotheses.

This is an unfortunate circumstance in which, had geoarchaeological thinking been employed at the time of excavation, a definitive answer may have been obtainable about the nature of the pit. While it is possible that the infant was placed in an existing pit as an act of care for the body, the evidence to date cannot address that possibility in any

meaningful way and can only illuminate evidence around the intentionality of a purposeful burial. The existence of karsts within the cave cannot prove that the Roc de Marsal child was deposited in one, but paired with evidence that Neanderthals were opportunistic in their disposal of the dead at sites like La Ferrassie (Peyrony 1934), Shanidar (Solecki et al. 2004), La Chapelle-aux-Saints (Dibble et al. 2015), and Qafzeh Cave (Gargett 1999) it does provide a compelling argument that while perhaps not digging graves, Neanderthals were engaging some form of mortuary behavior even if only to move bodies to a central location. However, this is not the question at all sites deemed Neanderthal burials.

Shanidar

The cave site of Shanidar in Iraq has become best known for its Neanderthal burials, dates from $46,900 \pm 1500$ ka to $10,600 \pm 300$ ka via radiocarbon dating (Becerra-Valdivia et al. 2017), and thus far has produced the remains of 10 Neanderthal individuals ranging in age from 45 to infant. Excavations were initially conducted by Ralph Solecki in the 60's and 70's, but subsequent excavations have resumed after a long hiatus due to the political climate. The individual known as Shanidar IV has become the exemplar for intentional burials and is colloquially referred to as the 'flower burial' because of the presence of pollen clusters found in association with the remains, suggesting the individual had been buried with whole flowers in a symbolic gesture of mortuary behavior (Solecki 1975).

While over 100 different kinds of pollen were found in the soil sample taken in 1975, only 7 of them appeared in clusters which would suggest the individual was buried with whole botanicals, *Achilles*-type, *Centaurea solstitialis*, *Senetio*-type, *Muscari*-type, *Ephedra altissima*, *Althea*-

type (Leroi-Gourhan 1975). In traditional medicine, many of these plants have been used in a range of pharmaceutical ways from inflammation reducers to clotting agents to stimulants, and thus it has been suggested that Shanidar IV may have been a medicine man or being treated with medicinals even in the afterlife (Lietava 1992). No evidence to date suggests that Neanderthals used these botanicals in a medicinal way, although a recent study (Hardy et al. 2012) did find the presence of yarrow, *Achillea millefolium*, in the dental calculus of a Neanderthal at El Sidrón. Yarrow is bitter in taste and has little nutritional value, but is well known as a medicinal herb.

However, the notion that these pollen clumps were deliberately placed is predicated on the presumptions that 1, the burial was intentional, 2, whole botanicals could not have been distributed at the site naturally, and 3, Neanderthals shared our modern view of the symbology of flowers and mourning. All three of these presumptions can and have been called into question through geoarchaeological analysis. The first of these is easy to challenge, if not outright refute, because the original descriptions of Shanidar IV do not describe in detail the stratigraphic sequence in which he was found other than to say that Shanidar I through VI and one infant were all found in the upper third of an extremely thick layer, named Layer D (Solecki 1963) and that no observable burial pit was noted (Solecki et al. 2014).

Much has been made about the fact that these individuals were found so close together and in association with large boulders and lithics (Pettitt 2011), though the original descriptions of the site note repeated events of massive rockfalls that appear to have been the cause of death for multiple of the individuals found in the cave (Solecki 1963). Furthermore, the remains were actually separated by up to 19 cm of sediment, suggesting they were not deposited

at the same time (Gargett et al. 1989). Solecki himself suggested that rather than pit burials, bodies were deliberately placed in the natural gaps formed after rockfall events and possibly covered by sediment from the cave floor as evidenced by the close proximity of the individuals and their articulation (Solecki et al. 2014). This would be almost impossible to see geoarchaeologically, but the fact remains that no intentional pit seems to have been dug for any of the individuals found at Shanidar cave.

The original soil samples taken in 1975 showed a fairly uniform pollen distribution throughout the cave except for samples 313 and 314, which were collected from near Shanidar IV, which showed pollen clumps that suggested whole botanicals and flower heads, rather than just pollen, had been distributed around the body near the time of burial (Leroi-Gourhan 1975). This discovery was seized upon as clear evidence of ritualistic mourning behavior and deliberate symbolic action associated with the dead. Leroi-Gourhan in particular makes the claim that the taxa found in abundance near Shanidar IV all originate from flowering plants with brightly colored petals. The ‘flower people,’ as they came to be known, became symbols of Neolithic complexity and culture who mourned in the same way modern humans do, with grave goods and flowers.

Several studies since have refuted the claim, not that pollen clumps were present, but that they were a deliberate part of a burial and arrived at the site anthropogenically (yet they all suggest competing hypotheses as to how). Sommer (1999) noted that even within the original description of the remains, rodent burrows were noted all around the cave and in extreme abundance around Shanidar IV. While Solecki claims that there is no way rodents could have carried entire flowers nor deposited them around the body (Solecki 1971), Sommer suggests that the most likely

candidate of burrowmakers, *Meriones persicus*, could have indeed done both.

Meriones persicus, or the Persian jird, is a rodent about 6 inches long that has long been ubiquitous in the Iranian plateau. They often live in colonies and will burrow into soft substrate when available. Several zooarchaeological studies of the assemblage at Shanidar noted the remains of *Meriones persicus* to varying degrees and specifically identified them at the level of Shanidar IV. Zooarchaeologist Richard Redding excavated the burrows of several jirds and found that they habitually stored entire botanicals, including some of the types found near Shanidar IV, inside chambers, a behavior observed often in other members of *Meriones* (Sommer 1999). Given the number of burrows and their proximity to Shanidar IV this could very well explain the presence of pollen clumps at the site.

Other modes of transport have also been investigated as an explanation for pollen distribution at Shanidar. Fiacconi and Hunt (2015) conducted a preliminary surface pollen study at Shanidar as part of a 5-year study on pollen accumulation at cave sites, spurred by other recent studies that suggest the distribution of pollen in caves is a locally contingent and complex process, much more so than was known when Leroi-Gourhan (1975) and Solecki (1975) were making their interpretations. They propose outright that wide mouth cave sites like Shanidar show pollen assemblages as varied and multiplex as open air sites, and are exposed to just as many agents of transport (i.e. animal activity, wind, and water percolation).

