Functional Changes in Fortified Places: Strategy and Defensive Architecture in the Medieval and Early Modern Eras

Scott Kirk

University of New Mexico - Main Campus

Follow this and additional works at: https://digitalrepository.unm.edu/anth_etds

Part of the Anthropology Commons

Recommended Citation


This Dissertation is brought to you for free and open access by the Electronic Theses and Dissertations at UNM Digital Repository. It has been accepted for inclusion in Anthropology ETDs by an authorized administrator of UNM Digital Repository. For more information, please contact disc@unm.edu.
Scott Kirk
Candidate

Anthropology
Department

This Dissertation is approved, and it is acceptable in quality and form for publication.

Approved by the Dissertation Committee

Chair: Dr. James L. Boone

Department Member: Dr. Loa Traxler

Department Member: Dr. Osbjorn Pearson

Outside Member: Dr. Christopher D. Lippitt

Outside Member: Dr. Michael J. Kolb
Functional Changes in Fortified Places:
Strategy and Defensive Architecture in the
Medieval and Early Modern Eras

by

Scott Kirk

Degrees:
Master of Arts in Anthropology, Northern Illinois University 2013
Bachelor of Arts in Anthropology, Northern Illinois University 2009

DISSERTATION
Submitted in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy in Anthropology
The University of New Mexico
Albuquerque, New Mexico

May, 2021
ACKNOWLEDGEMENTS

I would like to thank:

• My Wife, Kelly Tseng, Evan Sternberg, and Snoopy for their continued and persistent support.
• My dissertation chair: James Boone
• My co-authors for the three peer-reviewed papers in this dissertation: Paulina Przystupa, Lexi O’Donnell, and Kristina Machen
• My committee members: Chris Lippitt, Michael Kolb, Loa Traxler, and Osbjorn Pearson
• The Department of Anthropology at both University New Mexico and Northern Illinois University
• And Finally: Joe Birkmann, Amy Thompson, William Balco, Emily Jones, Asia Alsgaard, Joseba López de Ocáriz Casas, Clayton Meredith, Aria Holmes, Jon Dombrosky, Genevieve Woodhead, Micah Smith, Calvin Lan, Alex Anthony, Ross Salerno, James Mathieu, Rachel Swallow, Jose Maria Martin Civantos, Juan Antonio Quiros Castillo, Alex Kurota, Robin Cordero, Jill Jordan, Robert Dello-Russo, Linda Kitzbergova, Kelly’s family, and my blood-family: Jim, Betty, Don, Bonnie, and Mary, for never giving up on me.
Without a single person listed here this would not have been possible.
• Sorry if I forgot anyone :/
CASTLES – defined as the fortified residences of a militarized elite class – are a global, cross-cultural phenomenon rather than a historically particular development in medieval Europe. Pairing Niche Construction Theory (NCT) with the Lévi-Straussian concept of the House, this research combines architectural, statistical, and geospatial analyses for a sample of castles from medieval European, western colonial, and nonwestern societies to show: (1) castle building is a recurring feature of competition in stratified pre-industrial societies, (2) geography and topography constrain castle location and function, and (3) changes in castle placement, design and elaboration reflect the changing nature of social, economic and military tactics among militarized elite Houses. This research has general and theoretical significance for assessing mechanisms of elite status reinforcement behavior and tactical decision-making across space and time.
# Functional Changes in Fortified Places: Strategy and Defensive Architecture in the Medieval and Early Modern Eras

## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval Page</td>
<td>i</td>
</tr>
<tr>
<td>Title Page</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgement Page</td>
<td>iii</td>
</tr>
<tr>
<td>Abstract Page</td>
<td>iv</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>vi</td>
</tr>
<tr>
<td>Chapter 1: Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.1. An Anthropological Study of Castles</td>
<td>1</td>
</tr>
<tr>
<td>1.2. The Study of Castles up to Today</td>
<td>2</td>
</tr>
<tr>
<td>1.3. The Castle as House: The Revision of a Theory</td>
<td>5</td>
</tr>
<tr>
<td>1.4. Bridging the Medieval, the Early Modern, and the Other</td>
<td>12</td>
</tr>
<tr>
<td>1.5. The Three Papers: Landscape Typology, Architectural Clusters, and Change over Time</td>
<td>18</td>
</tr>
<tr>
<td>1.6. Castle Studies and Why It’s Important</td>
<td>21</td>
</tr>
<tr>
<td>Chapter 2: Landscape, Typologies, and the Social Meaning of Castles</td>
<td>25</td>
</tr>
<tr>
<td>2.1. Introduction</td>
<td>25</td>
</tr>
<tr>
<td>2.2. Theoretical Approaches</td>
<td>28</td>
</tr>
<tr>
<td>2.2.1. Castle Studies and The House Societies Model</td>
<td>28</td>
</tr>
<tr>
<td>2.2.2. Budding, Meaning, and Social Reproduction</td>
<td>32</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>2.2.3. Typology and Landscape</td>
<td>34</td>
</tr>
<tr>
<td>2.2.4. Definitions</td>
<td>36</td>
</tr>
<tr>
<td>2.3. Data</td>
<td>40</td>
</tr>
<tr>
<td>2.4. Methods</td>
<td>44</td>
</tr>
<tr>
<td>2.5. Results for Cluster and Principal Components Analyses</td>
<td>47</td>
</tr>
<tr>
<td>2.6. Typology</td>
<td>50</td>
</tr>
<tr>
<td>2.6.1. Type 1- Water-Based Urban Defense or Elite Compound</td>
<td>51</td>
</tr>
<tr>
<td>2.6.2. Type 2- Water-Based Control Point and Trade Hub</td>
<td>52</td>
</tr>
<tr>
<td>2.6.3. Type 3- Water-Based Trade or Border Control</td>
<td>52</td>
</tr>
<tr>
<td>2.6.4. Type 4- Isolated Fortress or Semi-Rural Retreat</td>
<td>53</td>
</tr>
<tr>
<td>2.6.5. Type 5- Frontier Fortress or Trade Hub</td>
<td>53</td>
</tr>
<tr>
<td>2.6.6. Type 6 - Urban or Semi-Urban Simple Refuge</td>
<td>53</td>
</tr>
<tr>
<td>2.6.7. Type 7- Urban or Semi-Urban Control Point and Refuge</td>
<td>54</td>
</tr>
<tr>
<td>2.6.8. Type 8- Urban Fortress or Government Center</td>
<td>55</td>
</tr>
<tr>
<td>2.7. Distribution of castle types</td>
<td>55</td>
</tr>
<tr>
<td>2.8. Decision tree</td>
<td>57</td>
</tr>
<tr>
<td>2.9. Change over time</td>
<td>58</td>
</tr>
<tr>
<td>2.10. Discussion</td>
<td>63</td>
</tr>
<tr>
<td>2.11. Conclusion</td>
<td>66</td>
</tr>
<tr>
<td>2.12. Acknowledgements</td>
<td>68</td>
</tr>
</tbody>
</table>
Chapter 3: A Clustering of Castles: Grouping Structural Features 

to Examine Change Over Time within a House Societies Model .........................69

3.1. Introduction ...................................................................................................69

3.2. Theoretical Background ...............................................................................72

3.3. Research Questions .......................................................................................76

3.4. Castles as Houses ..........................................................................................76

3.5. Hypotheses .....................................................................................................80

3.6. Data and Methods .........................................................................................80

3.6.1. Architectural Data ......................................................................................80

3.6.2. Castle Selection ..........................................................................................82

3.6.3. Potential for Bias and Remedial Actions ..................................................86

3.6.4. Analysis .....................................................................................................87

3.7. Results and Interpretations ..........................................................................88

3.7.1 Optimization and Principal Components ..................................................88

3.7.2. The European Typology ...........................................................................90

3.7.2.1. Defensively Focused Castles: .................................................................91

3.7.2.2. Showcase Castles: ..................................................................................92

3.7.2.3. Water-way Castles: .............................................................................93

3.7.3. The World Typology ................................................................................93

3.7.3.A. Border Control Castles: .......................................................................94

3.7.3.B. Defensive Fortresses: ..........................................................................94

3.7.3.C. Palaces: ...............................................................................................95

3.8. Discussion ......................................................................................................95
3.8.1. Relation to the Three Pillars ................................................................. 96
3.8.2. Change over Time in the European Dataset ....................................... 97
3.8.3. Change over Time in the World Dataset ............................................ 99
3.8.4. Hypothesis Testing and Utility ............................................................. 101

3.9. Conclusion ............................................................................................... 103

3.10. Acknowledgements ............................................................................... 104

Chapter 4: Castles as the Houses of the Military Elite: Battle, Social Memory, and Structural Changes in a Selection of Castles Across Europe .......... 105

4.1. Introduction .............................................................................................. 105

4.2. Theoretical background: The House Societies Model ......................... 108

4.3. Historical Justifications ......................................................................... 110

4.4. Methods: Measuring Change Over Time ............................................. 112

4.4.1. Castle Selection .................................................................................. 112

4.4.2. Index Development and Hypothesis Testing .................................... 113

4.4.3. Feature Selection and Condensed Datasets ..................................... 115

4.5. Results ..................................................................................................... 115

4.5.1. Averaging .......................................................................................... 116

4.5.2. Linear Regressions ............................................................................ 117

4.5.3. Condensed Datasets ......................................................................... 120

4.6. Discussion ............................................................................................... 120

4.8. Conclusion .............................................................................................. 125

4.9. Acknowledgements ............................................................................... 126
Chapter 1: Introduction

1.1. An Anthropological Study of Castles

Castles are a cross-cultural phenomenon, seen the world over. Despite the word being most often associated with fortified medieval residences common to Europe between the 10th and 14th centuries, one cannot deny the striking similarities between European castles, Japanese variants, and those found in the Early Modern port cities of the Caribbean.¹ These similarities are often pointed out by scholars focusing on castles outside of Europe (cf. Benesch 2018; Deagen 2010, 2002; Chartrand 2006; Coaldrake 1996; Hall 1955; McClain 1980; Niglio 2014; Satoh 1978), but neglected by medievalists. Pop culture, on the other hand, largely romanticizes castles in the same way cross-culturally, with monumental, fortified residences acting as both territorial markers and defensive strongholds in such popular novels as Ken Follett’s (2017, 2007, 1990) Kingsbridge Series, James Clavell’s (1976) Shogun, and Michael Crichton’s (2009) Pirate Latitudes.²

In this dissertation, I analyze the development of castles, both architecturally and geospatially, on a broad and comparative scale in much the same way that scholars working outside of Europe and popular authors have done. Defining castles as “fortified elite residences, built and maintained by members of militarized ruling classes in preindustrial societies” (Kirk et al. 2020: 101224), I argue that they are best studied comparatively under the paradigm of the House Societies Model (HSM; cf. Lévi-Strauss 1982; also see Beck 2007; Chesson 2003; Gillespie 2000; Joyce and Gillespie 2000). Furthermore, as the physical

¹ This is not meant to be an exhaustive list and could include more examples from the Pacific (cf. Field 1998; Knight 2009) to the Middle East (Nicole 2009).

² Note that these are all works of historical fiction that were heavily researched by respectable authors.
manifestation of elite Houses, I posit that castles arise from the need to express dominion over land, labor, and resources.

Over the course of two papers, I develop three different cross-cultural typologies for looking at castles, one based on landscape (Kirk et al. 2020), and two based on architecture (Kirk et al. In Review). As these typologies all suggest predictable mechanisms for change over time, I then present a third paper examining the architectural features of castles in four disparate regions of Europe (the Czech Republic, Iberia, Sicily, and the United Kingdom) to develop a series of indices from which hypotheses pertaining to change over time can be assessed (Kirk et al. In Prep). Thus, merging the anthropological framework of the HSM with the historical necessity to look at socio-economic mechanism over the longue durée (cf. Braudel 2012), I present a wholistic, cross-cultural study of castle building as a behavior, or complex form of niche construction (cf. Arroyo-Kalin 2017; Laland and O’Brien 2010; Odling-Smee et al. 2013; Odling-Smee et al. 1996; West-Eberhard 2003), common the world over.

1.2. The Study of Castles up to Today

The viewpoint that castle building is a behavior, not determined by historically particular events but rather by common practices, is rather rare in castle studies, although not entirely without precedent. Many scholars (e.g. Benesch 2018; Deagen 2010, 2002; Chartrand 2006; Coaldrake 1996; Hall 1955; Hogg 1981; McClain 1980; Niglio 2014; Satoh 1978; Toy 1955; Viollet-Le-Duc 1977) have pointed out commonalities between ancient, medieval, and non-European castles. However, as discussed by Kirk et al. (In Review), since the 1980s English Language castle studies have been dominated by a postmodern framework that has largely focused on the construction of castles as particular examples of seigneurial
authority in Europe (e.g. Coulson 2004, 1991, 1979; Johnson 2018, 2002; Lewis et al., 1997; also see Prior 2006, 22-23). Indeed, some of these studies have gone so far as to suggest that many castles serve very little functional purpose (e.g. Coulson 2004, 1991, 1979; Johnson 2002), and exist merely as a form of costly, or social, signaling (cf. Bell et al. 2019; Church 2012; Kantner and Vaughn 2012; Schwalbe 2018). The result of this paradigm shift has been that earlier comparative studies focused on developmental trends in castle architecture (e.g. De La Croix 1972; Hogg 1981; Toy 1955) have largely been disregarded in English language literature; and quantitative, cross-cultural comparisons, such as this one, have been slow to gain acceptance and – as a result – difficult to publish.

Aversion to quantitative and multi-regional approaches can largely be attributed to postmodernisms well-known opposition to grand narrative (Creighton 2012: 22), framing one’s findings through general tendencies and models. O’Keefe (2007), for instance, has suggested that the Romanesque – a generally recognized, pan-European architectural form common to the castles and churches of the 9th-12th centuries – is highly contextualized and distinct across much of Europe. As a result, he argues that the Romanesque must be studied in terms of local idiosyncrasies, and not broad commonalities. This approach to medieval monumental architecture is particularly common for those scholars focused on the British Isles (e.g. Coulson 2004, 1991, 1979; Johnson 2002; McNeill 1997; O’Keefe 2007; Wheatley

3 Note that Coulson and Johnson do not use the term costly signaling as it was developed as part of the more positivist theories of Human Behavioral Ecology.

4 This approach is largely the opposite of the one taken by (Schutz 2011) in his study of the Central European Romanesque, where he claims broad similarities due to the transmission of information on the part of the church.
2004), with datasets that place little to no importance on cross-cultural comparisons between non-neighboring territories.5

Yet, while castle studies in general, and English language castle studies6 in particular, have continued to shy away from multi-regional analyses, the staunch opposition to quantitative analyses has begun to fade in the second decade of the 21st century. This newfound appreciation for mathematical methods has largely been driven by computer-based approaches centered around the use of geospatial software packages like ArcGIS (e.g. Kirk 2017, 2016; McManama-Kearin 2013; Swallow 2016), and statistical programs like R (Kirk et al. 2020, In Review, In Prep), which have become increasingly accessible in recent years. Even non-computer-based approaches focused on quantitative methods have risen to prominence in the field, almost as a precursor to computer-generated ones (e.g. Bachrach 1984; Kolb et al. 2019; Mathieu 1999). And with the development of these new methodologies there has been a growing sense that castle studies have become too revisionist (Platt 2007), sacrificing academic integrity for trendy theoretical standpoints.

In this dissertation, I argue that castle studies still have not come far enough. Regionally specific architectural styles and spatial patterns, which have been the focus of castle studies since the 1980s, cannot explain the broad similarities in castle design and placement seen across Europe over the longue durée (cf. Braudel 2012), much less similarities in the fortified residences of elites outside of Europe (e.g. the castles of India and Japan). Therefore, I suggest that a much broader approach is needed for an in-depth

5 This parochial focus may be partly explained based on comparative analyses that I will touch on in each of the papers included within this dissertation.

6 In this I mean that those publications written in English typically must follow the intellectual agenda set forth by Coulson and Johnson, or at least some permeation thereof.
examination of castles, not as historical examples of defensive architecture or costly signaling, but as an anthropological phenomenon.

1.3. The Castle as House: The Revision of a Theory

To understand castle development cross-culturally, it is first necessary to assess similarities in both architecture and placement under an ahistorical unifying theory. Based on the definition that castles are fortified elite residences, acting in a similar manner to all residential structures (albeit on a grander scale), the HSM is here employed. Of course, when Claude Levi-Straus (1983) first proposed this model, he did so without much thought as to its archaeological implications. For him, the House was an institution, described as “a corporate body holding an estate made up of both material and immaterial wealth, which perpetuates itself through the transmission of its name, its goods, and its titles down a real or imaginary line, considered legitimate as long as this continuity can express itself in the language of kinship or of affinity and, most often, both” (Lèvi-Strauss 1982: 174). This definition has stood the test of time and provided scholars (e.g. Cab 2017; Carston and Hugh-Jones 1995) with a means of characterizing social relationships without relying on kinship trees, a standard ethnographic tool for much of the 19th and 20th centuries.

However, while the HSM was designed to look at the social, the material culture of the House – and the residence in particular – was described by Lèvi-Strauss (1982) as reflective of the House’s social traditions and norms. Thus, it was not difficult for subsequent generations of archaeologists to adapt the HSM to their own research agendas, as many have

7 He uses the term maison, hence House Societies. However, I believe the term maison, in French, has more connotations associated with it at face value than the English word House, which can hold the same connotations in specific contexts. This overlap in terminology likely has to do with Norman rule over England that created a lot of similar vernacular anomalies (cf. Hacker 2011; Mortimer 2008; Skaffari 2009).
done over the past three decades with great success (cf. Beck [ed.] 2007; Chesson 2003; Gillespie 2000; González-Ruibal and Ruiz-Gálvez 2016; Joyce and Gillespie 2000; Richards and Jones [eds.] 2016). In fact, within the original outline for the theory (Lèvi-Strauss 1982), the physical organization of the residence reflects the social organization of the unit within, which, in turn, acts to reinforce the social identity of the House. Thus, with the example of early medieval elite Houses, castles were built to defend territory in the Early Middle Ages. Once that territory no longer required defending, castles continued to serve as a reminder of the social obligation that elites had, prompting members to continue their military roles in foreign wars (such as the Crusades). Thus, the material configuration of the House reinforces identity, pushing its members into the social roles that their ancestors held, even if the responsibilities inherit in those roles bear little to no resemblance to that of their precursors.8

This clear link between the social and physical within European Noble Houses – arguably past and present – is something that Lévi-Strauss (1983), himself, cited as an example of House Society structure. In fact, he saw the social organization of medieval Europe, and its relationship to the physical world, as more or less similar to that of feudal Japan and the Kwakwaka’wakw9 of the early 20th century Pacific Northwest (see also Kirk et al. 2020). However, connections between the physical and the material – as well as many other aspects of the HSM - stretch far beyond anthropological theory. They can also be seen in literature and pop-culture, where there are subtle connections between characters, their relations, and the Houses in which they live. For instance, Castle Dracula is often referred to

---

8 Given the identity that the physical manifestations of the House press on to their biologic components, it should not be surprising that the connection between European nobility and the military existed up through the second world war.

9 Referred to as the Kwakiutl at the time of his publication.
as the House of Dracula, linking castles to Houses. Its physical organization is definitively fortified, signifying the walls Dracula has put up to protect himself and his brides against the outside world. The castle is described as labyrinthian (Stoker 1897), reflecting the duplicitous nature of the antagonist’s mind. It is full of mementos to the past and a culture that was all together foreign to the protagonists, with public and private spheres separate and reflective of a dualistic society. Dracula, of course, inhabited the public sphere (the entrance hall, the great hall, studies and libraries, etc.), guiding his guest, Johnathan Harker, to areas he was allowed. His three brides inhabited the private sphere, and areas where Johnathan was not allowed to go. ¹⁰ To establish a new House, Dracula had to bring earth from his homeland, making linkages between the House and its junior branches. Thus, much like with what academics argue to be the case within the HSM, Stoker establishes the link between the social and physical, giving the castle agency of its own while using it to reinforce the identity of his villain. ¹¹

Within the interplay between the social and the physical, one can also see an adaptation to the environment. Houses, the physical structures, offer protection from the elements, be they natural or social, making them a versatile human extrasomatic adaptation (cf. Binford’s [1965: 205; see also White 1959] definition of culture). Their physical organization often provides for a division of labor – sometimes along gender lines, but, more

¹⁰ Note that this description attributes characteristics of the Islamic World to Eastern Europe, these practices would not have been observed by travelers to Romania/Transylvania at the time but serve to make the antagonist more alien to a decidedly English audience.

¹¹ It goes without saying that Stoker’s linking Eastern European and Islamic customs to his villain also reflected Stoker’s own xenophobia; and that the popularity of the novel also likely demonstrates the xenophobia common to the elite and upwardly mobile Houses of England at the time.
importantly, often along the lines of ascribed or achieved status within the House – which make humans uniquely suited to achieve goals far beyond other social animals. Thus, from this viewpoint, the HSM also compares strongly with Niche Construction Theory (NCT).

In NCT, Niche Construction is defined as the co-evolution of a species with its environment by means of modifications to their surroundings (Arroyo-Kalin 2017; Laland and O’Brien 2010; Odling-Smee et al. 2013; Odling-Smee et al. 1996). Essentially, both humans and animals have a creative role in designing the environment in which they live, making NCT the theory of the built environment for understanding everything from early agriculturalists to modern day city planners. The best example of this in the animal world is the beaver (Odling-Smee et al. 2013), who – like humans – builds Houses that modify the environment. In Humans the House – both social and physical – is the Niche, which allows for us to adapt to our surroundings, but it also constrains the way we perceive our surroundings.\(^\text{12}\) Essentially, NCT is both a cause and product of evolutionary change (Broughton et al. 2010: 372). Thus, the study of Houses – and castles – is really the study of the interplay between the built and natural environments; what is essentially the embodiment of landscape archaeology (cf. Sauer 1925; Sanchez 2015).