The researchers took a total of 12 transects of samples from the back to the front of the cave, along the perimeter and the entrance (Figure 2), as well as externally from the cave along altitude transects to assess vegetation changes in altitude. Additional samples were taken from other caves in the area to expound on the findings

of the preliminary study at a later date. Only surface samples were taken, but with the intention of comparing them to the original samples taken by Solecki which penetrated to the Mousterian layer.

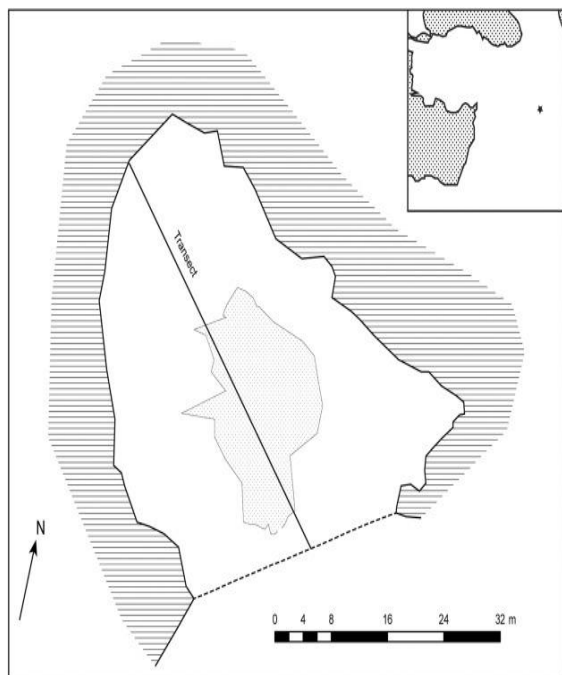


Figure 2. “Plan showing the location of the surface samples used in this study from within and immediately adjacent to Shanidar Cave. Inset: map showing the location of Shanidar Cave in the Middle East” (Fiacconi and Hunt 2015).

The samples were exposed to potassium hydroxide (KOH), which acted to separate the components and dissolve the humic material not relevant to the study. They were then treated with hydrochloric acid (HCl), which would serve to change any carbonate in the samples to salt carbon dioxide, and water which could then be easily separated out. A solution of sodium polytungstate (SPT) and water with a specific gravity of 1.9 was prepared and the samples were added, which allowed mineral fragments to separate from the organic fragments according to their relative density. Samples were then stained with aqueous safranin for greater visibility and mounted

using an aqueous mounting agent. The pollen grains were then individually identified and counted.

The results showed a wide variety of taxa in the assemblage with most showing up sporadically or with only one representative sample but a few showing consistently and in high numbers throughout. The interior of the cave showed better pollen preservation than the exterior and therefore more species were able to be identified in the interior. Pollens transported by wind, typically smaller pollens, showed homogeneous density inside and outside the cave suggesting Shanidar has good air circulation due to its morphology with one large opening at the mouth of the cave and two smaller openings at the roof. Insect pollinated taxa, typically larger pollens, were found in higher density within the cave than outside of it, suggesting that bees, in particular, were the main vectors of transport for those taxa within the cave and a density spike within the cave of those taxa may indicate the presence of a hive. Some observed pollens were only present outside the cave, most likely due to low grain mobility via size of the pollen or some other confounding factor.

In their comparison of taxa to Leroi-Gourhan’s results (1975) they found relative stability in species of plants from the Mousterian level to the contemporary level, suggesting vegetation has remained fairly established since the last glacial period. All but one of the botanicals found in the ‘flower burial’ assemblage were represented in their surface pollen analysis. Most importantly, they found groups of grain pollen like the ones described by Leroi-Gourhan, suggesting that the clumping they interpreted as anthropogenic can occur naturally within the cave context. This proves that a purely natural explanation exists for the presents of the observed pollen clumps found near Shanidar IV.

This was only an initial study and therefore samples were taken only once during the month of April. More research is ongoing to investigate how these pollen distributions change from the rainy to dry season, but this study demonstrates how alternative hypotheses of flower pollen distribution within caves can be investigated. It does not, however, demonstrate the actual process by which pollen was deposited near the remains. The researchers are careful to note that while the taxa of pollen found in the modern context seemed on par with those from Leroi-Gourhan's results, 65,000 years separates the Mousterian level and the contemporary one. The pollen transportation processes at work may have been very different and a detailed study of multiple samples taken from the Shanidar IV level would be needed to generate a more complete picture of the mechanics of the cave throughout time. In a subsequent publication, Fiacconi and Hunt (2017) find that the pollen taphonomy at Shanidar cave does not follow the distribution pattern seen in other local caves, possibly due to the number of visitors the cave gets each year. This would also suggest that surface samples alone may not elucidate much of the processes at work when Shanidar IV was deposited.

Shanidar is an example of how imagination can run wild with just a little bit of data, and how hard it is to walk back an interpretation once it has been put in the public eye. While it would be extremely difficult to make the argument that all 10 individuals at Shanidar were deposited there through no anthropogenic means at all, the level of ritual and symbolic behavior remains firmly in the camp of possibility over probability. Assumptions about anthropogenic activity should never be taken as truth if alternatives are plausible, and when geoarchaeological methods such as those employed by Fiacconi and Hunt (2015) illuminate the naturalistic explanation of a

phenomenon, the entire interpretation is called into question.

La Ferrassie

Nowhere is this better demonstrated than at our last case study: La Ferrassie. Like Roc de Marsal, La Ferrassie is located in Dordogne, southwestern France, and is a rock shelter site that dates from 91 ± 9 ka to 37 ± 2 ka using luminescence dating and radiocarbon ages (Guérin et al. 2015). Here the remains of seven Neanderthal individuals have been found ranging from age 45 to neonate. The site has been known since 1896, and initial excavations of remains were conducted by Capitan and Peyrony from 1909 to 1920 (Gargett et al. 1989). The most famous of the La Ferrassie burials is La Ferrassie 5, a neonate unearthed in 1920 under what Capitan and Peyrony described as a meter-sized cone or mound, one of nine described at the site (although the only one with remains inside).

This feature was initially and for many decades after described as a burial mound, analog to the burial mounds of later archaeological populations and the first, best evidence of Neanderthal behavioral complexity, spirituality, and cognition (Frey 1938; Binford 1968). La Ferrassie 5 was seen as an infant who had been mourned and buried intentionally with the rest of its family in the home (rock shelter) they resided in. The mounds were a symbolic ritual whose meaning had been lost to time (although no author seemed to broach why the other 8 were 'empty' of remains).

Also like Roc de Marsal, available information about the original context of the find is a product of the time it was found and geological information is limited. It was recorded that the remains penetrated two distinct layers of sediment, a Mousterian sedimentary layer on the bottom and a yellowish sediment layer over the top known as C and D (Peyrony 1934; Gargett et al.