Similarly, as landscape is comprised of the things we build (i.e. residences, roadways, bridges), and what we build them on (i.e. hills, valleys, rivers), we end up interacting with both, modifying them and ourselves for what we think of as greater synergy (cf. Hodder 2020).\(^\text{13}\) This idea has been proposed under a number of theoretical frameworks but, the one

\(^{12}\) In this way the House is also similar to language in a manner analogous to the Sapir-Whorf hypothesis (see Kay and Kempton 1984; Kronenfeld et al. 2011).

\(^{13}\) Note that this does not mean we do not create problems for our future selves with current adaptations that make our lives easier. The use of fossil fuels is the best example of this.
that I will highlight here is Ian Hodder’s Entanglement Theory (cf. 2020, 2016, 2014). Under Entanglement Theory, a complex set of variables – including social practice, environment, resource procurement, etc. – interact to form the world that we both live in and experience (cf. Hodder 2020). Recently, Hodder (2020) has pointed out that this often leads to increased complexity in both human societies and the things they create, though the level of complexity may vary depending upon what aspects of a society one studies and may only be truly visible at the local level.

Relating Entanglement Theory back to the HSM, we see Houses within most societies grow and expand based on how they interact with each other, their environment, available resources, and the residences they create. In this, there is often an agglomeration effect – mostly on the social level- that leads to the creation of “higher-order Houses.” Through this agglomeration, the House continues to be the basic unit of production and consumption with the caveat that there is usually a governing body that allows for specialization. This governing body is also modeled after the House and requires all the things that the house needs to survive.14 Thus, Houses essentially become niches within niches; as exemplified in the castles of military elites with the use of dependent Houses as servants.

Through the adoption of social specialization, Houses, as agents in their own rights, take on “personalities,” what is referred to as a personne morale (cf. Lèvi-Strauss 1982; also see Beck [ed.] 2007; Joyce and Gillespie 2000), with attributes ascribed to them that are then related to individuals who have sworn allegiance to the House. Lèvi-Strauss (1982) of course used the examples of family crests and mottos in medieval societies – which are also seen in Japan – and totems with the Kwakwaka’wakw, but it is really more than that. Again, turning

---

14 Which are described in greater detail below.
to pop culture, one can see these ascribed personalities as embodying the individuals, from James Bond’s family motto (“The World is Not Enough”), to the family mottos of the Houses on HBO’s *Game of Thrones* (i.e. “Winter is Coming,” “Fire and Blood,” etc.). These mottos, of course, embody the individuals associated with them. James Bond is always fighting for crown and country; he cannot be bought. The Starks are a depressive lot, always preparing for the worst. And the fact that another aspect of the HSM is so easily demonstrated by both historical references and popular culture speaks to its strength as a cross-cultural, comparative framework that can be used to examine a wide range of topics from anthropology to sociology, literature, and pop-culture.

Of course, as an agent, a *personne morale* analogous to a living thing, there are certain requirements that a House has in order to survive and propagate over generations, evolving along with the societies that construct them. In Kirk et al. (2020) it is argued that these requirements are met through the creation and adjustment of various material and organizational traits that fulfill three fundamental roles necessary for intergenerational continuity. Referring to these as the three pillars, they are: (1) Defense (i.e. how the House protects itself either through physical means or social signals); (2) Social reproduction (i.e. the means by which the House transmits information for familial and cultural continuity); and (3) Production (i.e. the means by which the House generates both foodstuffs and revenue). Once again, as stated in Kirk et al. (2020), these pillars are not unlike those proposed for the propagation of medieval societies by Duby (1982) in his *Three Orders*, or by Wilson (2016) in his description of "Estate Societies;" and similar ideas have been suggested as fundamental to the House by Bolender (2007: 401).
Wealth and social power are typically maintained within the House by adherence to a staunch set of rules (Kirk et al. 2020; also see Boone 1983). In many militarized societies, including that of medieval Europe, these rules are defined by primogeniture, where the first-born son inherits all. This, of course, creates a problem for second born sons. As many societies have dualistic leadership roles (cf. Duby 1982; Wickham 2016), this problem is often solved by inclusion in religious Houses and an imposition of celibacy (see, tangentially, Cullum 2013; De La Croix et al. 2019).\(^\text{15}\) Thus, wealth stays consolidated in the House without completely abandoning second born sons. However, the problem often exists where there are too many children born within a House for the donations required to enter religious Houses to be possible for all. In these cases, societies often encourage raids, exploration, colonization, and foreign wars – as was the case with the Vikings (cf. Jesch 2015; Oliver 2014), the Reconquista (cf. Burns 1975; O’Callaghan 2003), and the crusades (cf. Boas 1999; Prawer 1972). In these instances, junior branches of the House are often established in foreign lands by children who had nothing to inherit and nowhere to go, with Houses comprised of fictive kin. In foreign settings, new combinations of Houses often emerge, with elements of fictive kinship inherent in how they refer to each other.\(^\text{16}\) Thus, Great Houses propagate themselves through two mechanisms, the consolidation of wealth in a main branch, and the establishment of junior branches that rely on newer resource acquisitions for survival (Kirk et al. 2020).

\(^\text{15}\) Note that the language used in the catholic church mirrors that of the House as well. Priests are fathers, monks are brothers, nuns are sisters.

\(^\text{16}\) For example, in the armed forces soldiers often refer to each other as brothers.
1.4. Bridging the Medieval, the Early Modern, and the Other

Naturally, as a representation of militarized elite Houses, castles and castle-like structures in Europe have been around much longer than the modern connotations with the word would imply. The Greeks had castles (e.g. the Castello Eurialo near Syracuse, Sicily), and it could be argued that the Iron Age Hillforts, or Oppida, of central Europe have much in common with these structures as well (Kirk et al. 2020). However, the overwhelming majority of castles examined in this dissertation are, at least architecturally, from the past millennium of the Common Era. Furthermore, of those castles included in this study that were built outside of Europe – in Japan, India, and the Americas – few examples were from contexts where people did not have at least some contact with the descendants of medieval European castle builders.\(^\text{17}\) Therefore, it is necessary to have a brief discussion related to the rise of castle building in medieval Europe, with footnotes pertaining to parallels seen in India and Japan.\(^\text{18}\)

As Roman authority over western Europe crumbled in the late 4\(^{\text{th}}\) and early 5\(^{\text{th}}\) centuries AD, European societies began to reorganize themselves around more localized power structures (cf. Kirk 2017) and a militarized elite class acting independent from centralized authority (Brown 2012; Duby 1982; Le Goff 2000; Hodges 1982; Hodges and Whitehouse 1983; McCormick 2001; Pirenne 1925, 2001; Ward–Perkins 2005; Wickham 2004, 2005, 2009, 2016). With climatic changes (the end of the Roman optimum) and the

\(^{17}\) While some Indian and Japanese castles included in Kirk et al. (2020) were first erected prior to sustained contact with Europe, most are from the 17\(^{\text{th}}\) Century, the European Age of Exploration (i.e. colonialism).

\(^{18}\) This decision was made for two reasons. The first was that a majority of the structures analyzed here were those of Europe and its colonies. The second was for flow, as cross-cultural discussions in a brief history section became distracting.

In the Mediterranean, the standard form of protection offered by military elites was the fortified hilltop settlement (cf. Francovich and Hodges 2006; Glick 1995; Toubert 1990, 1973), which they would defend if attacked. Referred to as incastellamento (cf. Bazzana, et al. 1988; Boone 2009; Boone and Benco 1999; Creighton 2012; Glick 1995; Kirk 2016; Toubert 1973, 1990), similar defensive measures to this phenomenon can be seen throughout Europe, though the extent to which they relate to castle development is debated (cf. Creighton 2012). In any event, centralized authority continued to exist at this time in the form of the papacy, though the extent of its authority was rather limited (cf. Nicholas 1992; Whalen 2013), likely due to an inability to protect the populous. This division between localized and centralized authority led to a dual system of elite control; with one centered upon secular, territorial power, and the other centered on religious authority (cf. Duby 1982). With limited power, however, religious leaders would often find themselves needing to cede more and more to localized elites, which likely had something to do with how much these elites feared punishment in the hereafter. And while the specifics of this power structure differed from region to region, the movement of populations throughout Europe at

19 The same phenomenon can be seen in northern India during the Middle Ages and feudal Japan (cf. Nossov 2006; Schmorleitz 1974 Toy 1957; Turnbull 2009).

20 Note that this is mirrored in Japan with the dual authority of the Emperor as the highest religious authority and the Shogun as the highest secular one (cf. Deal 2006; Friday 2004).
this time – through migration, raiding, warfare, and intermarriage – served to unify the political economy.

After centuries of intermarriage and infighting between localized feudal lords, certain Houses began to rise to prominence through a stranglehold on resources.\textsuperscript{21} The most famous example of this is that of the Hapsburgs, who ruled an empire stretching from Spain to Bohemia at the onset of the Early Modern Era (cf. Kann 1974). However, earlier examples can be seen with the rise of the Norman Hautevilles\textsuperscript{22} in Sicily and southern Italy (cf. Brownsworth 2014; Chibnall 2000), and the Premyslid dynasty of Bohemia who ruled over central Europe as Holy Roman Emperors (cf. Wilson 2016). These early examples highlight the ongoing process of power acquisition that occurred throughout much of the High Middle Ages (10\textsuperscript{th}-15\textsuperscript{th} centuries). Whether a Noble House was grossly successful at this – as was the case with the Hautvilles and Premyslids – or not – as was the case with the Rosenbergs, a prominent Bohemian family who controlled a great deal of territory but never rose to a position of Royal power – the results were largely the same; less successful Houses saw their social roles become much more rigid, with opportunities for social mobility limited, while more successful Houses consolidated power leading to the return of a centralized authority for much of Europe. In short, the consolidation of power by a few Houses precipitated the rise of kingdoms and eventually Early Modern states.\textsuperscript{23}

\textsuperscript{21} Again, this is seen in feudal Japan with the wars that lead to the creation of the Shogunate (cf. Deal 2006; Friday 2004; MacFarlane 2003).

\textsuperscript{22} Hautville actually means High House in French.

\textsuperscript{23} One could argue that states were also necessary to challenge the power of the Papacy.
As kingdoms with more centralized leadership began to take over Europe, it is generally thought that people moved around their surroundings less (cf. Pettengill 1979). However, the movement of certain populations – especially those of elites – continued into the High Middle Ages, albeit perhaps on a diminished scale (see Creighton 2012: 23). This can be seen through the general movement and migration of Norman soldiers and elites throughout Europe (see Brownsworth 2014; Chibnall 2000), the translocation of many able-bodied European men during the crusades (see Burns 1975; Lawrence 1988; Prawer 1972), religious pilgrimages (also see Brabbs 2017; Ure 2006), calls for skilled labor to produce castles and cathedrals (Ashbee 2007; Taylor 1986), and bridal exchange in elite marriages (Creighton 2012; Nicholas 1992).