1989). The remains which sat in layer D, or the Mousterian layer, were completely dissolved, and therefore the remains themselves only consist of those which sat in the upper layer C and are partial. The mound over the remains led Peyrony (1934) to conclude that the body was buried in an intentional pit, however he does not address what taphonomic process would lead to it sinking into the layer below if that were the case.

The mounds themselves have long been a source of mystery, both their construction and placement within the cave. However recent comparison with other sites around the world may have provided an answer: cryoturbation. Gargett et al. (1989) point out that similar mound-like structures have been observed in British Columbia as a permafrost feature, although at the time of their publication the mechanisms behind that formation were unknown. Subsequent research has illuminated the formation of what is now known as frost boils or hummocks, a complex interaction between soils, vegetation, and permafrost in arctic and semi-arctic environments where frost heave and cracking, displacement, and sorting processes lead to raised mounds of earth which can be up to 3 meters in diameter (Walker et al. 2014).

According to Walker et al. (2014), cryoturbation forms these mounds in primarily silty or loamy soils which retain more water. During the freeze phase of freeze/thaw cycles, the water forms ice lenses which grow toward the path of least resistance (upward), causing frost-heave where the soils above are also pushed upward. These frost heaves recede when the lenses melt but don't settle back to their original position entirely as they are subject to soil creep from the sides of the lenses as well as leaching of minerals from above which also serve to fill the space the lenses occupied (Figure 3). Over centuries these

cycles form distinct mounds in the earth which have been observed in permafrost environments from Alaska (Overduin and Kane 2006), to Yakutia (Gubin et al. 2017), to the Front Range of Colorado (Fahey 1974), and even on Mars (Machado et al. 2012).

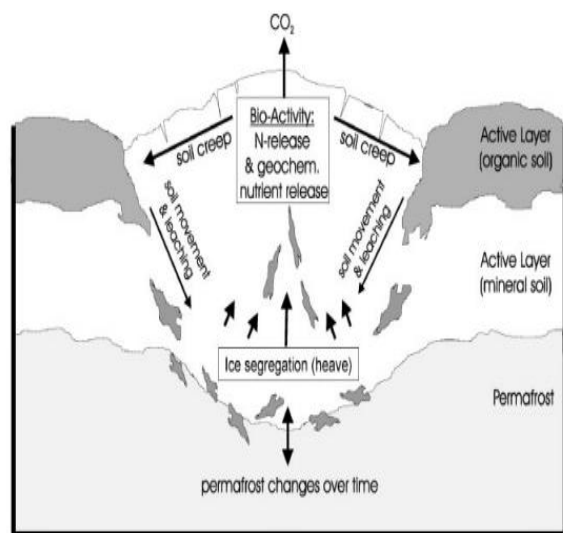


Figure 3. “Conceptual diagram of biogeochemical cycling within frost boils” (Walker et al. 2014).

The La Ferrassie mounds measure around 1 meter in diameter and are situated along the C/D barrier in what is described as (Laville and Tuffreau 1984; Bertran et al. 2008). In the available translations, the soil types of these strata are infuriatingly not described beyond being “light brown” (Gargett et al. 1989:165), however there is a long history of evidence regarding cryoturbation within the cave. In his response to RielSalvatore et al. (2001:463), Robert Gargett points out that profile photos were taken at La Ferrassie clearly show evidence of cryoturbation at the C/D interchange (Laville 2007), as well as a profile view of the mounds where the tops appear to have the shape of cresting waves, something he argues could not happen if they were anthropogenic

formations unless they were then subject to cryoturbation.

These claims are supported by other studies at the site, which note cryoturbation features at various levels including those at which the remains were found (Laville 2007; Bertran et al. 2008; Guérin et al. 2011). Furthermore, paleoclimate reconstructions done at the site suggest the climate at the time of and succeeding the burial of La Ferrassie 5 would have been conducive to a permafrost environment within the cave (Bertran et al. 2008; Talamo et al. 2020). While once again this evidence cannot refute the claim of an anthropogenic origin to the mounds, it calls into question the notion that that is the only explanation for their presence in the cave.

Conclusion

Throughout this paper, we have explored the ways in which geoarchaeological methods are able to shed light on claims of intentional Neanderthal burials at the three sites of Roc de Marsal, Shanidar, and La Ferrassie. There are shortcomings to these kinds of analyses as well. As previously discussed, these methods are incapable of ruling out an anthropogenic origin to the features touted as symbolic. However, had they been employed at the time of excavation for all of these sites, the interpretations may have come out very differently and may have provided irrefutable evidence to the contrary. Geoarchaeological methods provide additional information to a larger picture and are meant to be utilized in conjunction with other methods and in comparison with like sites.

Given the dearth of information provided by geoarchaeology in these and other cases of Neanderthal 'burials', the picture remains unclear. Beyond the sheer number of individuals found at sites together, there is no evidence of intentionality that cannot be explained by geophysical processes through time. However, there is

also no definitive proof that those processes *did* in fact result in the observed phenomena. In these cases, geoarchaeology acts as a checkpoint through which no evidence of symbolic mortuary behavior to date has been able to pass. However should that evidence be unearthed (geo puns), it will be all the more meaningful and impressive by virtue of the rigorous standards established by the use of geoarchaeology.

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An Old Sugar Factory, New Graffiti, and Longmont's Sense of Place

Morgan Lundy

Introduction

When looking at individual pieces of graffiti, devoid of context, it is difficult to understand the power graffiti has to shape existing places and broader community identities. Often that inability to recognize and understand this power results in graffiti's designation as vandalism that creates headaches for property owners, local governments, and police departments. Despite this misunderstanding and the negative views often associated with the artform, graffiti and those who create it play a role in broader place-making and identity-creating processes within a community. Graffiti can intersect with a place's history, landmarks, and beliefs about itself in ways that contribute to a community's transformation and growth. I demonstrate this argument using Longmont, Colorado and its graffitied, historic sugar factory.

Graffiti and Space

Graffiti does not exist within a vacuum. It is steeped in rich context, which interacts with many different factors to create a sense of place. This maps well onto Doreen Massey's theories of space (2005). Massey asserts that space is created through all interactions between human and non-human factors. These interactions are called trajectories. She also explains that space is continually under construction through ongoing social and political negotiations between different trajectories. Also, space is open to all possibilities (9-15, 154-162).