Through the exchange of elites and the movement of skilled laborers and architects in particular, European elite society shared a similar cultural background that transcended state boundaries. This background was further reinforced by elite desire to expand and consolidate more territory, as well as through the practice of primogeniture, which forced unlanded elite males into expansionist practices (Boone 1983; 1988). Thus, a commonality through military practices, a common pool of skilled laborers, noble lines,

24 Chaucer’s *Canterbury Tales* serves as an example of this.

25 Exemplified by Eleonore of England, Beatrice of Swabia, and especially Anna, Margaret, and Maria Anna, each of Austria, who all married into the royal family of Castile and no doubt influenced the more central European-like appearance of Alcazar de Segovia just north of Madrid (Gonzales 2011; Washburn 1957).


27 Exemplified by Frederick II's reign over parts of Germany, Bohemia, and Italy (see Abulafia 1992; Wilson 2016), as well as the English landholdings in France during the 14th century (see Seward 1999).
papal mandates, and knightly ideas developed into a loosely confederated political economy. The result of which led to remarkable similarities in western European/late medieval/Early Modern architectural forms (e.g. castles, houses, churches, and cathedrals) that began to appear far beyond the traditional confines of Europe in places like the Ivory Coast of Africa and the New World.

As Europeans fought for new lands, both in the High Middle Ages and Early Modern Era, castles were often placed in strategic locations to control the movement of people and goods across the landscape (Christie 2008; Creighton 2012, 2002; Kirk et al. 2020; Kolb et al. 2019; Mathieu 2001; Morris 2016; Painter 1956; Prior 2006). Over time, however, the connection between militarized elite Houses and localized territorial defense faded in Europe. Castles became more palatial (though still capable of defending themselves), signifying the importance ascribed to social reproduction explored in this dissertation, and the militarized elite turned their attention towards military service dedicated to protecting/expanding the kingdom/state.

Between the 16th and 19th centuries, European military attention on the continent and in the British Isles turned toward the fortification of borders (cf. Clements 1999; Hogg 1981; Kirk 2017; Maurici et al. 2008; Maurici 2008), while medieval style castles continued – for the most part – to be built into the town walls of colonial enterprises (cf. Deagan 2010, 2002;

---

28 Which is arguably what the Holy Roman Empire was and the backbone behind ideas of a unified Europe.

29 Of course, concurrent to these developments, the Islamic Empires of Arabia and North Africa spread architecture that was somewhat rooted in Latin ideals into Asia, with some scholars even arguing that the Indian castle was really an Islamic ideal (see Nossov 2006).

30 This can be seen in the case of the English civil war (Liddiard 2005) and the Thirty Years (or Hussite) War (cf. Wickham 2016; Wilson 2016).
Still providing quarters for commanders, officers, and their families – retaining the same elements of the House that their medieval precursors did – defensively focused Early Modern structures are often referred to by English scholars as fortifications, in spite of the prefix castillo often being given to them by their architects and Spanish scholars. Nonetheless, changes in defensive architecture – both in Europe and colonial port towns – seem to demonstrate a definitive shift in primary focus away from the elements of social reproduction so inherent in late medieval castles towards protection from modern artillery. However, in frontier settings further away from stable supply routes, where Anglo-American forts, Spanish presidios, and missions developed, fortifications and living conditions were often more consolidated in a manner analogous to the earliest medieval castles of Europe.

Thus, during the Early Modern Era (16th-19th centuries), one can see a bifurcation in castle architecture develop, where border and colonial castles retain their militarily function, while the interior castles that were once crucial to the consolidation of territory by elite Houses show a marked demilitarization. At both ends of the spectrum, however, castles continue to reinforce the elite connection to military service, though one end seems to rely more heavily on citation (cf. Mattson 2016: 122, 135) – broadly defined as the referencing of

31 This is exemplified by the Early Modern city of Havana (Zuniga 2004).

32 Spanish and Italian architects, such as Battista Antonelli, were most often used by nearly all the Early Modern European States (see Niglio 2014).

33 While missions are often not seen as fortifications in their own right, many – like the Mission of Goliad in Texas and Pecos in New Mexico – had features associated with contemporary castles (like artillery towers in the case of Goliad). Furthermore, anyone who has played a game in the Red Dead Redemption series, watched more than one Spaghetti Western, or been to the Alamo knows that missions were often seen as potential strongholds in the event of a shootout.
past beliefs, politics, and ancestors in an attempt to replicate specific meanings – rather than modern military designs. Though connection to military service in settled lands with secure borders might have become more symbolic over time, it never really departed from European cultural practices even up through the present day, as evidenced by the military attire worn by the English Prince Harry’s wedding party at his recent (May 2018) wedding. Furthermore, the familial relationships and terms used in modern militaries (i.e. servicemen engaged in active combat often refer to themselves as brothers, commanding officers take on a paternalistic role, etc.) seem to reinforce the structure of the House that our medieval forebears laid out.

1.5. The Three Papers: Landscape Typology, Architectural Clusters, and Change over Time

Exploring how the HSM relates to the development of castles – how they changed and evolved both architecturally and locationally over the past millennia – is the focus of this dissertation. In the three papers included here, my co-authors and I examined a geographically diverse sample of more than 460 castles and castle-like structures (i.e. Early Modern Forts, fortified churches, etc.) from two different methodological standpoints; namely those of landscape and architecture. Both approaches differ from the traditional study of castles in English language publications. For instance, our approach to landscape was more scientific, seeing it as the “synthesis of habitat and history” (Sanchez 2015: 17), as opposed to the more postmodern approaches taken by English scholars who see it as predominantly a socio-cultural construct on which things happen (cf. Johnson 2007:2-4). As both a part of the built environment and the natural world, we attempt to objectively categorized landscape feature in accordance with scientific meaning (cf. Sauer 1925: 25).
Thus, in many ways, this research is a reaction against the postmodern framework on which castles studies have developed since the 1980s, formalizing ideas that have been suggested in castle studies, and incorporating the work of scholars who have focused on castle development within the confines of the European continent.

In our first paper, *Landscape, Typologies, and the Social Meaning of Castles*, Evan S. Sternberg, Paulina F. Przystupa, and I began by taking a more cross-cultural, comparative approach to the understanding of castle landscapes. While the study of landscape as it relates to castles is, in and of itself, not a new concept (e.g. Asur and Alp 2020; Creighton 2002; Liddiard 2005), our predecessors have often been more concerned with how the landscape relates to individual castles in traditional medieval European settings. In contrast to this, we examined 63 different landscape features from 459 medieval and Early Modern castles (Paper 1, Figure 1),34 performing a series of cluster analyses which we then used to construct a typology with eight different castle types reflective of their placement on the landscape (see Paper 1, Figures 2 and 4). Most of these castle types could be seen the world over (meaning that there was nothing inherently special about the placement of European castles). However, certain trends arose that also demonstrated a connection to theoretical concepts, like *incastellamento*, and the potential to investigate change over time regionally. Thus, this study can be seen as a first step in the reorientation of English language castle studies, turning attention back to a broader, more comparative approaches that draw on continental European literature for a general understanding of castle development.

As landscape is not the typical medium from which similarities in castle development are studied, Evan S. Sternberg, Lexi O’Donnell, Kristina Machen, James L. Boone and I

---

34 Note that this sample does not include fortified churches or missions.
chose to take an architecturally focused approach for our next paper: *A Clustering of Castles: Grouping Structural Features to Examine Change Over Time within a House Societies Model*. For this paper we analyzed a dataset of 217 structural features from a cross-cultural sample of 391 castle and castle-like structure incarnations.\(^{35}\) Again, cluster analyses were performed to explore cross-cultural similarities by group structures together based on mathematical associations. Tests for optimization indicated that castles were best placed into one of three groups largely indicative of change over time in relation to both defensive and palatial attributes. Repeating this on a dataset of 306 castle incarnations from four regions of Europe in particular, results were similar but indicated more alignment with traditional theories of castle development which saw these structures as part of a technological arms race against advances in artillery. Thus, slight variations in sample size and regional focus yielded slightly different, but largely overlapping, results.

In the final paper, *Castles as the Houses of the Military Elite: Battle, Social Memory, and Structural Changes in a Selection of Castles Across Europe*, Evan S. Sternberg, Lexi O’Donnell, James L. Boone and I revisit the dataset focused on Europe from the previous paper to assess change over time. Taking architectural features and assigning them to categories reflective of the three pillars, we developed a series of indices similar to Morris’s (2010) Index of Social Development to test longstanding hypotheses presented in both previous papers and larger debates in castle studies. As with the first two papers presented in this dissertation, results were often in line with what has previously been proposed by

---

\(^{35}\) Defined by Kirk et al. (In Review) as the architecture representative of a single century. Within the dataset, a single castle may be used multiple times if two different construction phases could be parsed out.
scholars for the observed development of castles, demonstrating clear problems with the theoretical paradigms first proposed by Coulson (2004, 1991, 1979).

1.6. Castle Studies and Why It’s Important

Overcoming the Coulson-Johnson paradigm is just one of the many obstacles that researchers focused on castles, and medieval studies in general, face. Within American archaeology, there is often a rather substantial disconnect between the interests of the general public and those of academics. Medieval studies, it seems, often falls within this divide. The general public is interested in it, there is a role for it within history, but many academics – particularly within anthropological archaeology – see it as unworthy of attention. I want to conclude this introduction on a personal note, without diverging too much into the broader patterns I note above pertaining to castle studies.

A few years ago, I was introduced to a colleague; we briefly discussed each other’s doctoral research and, upon hearing that I study castles, this colleague responded by saying: “Wow, that’s like what most people think that archaeologists do. That is so cool.” It is a comment I have heard often and from numerous individuals, both from within anthropological archaeology and from the general public. Yet, over the course of my career I have been confronted with numerous challenges pertaining to my focus on castles and medieval archaeology. I have been told that “castles are not anthropological,” even though they are built by people and, by definition, anthropology is the holistic study of the human condition (American Anthropological Association 2020). I have been told that “the study of castles is a dead subject,” even though there is significant interest in the topic and that “my study lacks methodological nuances and a theoretical framework which will contribute to castellology” because it is too anthropological and not focused on a single region. Lastly, my
personal favorite is that “Europeans do not build castles in their oversees colonies and the fortifications they do build were partially designed by indigenous people, thus making them different from all castles seen in Europe.”

All these critiques I wholeheartedly reject, and in this dissertation I intend to outline why they are incorrect. I want to confront the fact that, in spite of general interest in the subject, castle studies have become a rather exclusionary club (which is one point that Matthew Jonson [2002] and I agree on), with the general public being more familiar with the thoughts and beliefs of early 20th century scholars than they are with views held by people who contribute to the study today. I want to discuss how, further complicating the prospect for a more open research community, interest in European archaeology within American institutions has largely been discouraged. And I will argue that all of the road-blocks set before scholars interested in medieval studies have been to the detriment of the liberal arts and sciences.