Graffiti has its own trajectory and so do the surfaces and structures on which it is found. The community in which those structures exist has its own trajectory, as well as the people who live in the area and see the graffiti. All of these trajectories can intersect to create shared or differing meanings, a sense of place, and possibilities for how these entities move through time. These separate players negotiate how they proceed together or apart in creating and recreating space.

Schacter expands on this idea, explaining that graffiti has agency and intrinsically incorporates and creates new meaning with the surface on which it appears (2016, 150-151). While the graffiti is an extension of the writer, it also opens "a network between objects and persons, between writer and reader, producer and consumer of the work" (148). Schacter also asserts that graffiti works "as an influential form of social practice, a means of re-forming the city, re-negotiating the symbolic and formal expressions of built form, re-formatting the very meaning of the space they inhabit" (154). Schacter is describing the trajectories of and negotiations between graffiti, buildings, people, places, and other elements of space to create meaning within a certain location. It is an ongoing social process in which graffiti has a life of its own and endless possibilities to shape the place around it in conjunction with other trajectories.

That power and agency of graffiti extends into Brighenti's theories about the valorization of graffiti and Evans' ideas about change and building authenticity of place. Brighenti explains that "valorisation is the process whereby entities -- places included -- are bestowed a certain value" (2016, 158). Fluctuating between criminal activity and sanctioned art, graffiti participates in changing the character and value of a place. Value and meaning of a place change and metamorphose through time and by different means (159). Graffiti is able to build upon and affirm the meaning of place by establishing difference and creating a sense of authenticity (159, 162). Evans asserts post-industrial cities use that sense of authenticity extracted from graffiti, in conjunction with its industrial roots, to revitalize and rework its identity in times of transition (2016, 175-176, 179). Graffiti combines with historical structures, local sentiments, trajectories, and other materials to create new and differing meanings of place for both local people and outsiders (174). In this context, and relating back to Massey, graffiti is one of many trajectories that constantly negotiate and intersect with one another, thus contributing to changing meanings, identities, and place-making.

With these understandings of graffiti, identity, and space, I apply these concepts to a case study specific to my own life to understand how these processes unfold in a real-world context.

Longmont's Graffiti and Sense of Place:

In the winter of 2019, I drove into Longmont, Colorado for the first time with my partner, Ed, in search for a place to live. We drove west on State Highway 119 from I-25 for a stretch of about five miles, passing gas stations, industrial-looking buildings, and yellow fields. Nothing special stood out or differentiated the area from other places. As

we approached Longmont proper, the road gradually curved and opened our view to a picturesque scene complete with dark blue mountains capped with crisp, white snow. In stark contrast with the mountains stood a tall collection of faded white silos, a smoke stack, and red brick, factory-looking buildings. Even at a distance, I could tell the buildings were in a state of decay. Some of the brick walls were crumbling and many windows were broken. Graffiti covered sections of the buildings, indicating that security and maintenance of the complex was not a high priority. Looking westward, I could not see the profile of any other buildings in the area. Although I did not know anything about the factory and its history, I was struck by the gritty, industrial feel of the site. The old buildings mixed with graffiti immediately gave the city an attitude and a strong sense of identity.



Image 1: View of the sugar factory looking westward.

A few weeks later, we ended up moving into an apartment complex located across the street from the factory. Through our adventures around town and conversations with new acquaintances, we learned that Longmont has a somewhat friendly rivalry with neighboring Boulder. This riff contrasts Longmont citizens -- some call themselves Long-monsters or Long-martians -- as no-frills, salt-of-the-earth people, against what many in town perceive as pretentious, wealthy Boulder residents. This perception partially comes from the vast difference in property values between the two municipalities. Aside from being a university town, Boulder is known for its exuberant housing and rent prices that prevent many people from living in the city. Although many folks work in Boulder, many commute from their homes in Longmont and other nearby towns. This rivalry is essentially one between two socioeconomic classes within a region.



Image 2: View of the factory looking eastward.

We also pieced together that the building across from our apartment was a sugar processing factory built at the turn of the 20th century. The factory processed beets grown in the surrounding area into sugar. This information added to the working-class feel of the city that distinguishes Longmont

from neighboring Boulder. The sugar factory and its graffiti play into this tough, working class identity, especially when contrasting it to Boulder's expensive houses and private-feeling mountains.



Image 3: Graffiti high on the eastern front of the factory.

Additional research provided more context and history about the factory. It was built in 1903 and incorporated by the Great Western Sugar Company in 1905. It was one of many sugar factories built in northeastern Colorado around that time. The factory helped process beets from “over 7,000 farms in three states” (Shields 2012). The processing facility and related agricultural activities brought people into the area from Sweden, Germany, Mexico, and Japan, helping develop the young city and increase its population (Mason 2020). The factory operated until its closure in 1977 (Rochat 2012). In 1980 Denver resident, Dick Thomas, bought the property “hoping to lease it back to a sugar manufacturer” (Shields 2012). Unfortunately for Thomas, those hopes were never actualized. The factory has stood there ever since, decaying over the decades and attracting arsonist activity,

trespassing, and graffiti. The level of this illicit activity and the degradation of the property prompted Boulder County to mandate that Thomas develop a security plan for the factory to protect public safety. The property does have fencing but that does not stop people from exploring it (Lounsberry 2018). That history, decay, and perceived mystery and danger of the property does not deter people but continues to attract them as evidenced by the vibrant graffiti on the factory.

Prompted by our curiosity, Ed and I took our telescope and phone cameras to get a closer look at the factory. We drove to different vantage points mainly to get photos of the eastern front of the buildings, as well as some views of the north side (see attached photos). We also hiked up white hills across from the factory made of piles of lime, which is a byproduct of sugar beet production (St. Vrain 2013). Decades after the factory closed, it continues to shape the physical and visual landscapes of the area.

The graffiti on the sugar factory is diverse in its content, artistic styles, written messaging, and presumably in the artists creating these pieces. Most of the visible graffiti is situated high upon the factory's exterior. This is a relatively risky position to paint, especially when considering the decades of decay and structural damage. However, the risk of painting at that height ensures that the graffiti is seen from great distances as people enter the city. Despite the ever-increasing peril, the pieces appear to be relatively new based on the vibrancy of the paint. There are intersecting and overlapping layers of graffiti indicating prolonged use of the building complex for artistic expression. Although there is a fence and a security plan for the property, there does not seem to be any serious efforts to remove the actual graffiti from the factory, allowing for its prolonged development and visibility. Although I have only lived in Longmont for

two years, the graffiti continues to grow exponentially along with the rest of the city.



Image 4: Graffiti high on the eastern front of the factory.



Image 5: Graffiti high on the eastern front of the factory.