Both medieval and castle studies are important given their role in Anglo-American heritage, and I believe their relegation to the periphery of academic interests has contributed to some of the internal social issues that have troubled the United States of late. Currently, the icons most associated with both classics and medieval scholarship – especially Viking studies – have been hijacked by white nationalism (cf. Little 2018; Price 2020; Schuessler 2019) due to a mistaken belief that Europe was a homogeneous group of conquerors who replaced the people they encountered with some sort of white lineage. This belief is, of course, wrong and could easily be disproven if advancements in medieval studies received greater attention. For instance, the more genetic studies that are conducted on medieval human remains, and the more research that goes into the study of the medieval
Mediterranean and Islamic World, the more we discover that Europe was not a homogeneous place (cf. Capelli et al. 2009; Fernandez-Morera 2016; Hahn 2001; Metcalfe 2009). Even a revisiting of historical sources seems to suggest that skin color was not something that would exclude someone from being a part of a Viking raid (cf. Price 2020), living in Europe (cf. Ramey 2014), or joining a pirate crew (cf. Gosse 2007; Konstam 2019). Furthermore, women played an important part in both classical and medieval societies. Most everyone knows the legends of shield maidens thanks to the History Channel’s *Vikings*, but medieval women across Europe would also manage the estate on which castles sat while their husbands were away at war for much of the Middle Ages (cf. Coulson 2004), and some of the most famous pirates in history, like Anne Bonny and Ching Shih, were women (cf. Konstam 2019).

Essentially, it is time to rebrand medieval – and castle – studies. Instead of being seen as a cultural period in Christian Europe, the Middle Ages should be viewed as a period defined by common occurrences across Europe, Africa, and Asia between the end of the Roman Optimum and the beginning of an era defined by long-distance oceanic voyages. Castles arise during this time within a multitude of settings throughout the Old World as a response to these socio-climatic events. And thus, the study of the castles and the medieval world should not be confined to the narrow definition it often is today but rather opened up to more anthropological approaches such as the one taken here. Furthermore, we should encourage students from a variety of backgrounds to look into the archaeology and history of

---

36 And to a lesser extent the work of Hedenstierna-Jonson et al. (2017) and Price et al. (2019) amongst others.

37 Note that while the Chinese had the capability for long distance oceanic voyages long before their European counterparts (cf. Morris 2010), they did not partake in such voyages to the same extent as European countries did during the 16th and 17th centuries.
Europe, especially those students with an interest in their own heritage. The people who
discourage the study of European archaeology because “there are no jobs in it” are both right
and wrong in their beliefs, because not every archaeology major goes into archaeology when
they are finished. Some just want to study archaeology while they get their degree and then
go into something else, and there is nothing wrong with that.

The archaeology of medieval Europe should, therefore, be seen as an opportunity for
young scholars to grow and develop the intellectual tools they need to thrive in any
environment, not just an academic one. And in this regard, opening the study of the medieval
world and castles up to a wider audience will also help to educate the general public about
the diverse interactions that occurred between different people across Europe between the 5th
and 15th centuries. While this dissertation does not explicitly focus on underrepresented
groups, as I have implied to be necessary for medieval studies to continue as a discipline, I
believe it opens the door for their study. Focusing on the House as a social unit, rather than
kinship based on blood, the HSM allows for a study of castles that incorporates an
understanding of fictive kin and the necessity for roles to be filled within the house even if
those filling them do not fit traditional social norms within society. In short, it is a way to
study historical developments, as opposed to particulars, that does not dismiss non-
conformity as a one-off. And furthermore, the comparative approach taken here helps to
illustrate how castle studies can help illuminate similarities between diverse cultures. In fact,
contrary to the way in which medieval studies has been misused by conservative groups of
late, this work demonstrates that there is nothing intrinsically special about European social
systems which lead to the world we live in today.
Chapter 2: Landscape, Typologies, and the Social Meaning of Castles

By: Scott D. Kirk, Evan S. Sternberg, Paulina F. Przystupa

2.1. Introduction

Castles are fortified elite residences, built and maintained by members of militarized ruling classes in preindustrial societies (cf. Anderson, 1970; Brown, 2012; Duby, 1982; Morris, 2017; Prior, 2006; Wickham, 2016). Defined in this way, they appear in a wide variety of temporal and spatial settings, not just medieval Europe. Commonly cited non-traditional examples include the castles of feudal Japan and colonial fortresses in places like Havana, Cuba. Regardless of spatiotemporal setting, castles are often the permanent residences of elites (i.e. Noble Houses, the Houses of a military commanders, and/or the residences of holy orders), equipped with provisions for their extended households and a garrison. However, they have also been built as summer retreats and temporary refugia. Despite obvious differences in form and specific functions, there are cross-cultural features of castles that make them recognizable as part of the same human behavior. In this paper we propose an anthropological explanation for why castles are universally recognizable and a typology for exploring variability in their development based on landscape.

Anthropological models in castle studies are rare, as most scholarship on the subject currently utilizes historically particular approaches. Contrasting the militaristic explanations for castle development published in the early to mid 20th century (e.g. Hogg, 1981; #38 We define the medieval period, or the Middle Ages, in Europe as the time from the collapse of the Western Roman Empire in the late 5th Century through to the Reconquista of Granada at the end of the 15th Century. This is subsequently followed by the Early Modern Period in Europe stretching from the 16th through the 19th centuries.
Lawrence, 1936; Pettengill, 1979), which often saw ancient and non-Western\textsuperscript{39} fortresses as similar to European castles, contemporary research largely rejects functional, behavioral, and evolutionary approaches (see Creighton, 2012; Johnson, 2002; Morris, 2017; Prior, 2006). Since the 1970s, many scholars, particularly in England, have understood castles as unique expressions of elite life, regionally distinct and steeped in local symbolism (e.g. Coulson, 2004, 1979; Johnson, 2002; O’Keefe, 2007). Newer definitions for these structures have increasingly linked the term “castle” to social change and the rise of Christian States in Western Europe (e.g. Molinari, 1998, 1997; see also Creighton, 2012). However, this focus generally ignores real cross-cultural, chronological, and functional similarities between castles across socio-political and geographic divides (cf. Boone, 2009; also see Quirós Castillo, 2014).

In contrast to the current trend explaining castles as a feudal or Christian phenomenon, we propose that the term “castle” has become too narrow. In this paper we argue that these monumental structures should be studied in light of the cross-cultural behavioral processes that led to their rise across disparate parts of the globe. With most castles functioning as elite residences, we suggest that the theoretical framework of the House Societies Model (HSM, see: Beck, 2007; Chesson, 2003; Gillespie, 2000; Joyce and Gillespie, 2000; Lévi-Strauss, 1982) is uniquely suited for exploring parallels in the development and use of castles globally. Originally devised as a cross-cultural, comparative approach to understanding social organization (Lévi-Strauss, 1982), the HSM sees the House as the basic unit for human sociality. Within this model, the House is defined as a corporate behavioral processes that led to their rise across disparate parts of the globe. With most castles functioning as elite residences, we suggest that the theoretical framework of the House Societies Model (HSM, see: Beck, 2007; Chesson, 2003; Gillespie, 2000; Joyce and Gillespie, 2000; Lévi-Strauss, 1982) is uniquely suited for exploring parallels in the development and use of castles globally. Originally devised as a cross-cultural, comparative approach to understanding social organization (Lévi-Strauss, 1982), the HSM sees the House as the basic unit for human sociality. Within this model, the House is defined as a corporate

---

\textsuperscript{39} By non-Western we are referring to elements of cultures that are not European or European colonial.
residential group (cf. Hayden and Cannon, 1982; Honigmann, 1959) that acts as an individual with respect to land, material goods, immaterial wealth, and namesake (Lévi-Strauss, 1982). Its material manifestation, as well as the landscape it inhabits, are thus as important to its protection, prosperity, and the maintenance of its traditions as the people who inhabit it (cf. Beck, 2007; Chesson, 2003; Joyce and Gillespie, 2000; Lévi-Strauss, 1982).

Landscape (cf. Sánchez, 2015) and placement are particularly important for understanding why castles appear as manifestations of the built environment because of their ability to protect individuals and resources, as well as generate new wealth, within the House. Assuming a functional relationship between the environment, and continuity in major landscape features over time, we suggest that categorizing castles based on landscape helps to illuminate why these structures developed in such culturally diverse locations by largely ignoring the aesthetic differences in castle design that are often the focus of castellology. Using a sample of 459 medieval and Early Modern castles from around the world (Figure 2.1), we collected data on common landscape features around each castle to conduct a series of k-means cluster analyses after the algorithm of Hartigan and Wong (1979) in (R Core Team, 2019). Analyzed regionally, supra-regionally, and as one sample, we sorted castles into eight types that broadly define these structures across regions and present a model to aid in their categorization.
2.2. Theoretical Approaches

2.2.1. Castle Studies and The House Societies Model

Since the late 1960s, European scholars have debated whether castles are a cross-cultural phenomenon or contextually unique and regionally specific (Askew, 2016; Creighton, 2012; Johnson, 2002; Prior, 2006).\(^{40}\) Current academic disagreement largely falls along geographic lines. Mediterranean scholars tend to favor trend-based, largescale (i.e. regional or supra-regional) theoretical approaches, such as *incastellamento*, the shift to

\(^{40}\) A major facet of this debate centers around how functional, in a military sense, castles really are.
settlement patterns centered on fortified hilltops, anchored by castles (also see Bazzana et al., 1988; Boone, 2009; Quirós Castillo, 2016, 2013; Toubert, 1973).\(^{41}\) Northwestern Europeans, particularly those in England, often favor locally contextual, postmodern frameworks that emphasize each castle’s unique development (e.g. Askew, 2016; Coulson, 1991, 1979; Johnson, 2018, 2002). We argue that these approaches represent opposite ends of the same spectrum, with both necessary for the holistic study of castle development. For castle studies to advance, more scholars need to embrace this and look beyond the confines of Europe to establish a theoretical standpoint that bridges the gap between these two approaches.

Achieving a Middle Range Theory (cf. Binford, 1983) that accommodates both large-scale analyses and fine-resolution symbolic interpretations can be realized by examining castles as Houses. Using an adaptation of the House Societies Model (cf. Lévi-Strauss, 1982), Houses are the fundamental units of social organization encompassing continuity and change over time, materially manifest in the physical attributes of the residences and landscapes they inhabit.\(^{42}\) Similar approaches have been increasingly used in archaeological analyses since 2000 under the purview of the HSM (see Beck, 2007; Chesson, 2003; González-Ruibal and Ruiz-Gálvez, 2016; Joyce and Gillespie, 2000; Richards and Jones, 2001).

\(^{41}\) While this is not the place for a more in depth discussion of *incastellamento*, we will note that Toubert (1973) defined the term, using the castles of Lazio as a case study, seeing a shift in settlement pattern as imposed by feudal lords in the 10th and 11th centuries (also see Boone 2009: 95-99; Creighton 2012: 140-145). Since then, other scholars, such as Guichard (1976), have been struck by commonalities between Christian and Islamic settlement patterns during the Early Middle Ages, breaking down the connection between *incastellamento* and feudal seigneury, and expanding the centuries in which they see this phenomenon occurring, suggesting that this is indeed a cross-cultural phenomenon.

\(^{42}\) Special thanks must be given to Dr. James L Boone of the University of New Mexico for helping us adapt this model to our study as a small part of his own ongoing research into House Societies.
2016). Adding to an already well-established body of literature, we argue that the House is a social and material unit carrying out three central roles, or pillars, needed for corporate groups to survive and socially reproduce themselves across generations. These pillars focus on the defense of the House, cooperation and competition between Houses (i.e. social reproduction), and production. While not explicitly stated in previous studies, these pillars are largely in keeping with analogous proposals for necessary aspects of the House in Icelandic House Societies (Bolender, 2007), Central European Estate Societies (Wilson, 2016), and medieval French society as a whole (Duby, 1982), and thus are a formalization of preestablished ideas.

Materially, aspects of each pillar are not just embedded in the physical attributes of the residences created by individual Houses, but in the landscapes around them as well. The needs and characteristics of Houses interact with and modify the built environment to better reflect the roles and responsibilities of Houses within the societies they inhabit. Whether examined socially, architecturally, or through landscape-based approaches, on a fundamental level the material aspects of these pillars are comparable across cultures. This aspect of the HSM makes it apt for comparative approaches, such as this one. Using the HSM to study the development of castles, medieval European examples fall much more in line with those seen in the medieval Islamic Empires of the Mediterranean (see Kennedy, 2001; Lewis, 1987).

Note that with his Three Orders, Duby (1982) has already formalized this notion within the social roles of people in medieval France. However, we argue that new terminology was needed to better fit the idea into the HSM as we are discussing both material and immaterial needs necessary for the House (and not society) to survive and propagate over generations.

Though the tribal organization apparent in much of Islamic society made the formation of a stable military elite class difficult to achieve (Glick 1979: 163), the authors argue that it did occur because of the importance ascribed to war and expansion in early Islamic Empires, such as the Umayyads and Abbasids (see Lewis 1987).
those of feudal Japan (see Deal, 2006; Friday, 2004), and examples in India such as those built by the Delhi Sultanate and Mughal Empires (see Early, 2015; Nossov, 2006; Richards, 1993). In such places, members of elite Houses also participated in a military or warrior class comparable to that of the European nobility (see also Lewis, 1969). Likewise, this model may even be applicable to Iron Age Hillforts (see Arnold and Fernández-Götz, 2018; Fernández Götz et al., 2014; Herold, 2016; Moret, 2018), which medieval examples share many similarities with and have often been built atop.

Using the HSM to study castles, therefore, accomplishes two things. First, it formalizes the association between Houses and castles (e.g. Morris, 2017), and second, it strips the Houses of the European nobility of any racial undertones of exceptionalism or uniqueness. As part of a sociétés à maison (House Society cf. Lévi-Strauss, 1982), the castle becomes the functional residence of a House with contextually specific symbolism (e.g. Coulson, 1991, 1979; Johnson, 2002), but also comparable to monumental defensive residences in other parts of the world as well. Indeed, Lévi-Strauss (1982) himself saw the various nobilities and aristocracies of Europe as sociétés à maison no different from those of the Kwakwaka’wakw Tribes of the Pacific Northwest in the 19th and 20th centuries, or members of the Japanese Nobility during their feudal period (12th-16th centuries). Comparisons such these, or those between feudal Japan and medieval England (e.g. Macfarlane, 2010, 2003) for that matter, are important for a fuller understanding of past

45 At the time of publication, Lévi-Strauss (1982) referred to the Kwakwaka’-wakw at the Kwakiutl. We have opted to use the modern designation for these tribes as that is how they prefer to identify themselves.

46 The subsequent Edo Period, which lasted from the 16th-19th centuries, saw the continuation of many “feudal” elements to society.
phenomena (cf. McClain, 1980). However, many of these studies privilege the social over the material, relying on documentary evidence for interpretation. Even Lévi-Strauss (1982) discussed the social roles of the European nobility in relation to those of others without a detailed interpretation of similarities in material culture. Here, we hope to build upon this foundation by examining the material placement of castles in terms of how they relate to the socio-economic needs of the Houses that live within them.

2.2.2. Budding, Meaning, and Social Reproduction

Typically, Houses that rely on the use of castles arise through what is referred to as a budding effect.47 Budding occurs when a House in one area becomes too large to sustain itself given available resources, and members are sent to establish a junior branch of the House in other localities (e.g. the Vikings, see Bolender, 2007). These new Houses are often established in economically advantageous locations, and thus must be protected. For castellologists, the classic example of this phenomenon is that of Norman castle building in Britain and Sicily (see, for example, Creighton, 2002; Kirk, 2016; Kolb et al., 2019; Maurici, 1992; Prior, 2006). Likewise, Christian elites from northern Spanish kingdoms built castles when entering formerly Islamic territories on the Iberian Peninsula (see Glick, 1995; Quirós Castillo 2016, 2013), and, in conquered or stolen lands overseas (see Chartrand, 2006; Deagan 2010, Deagan, 2002).

47 Note that more House Societies than just those using castles propagate through a budding effect.
Scholars debate whether similar fortified elite residences built by people from outside the medieval Latin-European world\textsuperscript{48} can be called castles because of the Christian and feudal connotations the word “castle” carries with it. Molinari (1998, 1997), for instance, refers to the pre-Christian fortified elite residences of Sicily during the Islamic Period as fortresses rather than castles. Other scholars see less of a divide. For instance, Bazzana et al. (1988), Boone and Benco (1999), and Glick (1995), have explored the phenomenon of \textit{incastellamento} as one common to both Christian and Muslim elites in Iberia. Furthermore, in an overview of Spanish castle studies Gutiérrez and Valor (2014) draw little distinction between the castles of Christian and Muslim kingdoms.

Continuity between Christian and Muslim elite castle building suggests that it is not an exclusively medieval Christian/European phenomenon. Therefore, additional evidence for this behavior may exist outside the confines of Europe. Mughal fortress building in India, for instance, represents the same sort of monumental construction on the part of an invading army (see: Richards, 1993; Rosen, 1996) as that of the Normans in Sicily. Similarly, the Japanese elite, known for castle building in their own islands, can be seen building the same sort of structures in Korea during a 16\textsuperscript{th} century attempted takeover of the Peninsula (see Turnbull, 2007). Thus, it seems that castle building is not as much a Western-Christian-feudal phenomenon as it is a phenomenon where militarized elites establish fortified residences to control territory, resources, or both.

\textsuperscript{48} To be explicitly clear, we characterize Latin Europe during the Middle Ages as those countries who relied on Latin for official correspondences. This would include all countries within the Holy Roman Empire and the British Isles, even though the common languages of these regions may not be Latin based.
After a new House has become established, typically several generations after budding has occurred and a physical residence (or castle) has been built, continuity within the House is maintained through inheritance and tradition, while change is the result of adjustment to new social and material conditions. Power is passed from one generation to the next through a strict set of rules designed to keep the House’s resources from being divided (cf. Boone, 1983). For castle builders, these rules are often defined by primogeniture, where the first-born son of the head of the House inherits everything. Since castles stand as monuments to the founding of the House, they are not torn down and rebuilt with each passing generation. Instead, they are constantly changing to better reflect the role of elite Houses in the societies they inhabit. They are therefore both functional and social in terms of their physical attributes, becoming active agents for the transmission of individual and cultural traditions, and altering in their material manifestation because of external pressures (cf. Chesson, 2003; Joyce and Gillespie, 2000). Because the roles of elites are not static across space and time, we can attribute variation between residential structures to differences in available wealth and the societal roles of the corporate groups living within them. For instance, as newly acquired territories settle, less investment may be paid towards the active defense of strategic resources, with resources reallocated to increased production or a physical display of the Houses’ status (i.e. conspicuous consumption; cf. Bjerregaard, 2019).  

2.2.3. Typology and Landscape

Belonging to the Houses of militarized elites cross-culturally,⁴⁹ castles typically utilize design and placement attributes that reflect military status, even if not actively used in

---

⁴⁹ It is important to note that in Western Europe, especially those parts that were once under the Roman Empire, elites forming noble and aristocratic Houses were largely tied to active military service since late Antiquity (Brown 2012; Duby 1982; Kirk et al. In Review; Morris
military services. However, as elite symbols and status vary temporally and spatially, outward appearance or aesthetics may accentuate the secular roles of the castle to a greater or lesser degree than the military ones. Functional and aesthetic differences may be codified in language, such as calling an elaborately decorated castle a palace, though common terms are often loosely defined and overlap substantially (Creighton 2012).

To overcome the imprecision introduced by covariable terminology, we present a data driven typology in this paper, based on defined attributes of the landscape surrounding fortified elite residences. This paper is not the first attempt at typologizing castles. Examples of existing castle typologies range from classification based on regionally common architectural features (e.g. Kilimnik and Kholodova, 2014), to simple classifications based on the dominant feature of the landscape (Schmorleitz, 1974), to an exploration of how castles relate to population centers (Bazzana et al., 1988; Porras, 2015). However, our approach is unique in that 1) it prioritizes an understanding of cross-cultural similarities rooted in anthropological theory over architectural preferences and/or historical developments, and 2) it maintains a quantitative focus on defining castles based on a strict set of rules incorporating many features of the landscape. While some scholars question the value of such pan-European studies (e.g. O’Keefe, 2007; also see Creighton, 2012), we argue that they are necessary for examining large-scale anthropological questions regarding cross-cultural developments.

To appropriately examine similarity in castle types that exist cross-culturally, selecting an appropriate measure to evaluate the entire sample is key. Landscape, 2017; Prior 2006; Wickham 2016). Undeniably, the same is true in Japan as well with castles belonging to daimyo, provincial lords under the shogunate (Deal 2006; Turnbull 2009).
conceptualized as the “synthesis of habitat and history” (Sánchez, 2015: 17), provides such a measure.  

Many regions where people build castles share environmental traits. For instance, Britain and Japan are both island nations dominated by riverine environments, and scholars have used *incastellamento* with great success to describe Spanish and Italian hilltop fortifications where landscapes are defined by the Mediterranean environment (see Boone, 2009; Boone and Benco, 1999; Creighton, 2012; Glick, 1995; Toubert, 1973). Furthermore, landscape endures in ways that cultural borders often do not. Many environmental features, such as mountains and rivers, existed prior to castle construction, and even man-made features, such as major roadways, can- and often do- predate a particular castle’s construction, influencing placement, with continuity right up to the modern day (see Kirk, 2017; Swallow, 2016; Creighton, 2002).  

In contrast, cultural boundaries are determined by the people living within them, and may have changed over time in ways that modern scholars cannot comprehend, necessitating approaches that do not fully rely on an understanding of them.

### 2.2.4. Definitions

The word “castle,” in English, has a socio-temporal connotation associating it with medieval structures built in regions with feudal governments (e.g. Duus, 1993; McNeill, 1997; Molinari, 1998; 1997; Omoush, 2019; Painter, 1956; 1935). However, this narrow association may represent a definition ascribed to castles by Victorian Era English scholars.

---

50 It should be noted that Sánchez (2015), and subsequently this paper, takes a somewhat different approach to landscape than is typically taken in English language literature. For more on common takes on landscape studies, see Johnson (2007a).