Longmont is in the midst of growth and transition. In the last 10 years, there has been a surge of development projects in the area. One project includes a series of walking and biking pathways throughout the city, some providing scenic views of the sugar

factory (*see image 11*). Another includes the apartment complex that we moved into, which purposefully uses the sugary factory imagery to create a kitsch and modern feel for its residents (Kindlespire 2013). In the apartment complex there is a tall, silo-looking building, reminiscent of structures across the street, hiding the pump for the complex's pool. The city has also attracted business development from the J.M. Smucker Co. and PODS, while developing shopping areas, a hospital, new housing units, warehouses, and business spaces (Joshi 2019). These new spaces also invoke architectural details and use names that tie back to the factory and the city's mixed agricultural and industrial roots.



Image 6: Graffiti high on the eastern front of the factory.

Despite this development and efforts to cultivate a modern image of growth and prosperity, the factory and its graffiti persist in Longmont's collective imagery. In part, this may be due to the factory being privately owned. However, at a community level the factory and graffiti play an important role in Longmont's continuing place-making and

identity-creating processes. At this moment in time, this landmark means two different things for Longmont. The factory is emblematic of decay, the city's past, and loss of an industry. However, both graffiti writers and Longmont as a whole, intersect and change the factory's trajectory, using it to create literal and economic vibrancy in the community. The factory has metamorphized; it no longer produces sugar, but it provides the city with an iconography and reinforced identity that continues to draw people and businesses into the area. The graffiti has its own agency and trajectory that combine with the sugar factory's existing symbolism and history of blue-color work (Schacter 2016). It strengthens this collective, tough narrative by adding to the gritty authenticity Evans discusses and Longmont prides itself for (2016).



Image 7: Courtesy of Edward Nassy. View of the factory looking north from a public walking trail.

There is no rush to remove the graffiti from the factory because it enhances its meaning, thus speaking to the valorization process Brighenti discusses (2016). Although the image is just as cultivated as Boulder's, the factory and its graffiti ornamentation differentiate Longmont from the perceived pretentiousness of its neighbor, while still serving its economic needs. Similar to what Evans explains, Longmont's ongoing

transition is taking advantage of its own history and infrastructure to propel itself into the future (175-176, 179). The sugar factory, the graffiti, Longmont's economic development, its residents, and other elements all have trajectories that socially negotiate with one another to create space, shared meaning, and the opening of possibilities for the city (Massey 2005).

Conclusion

The sugar factory, its history and graffiti are collectively part of a broader narrative about Longmont and its identity. The majority of the graffiti lies prominently on the eastern front of the property, contributing to the city's opening images and introduction to those driving into Longmont. This introduction, as it did for me, establishes a sense of place and identity for the community. Graffiti utilizes and builds upon the existing, yet changing image of Longmont to create a sense of authenticity that draws people in and compels them to stay.

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Midwifery in Scotland: Cultural Historical & Critical Medical Anthropology Perspectives

Olivia Garl

The National Health Service Scotland defines the midwife as the figure who provides “support to women before, during, and after childbirth, making sure babies receive the care they need at the earliest stages of life” (NHS Scotland Careers: Midwifery). In Scotland, midwifery remains entrenched in the sociocultural experience of birth and is entangled within biomedicine. While modern understandings and perceptions of midwives’ roles changed significantly over the course of the eighteenth to twentieth centuries, there is much to be said about midwifery’s entanglement with the rise of the biomedical field, particularly obstetrics. Developments in the twentieth century, including the Midwives Act of 1915 and the 1980 *Short Report*, made the hospital the preferred place to give birth. Scotland provides an opportunity to analyze the unique national, regional, and cultural forces that shape midwife-assisted births because of its contributions to the history of midwifery. In order to analyze the role of Scottish midwives, I will use two approaches. Firstly, a cultural historical approach will be used to reveal how Scottish midwives’ work was changed by sociocultural developments tied to the rise of the male-dominated medical field. A critical medical anthropology approach reveals how the rise of obstetrics and biomedicine shaped midwives’ roles in the NHS Scotland, sense of meaning attributed to them, and women’s choices in childbirth. The use of intersectional sources will demonstrate the ways Scottish midwifery has been shaped over time.

This article builds on several concepts and models in order to contextualize the

placement of Scottish midwifery within the biomedical field. Historical, political, and economic factors determine women’s choices made for their births. These factors generate cultural production during childbirth and are “constructed within and by the social worlds of those participating” (Dosumu 2004: 8). This assertion of childbirth as a social and cultural process has been established by Brigitte Jordan’s work *Birth in Four Cultures* and reveals that “birth – in both biomedical and local birthing systems - constitutes a cultural production” (Sargent and Gulbas 2011: 291). The biomedical model, also referred to as the “active medical model”, views birth as “inherently pathological, a problematic mechanical process in danger of constant malfunction” (Dosumu 2004: 5). The biomedical model uses clinical methods and biomedical management in order to approach any ‘malfunction’ that may arise during birth. The midwifery model of birth is strongly defined by the conception of a ‘normal’ or ‘standard’ birth considered to be “birth without routine medicalization” (Hunt et. al., 2002 in Dosumu 2004: 5). The midwifery model’s rejection of routine medicalization is also apparent in its definition of birth, where it is “an inherently normal physiological process with powerful emotional and spiritual dimensions” (Dosumu 2004: 5). I will use the ‘rise of the biomedical field’ to refer to the professionalization of the medical field in Scotland since the eighteenth century. This directly ties to the status of midwives, as male midwives emerged during this time and “railed at the mismatch of women with science” to establish their scientific

legitimacy (Yeo 2006: 141). This gender aspect is an essential part of understanding the history of Scottish midwifery.

In order to effectively evaluate the status of midwifery in Scotland, I will be using two approaches to analyze its historical, sociocultural, medical, and political influences. Firstly, a cultural historical approach will serve to form the basis of historical context essential to understand Scottish midwifery's modern state. This approach details the rise of the male, professional medical field, namely obstetrics, and its implication for female midwives in the eighteenth and nineteenth centuries. The approach will follow the important developments of twentieth century midwifery in Scotland, illustrating how the passage of the Midwives Act of 1915 was essential for the formation of modern midwifery. Finally, this approach will provide insight for the status of modern midwifery through analyzing key historical moments.