51 In a recent article, Jamieson (2019) also discusses the siting of castles on older monuments creating a sense of continuity in elite places over time.
rather than a collective representation (cf. Kolb, 2019) held by the people who lived in and around them (cf. Johnson, 2002). Indeed, many scholars (e.g. Kolb, 2019; Osborne, 2014) have spilled much ink over how, while monuments were built to endure, the meanings ascribed to them have changed over generations. This can clearly be seen in English-language scholarly, and popular, associations of castles with myth, legend, and romance, rather than the functional needs of a people living in what was often a politically unstable social arena. While this is somewhat understandable for popular literature, as the link between castles and the romantic goes back at least as far as the 15th century with the popularization of Sir Thomas Malory’s (1485) *Le Morte d’Arthur*, we see the narrowing of the definition for castles in academia as problematic. This reorientation in scholarly literature can at least partly be attributed to Coulson’s revisionist approach to castle studies (cf. Platt, 2007), a perspective that emphasizes the symbolic aspects of castle building popularized in literature over the functional, leading to a paradigm shift in the 1970s.

Here, we seek to erode the connotation the word castle has in modern English academic parlance, and expand the definition to include functionally similar structures, making our use of the word castle more of an anthropological unit (cf. Dunnell, 1971) than the common definition allows for. While using a neutral term or acronym, such as fortified elite residence or FER, might have been preferable for some, doing so diminishes the importance of our argument that castles can be studied comparatively as a cross-cultural phenomenon. Furthermore, using the English vernacular term castle to refer to the portion of the sample from medieval Western Europe, and another term, such as FER, for the rest of the sample would make us complicit in the continued use of language that separates European culture and history from that of the rest of the world. Lastly, using words like fortification or
fortress lacks the association of residence that the word castle already has, making them less accurate descriptors of the structures we’re investigating.

To see the castle as a uniquely western European cultural phenomena, whose origin is steeped in symbolism, already ignores both similarities and differences in terminology seen across the European languages that gave birth to our modern conceptions of these structures (cf. Creighton, 2012). For instance, the English term castle, the Italian castello, and the Spanish castillo, are all roughly coterminous, suggesting similarities in the form and function of the structures across these regions. However, words like chateaux (French), hrad (Czech) and Burg (German) have additional cultural connotations that vary more than the terms used for castles in English and the romance languages. For example, the word hrad, in Czech is the catch all term for castle, but can also be used to distinguish a medieval example from an Early Modern one if needed. If one is talking in Czech about an agricultural fortified residence the word tvrz might be used, while if a castle is more palace like, it might be referred to as a zámeck. Castles referred to as a tvrz or zámeck may also be called a hrad in certain contexts and would almost certainly just be translated to castle or castillo in English and Spanish respectively. For Example, Český Krumlov and Hluboká are both called castles in English translations while the Czech word most often used to describe them is zámek. Thus, to discuss European castles, one must already accept a certain degree of variation in meaning and connotation across regions when using translations.

Likewise, Burg or Schloss are the most common terms for castle in German, with the latter having a connotation closer to palace. These terms both carry with them temporal connotations, as Schloss is used to describe older castle/palaces, while more recent palaces are often just referred to as Haus (house), or some derivative thereof (e.g., Fürstenhaus). Similar to the problems in Czech, both Burg and Schloss are often just translated to castle in English (e.g. Schloss Neuschwanstein is just Neuschwanstein Castle in English).
Likewise, the terms castle, *castello*, and *castillo* imply a degree of continuity across space and time. This connection is particularly apparent during the Low Middle Ages when the Latin words *castrum* and *castellum*, from which the word castle is derived, were adopted for fortresses that, on an objective level, were different from the Roman fortresses these words originally described. This same phenomenon can be seen again with the Spanish using the word *castillo* to describe Early Modern fortifications they built in their colonies, such as the Castillo San Salvador de la Punta in Havana, Cuba; and the adoption of European words for castle to describe structures serving similar socio-cultural functions in Japan.

Many medieval architects understood the concepts and designs of the ancient world and incorporated them into their own medieval structures (see Bachrach and Bachrach, 2017; Creighton, 2012; Toy, 2006), showing a further sense of continuity between the ancient and medieval worlds. Beyond imitation, there are also certain fortresses of the ancient world, such as the Castello Eurialo in Sicily (see Cerchiai et al., 2002; Militello and Santoro, 2006) that have been considered equivalent to the medieval castle. While the Castello Eurialo stands out because it was not continuously occupied through to the Early Modern Era, many castles, such as Edinburgh Castle in Scotland and Segunto in Spain, show continuous occupation since prehistory and have obtained the descriptor castle along the way. Therefore, the term castle, in the modern academic sense of the word, is somewhat arbitrary, used as a chronological marker rather than an analytical unit depending on the context.

Our choice to understand castle building as an anthropological phenomenon is rooted in a cross-cultural understanding of these structures, rather than an attempt to understand a subset that fit a specific definition. As a result, our use of the term castle is applied as broadly as possible, beyond spatio-temporal confines, and we distinguish between castles by
constructing a typology to subdivide these structures with precise, quantitative meanings attached to each class. This stands in contrast to other studies that establish a definition for the word castle prior to investigation and seek to make generalizations for castles based on the subset they are interested in. We do not say that this is an inherently wrong approach, but argue that both are needed to truly understand what castles are, both contextually and cross-culturally.

2.3. Data

We based our typology on the analysis of presence/absence data for 63 different landscape features (Table 2.1) from a sample of 459 castles. We included features that applied to castles globally, such as relationship to population centers, known travel routes, placement on topographical features, area a castle occupies, and elevation. Additionally, proxy measures were made for the area a castle could survey and how prominent a castle was on the landscape using viewshed analyses. For continuous data, such as elevation, area, and visibility; we placed castles into dataset-derived quartile categories. Thus, data that could have been assigned an exact numerical value were recorded as presence/absence within a certain quartile. To ensure that models were robust, quartiles were recalculated for each analysis. All data used in this study were derived from ASTER GDEM, a product of METI and NASA (ASTER Validation Team, 2013), in combination with Open Street Map (OpenStreetMap contributors, 2018) and Google Earth Pro (Google, Inc. 2019). Modern

53 This was done by making a 30m offset between the viewpoint and the ground with the assumption that most castles strove to make their keep 30m tall (Goodall 2016). In castles built closer to the present, of course, this measurement is likely not as accurate as castle height was reduced with the invention of gunpowder (Anderson1970; Bachrach and Bachrach 2016; Hogg 1981; Toy 2006).
landscape features, such as roads and surrounding population centers, were used as proxies for their historical counterparts for modeling purposes. The authors considered this appropriate due to continuity in landscape features over time discussed by Kirk (2017, 2016), Swallow (2016), Creighton (2002), and Jamieson (2019). In cases where modern landscape features may not have been appropriate proxies, we argue that the large sample size and the use of multiple iterations of analyses offset severe bias in the models.

Our approach was largely socio-economic in nature, focusing on tangible aspects of the landscape for our data. In doing so, we have deliberately excluded more symbolic considerations for castle construction, such as religious meaning, to our study. This decision was for functional reasons. If we had considered symbolic aspects of the landscape, more heavily studied castles with religious or mythological associations ascribed to them over time, such as Caernarfon in Wales and Erice in Sicily, would naturally separate out from lesser studied castles with penurious historical and archaeological records, such as that of Pancorbo, in Spain, as a bi-product of information available. As we did not want our interpretations to reflect the level of scholarship available for each location, we set aside religious aspects and other symbolic features for future investigations with a more directed focus.

---

54 We did, however, include proximity to religious monuments as one of the considerations in our K-means cluster analyses.
Table 2.1: Landscape features input into cluster analysis and criteria for their being added. With the exception of religious monuments, all analyses used modern features of the landscape for historic ones. Elevation and slope data were collected through ASTER GDEMs (a product of Meti and NASA; ASTER Validation Team, 2013). Data for roadways, waterways, and agriculture was collected from Open Street Map (OpenStreetMap contributors, 2018). All other data was collected from Google Earth Pro.

<table>
<thead>
<tr>
<th>Features Input for cluster analysis</th>
<th>No. Sub-Categories</th>
<th>Sub-Categories &amp; Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide Viewshed</td>
<td>4</td>
<td>Using a 30 m offset from the surface, the number of peaks visible from each castle within a 4 km radius. Results divided into quartiles.</td>
</tr>
<tr>
<td>Elevated Location</td>
<td>4</td>
<td>Elevation in meters above sea level recorded and divided into quartiles.</td>
</tr>
<tr>
<td>Surrounded by Steep Slope</td>
<td>9</td>
<td>For each cardinal direction around every castle, a slope of 16–31° was recorded as 1 and a slope &gt; 32° was recorded as 2. Sides for each side were summed, with sums of 0–4 representing their own unique categories.</td>
</tr>
<tr>
<td>Relation to Castlebrite</td>
<td>3</td>
<td>Castle was 1) central, 2) on an island, or 3) peripherally.</td>
</tr>
<tr>
<td>Prominently Visible</td>
<td>4</td>
<td>Estimation for castle prominence based on a 3 kmiewiewed with a 1 m offset from surface. Number of peaks visible recorded and broken into quartiles.</td>
</tr>
<tr>
<td>Loose association with monumental</td>
<td>1</td>
<td>Cathedral or temple dating contemporaneously with the castle was within 5 km.</td>
</tr>
<tr>
<td>religious center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relation to Urban Center</td>
<td>7</td>
<td>Castle was 1) on the center or edge of an urban area but higher than most of it, 2) at the center of an urban area with little to no elevation difference, 3) on the edge of an urban area, 4) on the periphery of an urban area, 5) adjacent to an urban area, 6) nearby an urban area, or 7) completely isolated.</td>
</tr>
<tr>
<td>Covering extensive Area</td>
<td>4</td>
<td>A polygon was traced around the outermost wall for each castle to calculate area in Google Earth Pro. Results were recorded and broken into quartiles.</td>
</tr>
<tr>
<td>Located along major trade route</td>
<td>7</td>
<td>Castle was 1) along multiple primary roads, 2) along a single primary road with secondary or tertiary roads, 3) along only one primary or secondary road with tertiary roads, 4) along a single primary or secondary road without tertiary roads, 5) along multiple tertiary roads, 6) along only a single tertiary road, or 7) along no modern roads.</td>
</tr>
<tr>
<td>Located along a major waterway</td>
<td>1</td>
<td>Castle was within 1 km of a river or stream.</td>
</tr>
<tr>
<td>Agriculturally productive land</td>
<td>1</td>
<td>Castle was within 2 km of a farm, vineyard, or orchard.</td>
</tr>
<tr>
<td>Relation to Port</td>
<td>1</td>
<td>Castle was within 3.5 km from a major commercial port.</td>
</tr>
<tr>
<td>Population</td>
<td>5</td>
<td>Population estimated nearest settlement characterized as 1) mega city (number of structures uncountable), 2) city (&gt;500 structures), 3) dense settlement (50–500 structures), 4) small town (50–10 structures), or 5) hamlet (&lt;10 structures).</td>
</tr>
<tr>
<td>Placement</td>
<td>4</td>
<td>Castle was 1) on a mountain summit, 2) elevated, 3) on a low hill, or 4) low-lying.</td>
</tr>
<tr>
<td>Shape</td>
<td>9</td>
<td>Castle was 1) nearly symmetrical, 2) semi-symmetrical, 3) had symmetrical outer walls, 4) had semi-symmetrical outer walls, 5) had a symmetrical inner structure, 6) had a semi-symmetrical inner structure, 7) had another scroll design, 8) was irregular, or 9) was indeterminate.</td>
</tr>
</tbody>
</table>