The second portion of this paper will use a critical medical anthropology approach to evaluate the impact of biomedicine on Scottish midwifery. Analyzing the emergence of the male midwife figure in the mid-to-late eighteenth century will critically examine the posturing male midwives used to place themselves in the field. The rise of obstetrics is critical to this examination and will demonstrate the key influences used to form modern Scottish midwifery practices. This approach will evaluate new biomedical technologies, such as the discovery of anesthesia via chloroform by Sir James Young Simpson. By using this approach, the biomedical entanglements of obstetrics and midwifery will be revealed. It will also demonstrate the use of the biomedical birth model and midwifery birth model, respectively, and lead to the analysis of modern Scottish midwifery by evaluating

data from the National Health Service Scotland.

In order to understand the full impacts of the historical, sociocultural, and political changes to Scotland's midwifery field, I chose to analyze documents and data produced by the National Health Service Scotland. The NHS Scotland fits into the larger framework of the National Health Service present within England, Wales, and Scotland. While NHS Scotland is important in dispensing standards and meanings for midwifery care. The data collected from the NHS Scotland is complimented by the perspectives offered by the NHS reports in order to show the ways British midwifery intersected with Scottish midwifery. My methodology for collecting this data took form in two ways. Firstly, a review of historical literature and reports from the Midwives Act to the Changing Childbirth report allows me to establish previous changes and to document the data to build a larger image of Scottish midwifery that is dependent on continuity and change over time. The data collected from the NHS Scotland's reports since 2000 compliments the first method, contributing to the continuity and change of Scottish midwifery. This methodology also allows the use of tangible data in the form of percentages, numbers, and statistics in order to project modern findings onto historical data.

This research was most impacted by my status as an American, childless, cisgender female graduate student. As this research is situated outside of the United States, I do not inherently have the cultural and national understandings that would ground the study of Scottish midwifery into my own experiences. My experiences with midwifery as a whole are non-existent aside from research and review of literature. As a cisgender woman, I cannot assume that the experiences for all individuals interacting with Scottish midwives are in any way

standard. Since a wide swath of gender identities are increasingly accepted within the United States, it is clear that there may be midwives' patients that do not identify as cisgender women. My status as a childless woman also acknowledges my lack of personal experiences with processes of birth, aside from research, literature review, and communication-derived knowledge from other. Finally, my role as a historian in creating this work was influenced by the Women, Health, and Culture anthropology class I took in Spring 2020. Anthropology reveals useful connections between history, medicine, and culture that can strengthen historical analyses.

Cultural Historical Approach

Origins of midwifery in Scotland are hard to trace to any particular moment in history yet it is clear that midwives attended all women during labor and childbirth, regardless of socioeconomic status (Ferlie 1964: 125). Midwives were central to the community they lived in, providing support, medical advice, and care for both the mother and infant. This posturing of midwives in society allotted them a sense of power and agency within local support networks. Their roles were acknowledged not only by kinship networks within their communities, but also by religious officials in the church who depended on their expertise to question laboring mothers to determine the father of an illegitimate child (Brown 2006: 93). In this sense, midwives were used by the Scottish church to bring "benefit to both child and mother" by pressuring the father into marriage, creating a family unit, and providing monetary support for his biological child. This intersection of the church within midwives' lives and duties clearly placed them into an authoritative religious standard where they were used to uphold a moral standard embedded within gender and societal norms of early modern Scotland.

Midwives' status and expertise within this predicament allowed the church to investigate women's sexual misdemeanors, where "a woman's body was regarded as the site of sin requiring intrusive investigation" (Brown 2006: 88). A midwife's involvement in these investigations allowed them access to the female body through her authority as a woman who was the "only proper person to handle the intimate parts of other women" (Yeo 2006: 142). While there is no evidence that provides a midwife's perspective on this practice, it reveals how their occupation was often used to assert the moral authority of the church through sexual policing. This presents an alternative to the supportive, community-based visage of the Scottish midwife and reveals the intricate ways a woman's status could be used to place her and other women beneath the control of the church.

It was not until the mid-eighteenth century that midwives' status began to be questioned by patriarchal authority in Scotland. During the eighteenth century, the medical field was partially professionalized through the Scottish Enlightenment's impact on science and built on traditions that put them at the forefront of European medicine. During this time, the status of women as midwives expanded through training opportunities offered in Edinburgh, Aberdeen, and Glasgow (Yeo 2006: 141). This position of the female midwife, a consistent and presumably comforting presence in birthing scenarios, was amplified by these opportunities and allowed them to become licensed in Edinburgh and western Scotland. Access to training and licensing placed female midwives under the scrutiny of newly created 'male midwives' who used science to establish their legitimacy through arguing medicine was the scientific "province of a man" (Yeo 2006: 141). This contradiction grew as elite women impacted birth patterns by demanding the best

scientific advances for their birth-related medical care.

While the rise of male midwives did not immediately or completely erode the position of the female midwife in Scotland, it showed a hint of what was to come. While female midwives continued to attend to births and received training, male midwives developed their own medical and scientific approaches to assisting births. This coincided with the formation of training establishments in London, England, that became obstetrics and gynecology by the nineteenth century (Yeo 2006: 141). The facilities in London were created by three Scottish male midwives, their goal to approach birth through the ‘scientific approach.’ The dichotomy between the ‘scientific approach’ used by male midwives and the traditional methods used by female midwives only continued to grow from this point onwards.

As the influence of male midwives continued to grow in Scotland, training provided to male medical students and women in Scotland became overwhelmingly influenced by London’s obstetrics and gynecology establishments (Yeo 2006: 142). The aims of these male midwives were two-fold. They sought to contribute to the rise of the professionalized medical field by carving out a spot for themselves within this new discipline. This provided male-dominated legitimacy to both the profession and their specialties, positioning them to overwhelm women’s place in midwifery by the mid-to-late nineteenth century. They also sought to “educate, rather than eradicate” female midwives, unlike their English counterparts (Yeo 2006: 142).

While the medical field continued to grow, discourses on the nature of women’s biology, psychology, and sexuality also changed. Previously, beliefs on female biology emphasized the “fragility of the female mind, the danger of women to good moral and social order, and the desirability

for the strict control of female sensibility and sexuality” (Brown 2006: 86). This view, embraced primarily by the Scottish church and its attempts to control the female body, was countered in the late eighteenth century when the medical field began to “re-view women as primarily maternal and passionless, full of soft sensibility rather than teeming with sexuality” (Yeo 2006: 143). This discourse heavily influenced nineteenth century views on women and femininity where the “maternal dimension of womanliness” lead to a belief that women were supposed to have irrevocable bonds with their children.

Midwifery in Scotland continued to change into the nineteenth century and saw the continued growth of the professional medicalized space as the safest place to give birth. Midwifery began to appear in Scotland’s universities throughout the century, where Chairs of Midwifery were appointed in Glasgow and Edinburgh (Ferlie 1964: 127). These establishments were followed by the creation of the ‘lying-in’ hospital, where women could give birth in a medical setting and beneath the supervision of both men and women midwives. Despite the improvements that slowly lead to the dominance of the biomedical birth model, dissenting voices made it clear that not all supported such changes. The church provided perhaps the strongest critique of these medicalized developments, their belief that “pain in childbirth was sent by God; anyone who attempted to lessen it must be in league with the Devil” (Ferlie 1964: 127). The intersection of religion, medicine, and midwifery provided Scottish women with many options to grapple with when looking towards birth. As male midwifery became more prominent, births veered towards the biomedical school’s dominating, engulfing, and controlling tendencies over the midwifery model of birth.

By the end of the nineteenth century, medical innovations marked the growing

displacement of traditional female midwives in Scotland. The discovery of chloroform by Dr. James Young Simpson, for example, revolutionized birth practices and was legitimized when Queen Victoria was given it during her own births (Ferlie 1964: 127). While Scottish midwives were not completely disenfranchised by these innovations and changes, there was a growing movement to bring them up to standards present within the growing medical field. The invention of lying-in hospitals allowed 'traditional' female midwives to be trained and pass hospital examinations that marked the first step towards the uniform certification of midwives. This was part of the process allowing male midwives to legitimize themselves while destabilizing female midwives' traditional practices. The nineteenth century was also a time when births in hospitals were on the rise and can be proven by the appearance of more births in Scotland's hospitals' birth registers (Dosumu 2004: 18-19). While births continued to be attended by midwives, Scottish hospitals made themselves the place for medically assisted births.

The twentieth century arguably brought the most changes to the midwifery profession in Scotland. In 1902, England and Wales passed the Midwives Act, mandating "better training of midwives and the regulation of their practice" (Wright 1907: 507). This required English and Welsh midwives to be certified under the Act, be certified under a doctor, and to conform to the regulations of the Act (Wright 1907: 507). While the introduction of the Act reformed midwifery in England and Wales, Scotland did not see similar changes until 1915. After the outbreak of World War I, a heightened sense of attention was drawn to the state of midwifery in Scotland. The mass violence of war, intensified in part by mobilization of disease and attention paid to lack of sanitation, brought more scrutiny to health

measures. This attention partially came from the persistence of Victorian stereotypes of the midwife as "drunken, bumbling" in an effort to "awaken public outcry and force unlicensed midwives to become licensed or lose all" (Dosumu 2004: 22). This stereotype grew with the professionalization of the medical field. When it intersected with the attention on health measures, midwives became a part of the narrative to modernize healthcare.

Scotland received its own act for midwifery in 1915 through the Midwives Act for Scotland. The Scottish midwifery act followed the Midwives Act of 1902 yet was distinguished by its own standards. One of the most prominent features of the 1915 Act was the power granted to the Central Midwives Board of Scotland for "regulating, supervising, and restricting within due limits the practice of midwives and defining the emergencies in which a midwife shall call in a registered medical practitioner to her assistance" (*The Lancet* 1916: 196). This legitimized the position of male medical professionals above midwives, posturing them as the upmost authority to be called upon in case of emergency. Prior to this time, male midwives gained legitimacy because of the emerging professional medical field. Change, drove by both universities and elite women, came from wide-spread training that introduced more medical professionals to the field. As elite women found options for shorter, less painful births they sought the help of male midwives. Over time, male medical professionals supplanted traditional birth choices, including the use of a midwife. These economic birth-centered choices reinforced changing birth patterns in Scotland. Through this, midwives were placed beneath the medical profession and left them jeopardized by the changes in education that came throughout the twentieth century.

Challenges posed by the Midwives Act of Scotland aimed to bring midwives beneath a uniform system of education and training. Before the Act was passed, midwifery training continued as it had for centuries through home-based education and the spread of education from one generation to the next. While the Act was successful in providing a base standard for midwifery, it did not lay out a proper system for the training of midwives beneath it. The Maternity Services (Scotland) Act of 1937 to address this issue. It was created to allow women to “retain the services of a midwife and a doctor” and also “call in the services of a consultant obstetrician” if needed (Dosumu 2004: 29). It is clear that these acts were passed to reform education and standards for midwifery in order to standardize the field to biomedical practices.

Throughout the mid-twentieth century, education for midwives continued to be standardized. The creation of the National Health Service in 1944 included midwives as an independent profession (Jevitt 1994: 68). The establishment of the NHS brought healthcare access to Scottish citizens and put their health and well-being at the forefront of medical discourses. One consequence of the creation of the NHS was the progression of the accepted wisdom that “the only safe place to give birth is in hospitals with full access to obstetric technology and expertise” (McCourt 2014: 169). Despite this change, there was no displacement of Scottish midwives unlike in the United States where the nurse-midwife nearly disappeared (Jevitt 1994: 69). Scottish midwives were not displaced as a greater balance was found in the dichotomy between midwives and obstetricians. Midwives were still available for births, even if many women went with the biomedical model of birth.

The mid-to-late twentieth century brought the most recognizable challenges to midwifery in Scotland. While by the 1960s

midwives were viewed as “highly skilled professional women” positioned as a “trusted and valued colleague with obstetricians, pediatricians, and general practitioners”, this role was reevaluated in the 1980s. (Ferlie 1964: 127) The *Short Report*, issued by the British government in 1980, advocated for the phasing out of home births, rural freestanding medical units, and small freestanding medical units completely. (McCourt 2014: 169) Scotland’s birth practices opposed some aspects of this trend, as freestanding medical units remain to be used by Scottish women today. The report prompted critiques from Scottish women’s, consumer’s, and midwifery groups, and was the sign of a new direction for births in Scotland. By the time the *Changing Childbirth* report was published in 1993, it became clear that consumerism served as a model for women giving birth. Women’s consumerism defined their own birth experiences whether they chose home or hospital births assisted by midwives or a hospital birth assisted by an obstetrician-gynecologist.

While this cultural historical approach traces the shifts in the midwifery field, the emergence of professional medical field, and women’s choice in the birth place, it does not acknowledge or critique the medical systems ingrained within these changes over time. Next, I incorporate a critical medical anthropology approach in order to survey the impacts of the biomedical birth model and midwifery birth model.

The midwifery birth model portrays birth as “an inherently normal physiological process with powerful emotional and spiritual dimensions” and presented women with a space to create their own meanings attributed to birth. Beneath this model, birth was a site of creation for social and cultural meanings deeply embedded within Scotland’s gendered hierarchy influenced by the church. In the eighteenth-century

dissenting voices emerged after the establishment of male midwives and obstetrics threatened to supplant the midwifery birth model with the biomedical birth model.

In this view of traditional midwifery, the newly emerging biomedical model of birth posed as a dangerous alternative to the more natural processes of birth beneath the midwifery model. As Elizabeth Nihell argued in her 1760 *A Treatise on the Art of Midwifery* nature's expulsive efforts would happen in due time, and if required, midwives would assist with their hands gently and skillfully, with less pain than "the art of the instrumentarians with their whole army of deadly weapons." (Yeo 2006: 142). Nihell spoke out against the use of new technologies such as forceps which she critiqued as being "dangerous and destructive" (Yeo 2006: 142). This perspective of childbirth highlighted the medicalization of childbirth brought on by the rise of obstetrics. In order to fully examine the dichotomy between the two birth models, we must turn to the perspectives of male midwives and their reliance on science.

The creation of obstetrics marked the beginning of the use of the biomedical birth model, where birth was seen as "inherently pathological, a problematic mechanical process in danger of constant malfunction." The entanglement of science within processes of birth distinguished obstetrics and gynecology from midwifery, offering clinical solutions to the difficulties of birth. Science used by male midwives included training with visual aids, medical technology to assist in birth, and the advancement of their education from medicalized midwifery training. (Yeo 2006: 142) The advantage of the biomedical birth model in this early sense was that male midwives were granted greater authority due to their association with the rising medical field. It offered an alternative to the midwifery birth model in assuring that,

in the case a birth went wrong, there were opportunities to save the life of both mother and child through medicalization.

Through the nineteenth century, distinctions between the biomedical birth model and midwifery birth model solidified. As the medical profession grew, it ushered in new technologies such as the use of chloroform in childbirth and the creation of lying-in hospitals. These advancements touched on Britain's, and Scotland's, move towards improving sanitation practices, which helped to legitimize the view that hospital-based births were more beneficial to women. As thought on birth settings began to shift during this time, the "view that hospitalization and obstetric intervention *produced* or assured safety in childbirth" emerged. (McCourt 2014: 169) This evidence for a preference towards the biomedical birth model is corroborated with the celebration of medical advancements that improved childbirth for women.

The passing of the Midwives Act of 1915 illustrated a governmental preference for the biomedical birth model. While the Act did not explicitly limit the role of midwives, as it was created specifically to regulate the profession, it authorized and legitimized the position of physicians and obstetrician-gynecologists over midwives. While this was done in an effort to lower maternal and infant mortality rates of the early twentieth century, the Act made it clear that there was a governmental preference for the hospital setting as a place of birth. Following the establishment of the Act, midwives' education became the top priority as well as proper licensing and registering procedures. This training entangled Scottish midwifery within standards set by medical professionals, illuminating the ways the midwifery birth model was influenced and controlled by the biomedical birth model.

Training and education requirements continued to veer on the side of biomedical

practices as the twentieth century progressed. In 1926, midwives received between six to twelve months of training before becoming certified. (Ferlie 1964: 127) Nearly forty years later, in 1964, training for midwives ranged from one year to two years in order to be certified. (Ferlie 1964: 128) While this training continued to expand and became more comprehensive throughout the twentieth century, the 1980 *Short Report* further illustrated the distrust of midwives in home births and small FMUs. The report also presented expectant parents with birth choices based on consumerism, entangling affective choices with the view that the hospital setting was the safest, most logical place for birth.

While the biomedical birth model overshadowed the midwifery birth model in the late twentieth century, it is important to highlight the techniques used in the hospital birth setting. Hospital births in Scotland, as well as in the West, moreover, continue to rely on medical interventions embedded within the biomedical birth model. These interventions, discussed earlier in this paper, are heavily dependent on the role of technoscientific advancements in the biomedical field. (Sargent and Gulbas 2011: 291) These advancements place hospital births in a framework dependent on the “hyper-valuation of technology” where any and all issues are addressed by medical interventions. (Sargent and Gulbas 2011: 292) While the impact of these interventions has not been studied or evaluated in Scotland, it becomes clear that many techniques in the biomedical birth model focus on the system of medical management rather than the comfort, fear, and need of support for women in the process of birth and labor. (McCourt 2014: 172)

While anthropologists have studied the midwifery birth model on a much smaller scale than the biomedical birth model, we can infer information from existing studies.

Biomedical births often readily provide women with hyper-technologic births in efforts to make birth a seamless, fully medicalized experience. This directly touches on a sense of embodiment these women possess, where they “were not accorded validity and were at times directly contradicted.” (McCourt 2014: 172) The advantages of biomedical births become less clear from this observation, especially where biomedical treatment of a woman’s physical and biological processes do not include as much concern for her mental well-being and management of psychological reactions.

This critical medical anthropology approach has shown the limits of the biomedical birth model as used in Scotland and reveals an interesting dynamic. While many Scottish births are indeed set in the hospital within the biomedical birth model, the role of midwives in NHS Scotland hospitals continues to be prevalent today. In 2010, over 2,100 births occurred in Scotland’s FMUs separate from the NHS. (Symon, Winter, and Cochrane 2015: 591) This paper did not explore the presence of midwives outside of the NHS, yet it is important to acknowledge midwives throughout Scotland as a whole. While this paper shows that the midwifery birth model has entangled with biomedical practices in Scotland, it is important to acknowledge the current state of Scottish midwifery in the NHS. In 2017, midwives made up five percent of the National Health Service Scotland’s full-time nurses. (National Health Service 2017) This number is represented by 2,970 midwives registered and licensed to work in the NHS Scotland system. While midwives remain a vital part of Scotland’s NHS, it is hard to survey their impacts on a nation-wide level. This is due to the dependence on local contexts and culture of care in each NHS hospital. Since this paper is limited to data available from remote research and cannot be supplemented with

ethnographic interviews, we do not know the current impacts of midwives on women's experiences on childbirth in Scotland.

This article touches on the ways midwifery has shaped the rise of the professional medical field in Scotland through a cultural historical approach. By establishing these differences, this approach allows a critical medical anthropology approach to be used. The critical medical anthropology approach used here demonstrates how the biomedical birth model and midwifery birth model are closely intertwined due to historical, societal, and cultural developments. These approaches revealed the status of midwifery within the NHS Scotland system in an attempt to survey how midwifery was shaped over time. While this article does not include ethnographic interviews of Scottish midwives or expectant parents, it establishes the differences in birth experiences beneath the biomedical birth model and the midwifery birth model. Further studies must be conducted in order to truly survey the impact of Scottish midwifery on women and their families in the NHS Scotland system.

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