Castles from Britain, the Czech Republic, Iberia, Scotland, Sicily, and Wales (n = 271 castles) comprised the majority of our sample. Referred to hereafter as “core Europe” for the purposes of the sample, the authors selected these regions because of demonstrable geographic and cultural differences that could disprove our hypothesis that castle building was similar worldwide if results of the k-means cluster analyses grouped individual castles together along geographic lines. For the sake of simplicity, the castles of Britain, Scotland and Wales were grouped together for “regional” level analyses based on geographic proximity and were given the designator United Kingdom (UK). 55 To establish that the

---

55 While in some regards Britain might have been a more apt descriptor, since our sample does not include Northern Ireland, we feel that referring to it as such would do a disservice to the people of Scotland and Wales.
typology was not tailored to these four regions, we added a small sample of European castles from southern France, the Netherlands, and Romania (n = 24). These tested how well the model scaled to different regions and if additional regions required model expansion. To demonstrate that castle building was a behavior extending well beyond the temporal confines of medieval Europe, we added fortified residential structures from European colonial contexts in Africa, Asia, North America and the Caribbean (n=67).\(^{56}\) Finally, to assess how cross-cultural castle building can be seen, we added castles from Japan and India (n = 97)\(^ {57}\) to our sample as well.

The commonality between all regions used in this study was the presence of a militarized elite class living within and maintaining these structures. Criteria for inclusion in this study was that the castle was largely built of stone,\(^ {58}\) and had enough extant remains to achieve a rough estimate of area covered. Castles with widely available historical information were favored over lesser known castles to allow for more detailed interpretations of the results. Likewise, we preferentially sought castles at least one author had conducted an in-person site visit to for an appraisal of our models based on experience.\(^ {59}\) Castles that had not been visited by any authors were selected at random, maintaining geographic distance so as not to bias our data through spatial autocorrelation. As explored previously, debates over

\(^{56}\) Some of the castles included in this figure were built by the native inhabitants of these areas using European designs. Thus, while not colonial, they were built in accordance with European principles.

\(^{57}\) This number includes a small amount of colonial fortifications to determine if they would separate out from those built by local populations. They did not.

\(^{58}\) Note that castles in Japan, while having significant portions of wood, all rest on solid stone foundations.

\(^{59}\) For the most part, this was only possible within the “core Europe” sample.
the term castle meant that castles outside of Europe, particularly those in India and former colonies, were difficult to find information on. This biased the selection process for castles outside of Europe and Japan to only those most widely known. However, we argue that differential preservation and levels of historical research introduces a sufficient stochastic element, and that by selecting castles from a number of geographically distinct regions, we have created a stratified random sample.

2.4. Methods

We analyzed data on the landscape around each castle using a series of k-means cluster routines after the algorithm of Hartigan and Wong (1979) in R (R Core Team, 2019). Initializing the algorithm with 30 random sets of centers and selecting to minimize the sum of squares for each set of points assigned to a cluster, we began by grouping castles into between 4 and 12 clusters regionally (i.e. by country). We then repeated the procedure supra-regionally (i.e. grouping countries by logical associations) and over the aggregate sample.\textsuperscript{60} We performed these iterations to determine if inconsistencies in castle placement were prominent between regions and to test the stability of the developing model. Likewise, examining these analyses regionally, supra-regionally, and as an aggregate allowed for comparisons to be made to 1) better explore similarities and differences between regions and groupings of regions, and 2) ensure that different sample sizes between regions did not significantly influence the results.

\textsuperscript{60} 4–12 clusters regionally (Czech Republic, Iberia, UK [Britain, Scotland, and Wales], Sicily, Japan, and India, for a total of 432 clusters), supra-regionally (four core areas of Europe combined, total Europe sample, New World sample, and Asian sample for a total of 288 clusters), and within the total sample (72 clusters) for a total of 792.
In conjunction with cluster analyses, elbow graphs were plotted for each iteration (e.g. Ladefoged and Pearson, 2000). These graphs show the total within-cluster sums of squares against the number of clusters, and are used to determine if an inflection point, the hypothetical optimum number of clusters for the dataset, can be observed (Aldenderfer and Blashfield, 1984; Ketchen and Shook, 1996).\textsuperscript{61} Our elbow plots did not indicate any best fits for our overall model. However, a qualitative examination of the results identified logical patterns in cluster creation. Specifically, clusters with the same co-occurring traits over multiple iterations. These patterns, such as the separation of hilltop fortifications in urban settings from high elevation refugia, coincides with previous categorizations in castle studies (see Glick, 1995; Gutiérrez and Valor, 2014). This correspondence suggests that, while there is no best fit for the number of clusters, castle placement represents a continuum with clear differences between archetypes but no clear break between them. Given that our findings follow logical patterns, each grouping was given a qualitative designator. These designators were three-tiered and descriptive, starting with 1) an indicator of the most unifying landscape feature for the group, such as water association; 2) a sub-category, what type of waterfront; and 3) a sub-division of that, such as city.\textsuperscript{62} Designators were codified in terms of what features were always included and what features were often included in their groupings. Many qualitative designators occurred repeatedly throughout the iterations of analyses, indicating that the cluster analyses were picking up on similarities between regions.

\textsuperscript{61} Note that it has been suggested that there is no one true best method for determining the best fit breaking points for clusters (Aldenderfer and Blashfield 1984; Everitt 1979).

\textsuperscript{62} Qualitative designators can, and often do, slightly overlap.
As logical patterns but no best fits were found, we created a typology informed by our investigations into each designator. While this adds subjectivity to the study, it is no more subjective than cluster analysis itself (see Aldenderfer and Blashfield, 1984; Hair et al., 1998). Principle Components Analyses (PCA), models used for maximizing variance between interrelated components (Pasini, 2017), were performed to determine key attributes for grouping castles in the cluster analyses (R Core Team, 2020). Weighing the ten most used qualitative designators against PCA Eigenvectors, indicating amount of variance between components (Hair et al., 1998), we derived eight different semi-quantitative categories characterizing variation in castle placement. Specifically, these categories differentiated castles based on their most influential features, as indicated by Eigenvector loadings for the most influential principal components, and further subdivided them based on which features co-occurred with the greatest frequency. Generally, the authors used the most common qualitative designators produced by cluster analyses to form their castle types, but because this process included subjective choice, no explicit rules were followed.

We argue that the similarities and variation seen in castle placement cross-culturally can help castellologists understand the role of particular Noble Houses within societies. Specifically, our typology can help determine the relative potential importance of castle inhabitants and their role within a community. To aid in the application of this typology, we developed a decision tree to categorize castles accordingly. This tree represents a simplified version of the decisions that produced our individual categories and was developed by taking each class in our typology and differentiating them based on their PCA Eigenvector-informed

63 Eigenvector loadings, component percent variation, and plots of the same can be found in supplementary materials: https://doi.org/10.1016/j.jaa.2020.101224
important attributes. The creation of this tree is similar to what Mathieu (1999) proposed for categorizing room function in English castles.

2.5. Results for Cluster and Principle Components Analyses

Fifty-eight different qualitative designators were assigned to 792 different clusters. Of those 58 designators, ten were used more than any other (Table 2.2), underscoring cross-cultural similarities in castle placement. Furthermore, major waterways, important trade routes, and agriculturally productive land were strongly associated with castles around the world. As many of these environmental factors existed before castle construction, and maintained continuity over changes in the socio-political landscape (e.g. the English takeover of Wales, the Iberian Reconquista, the Shogunate’s rise to power in Japan, etc.), we believe this indicates that control over trade and resources was at least as important to castle builders as more symbolic aspects of the landscape which modern scholars may or may not have knowledge of. Therefore, we argue that understanding castle development as an anthropological phenomenon should be, first and foremost, rooted in a theoretical discussion of resource control prior to more historically couched arguments that accentuate uniqueness.

---

64 All data for this work can be found in supplementary materials at https://doi.org/10.1016/j.jaa.2020.101224.

65 It is possible that this is due to preservation bias in both architecture and historical records.
Table 2.2: The ten most common descriptors assigned to clusters. Each descriptor used three of the most prominent features associated with the castle to describe it. Table shows the title of the descriptor, common attributes (present in 3/4 of the sample within each cluster), number of groups assigned this designator, and how many sub-samples they show up in out of 11.

<table>
<thead>
<tr>
<th>Title Description</th>
<th>Common Attributes</th>
<th>Times Used</th>
<th>Sub-sample Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water / Coastal / Stronghold</td>
<td>Low Elevation (&lt; Q2), Near Commercial Port, Agricultural Productive Land, Nature, Near a Commercial Port</td>
<td>48</td>
<td>8/11</td>
</tr>
<tr>
<td>Water / Coastal / Riverine / Coastal Point</td>
<td>Low Elevation (&lt; Q2), Not Protected by Steep Slope (&lt; 2), Coastal, Along Major Waterway, Agricultural Productive Land, Nature, Near a Commercial Port</td>
<td>47</td>
<td>8/11</td>
</tr>
<tr>
<td>Water / Riverine / Urban Stronghold</td>
<td>Along a Major Waterway, Within a Settlement, Low Elevation (&lt; Q2), Low Prominence (&lt; Q2), Agricultural Productive Land</td>
<td>16</td>
<td>5/11</td>
</tr>
<tr>
<td>Urban or Semi-Urban / Fortress / Low-Lying</td>
<td>At the Center or Edge of a Settlement, Wide Elevation (&gt; Q2), Elevated (&lt; Q2), Protected by Slope (&gt; 3), Not Low-Lying</td>
<td>29</td>
<td>6/11</td>
</tr>
<tr>
<td>Urban or Semi-Urban / Castle / Low-Lying</td>
<td>In the Center of a Settlement, Wide Elevation (&lt; Q2), Not Protected by Any Slope, Low Prominence (&lt; Q2), Associated with Cities or Magazines, Along Multiple Primary Roadways, Along a Major Waterway, Urban Stronghold, Low-Lying</td>
<td>27</td>
<td>5/11</td>
</tr>
<tr>
<td>Elevated / Religious / Stronghold</td>
<td>At the Summit of a Mountain or Low Hill, Wide Elevation (&gt; Q2), Elevated (&gt; Q2), Protected by Steep Slope (&gt; 3), Associated with a Settlement, Associated with Religious Monuments, On a Primary or Secondary Trade Route, Along a Major Waterway, Agricultural Productive Land</td>
<td>57</td>
<td>8/11</td>
</tr>
<tr>
<td>Elevated / Religious / Fortress</td>
<td>Wide Elevation (&gt; Q2), High Elevation (&gt; Q2), Protected by Steep Slope (&gt; 4), Prominent (&gt; Q2), At the Summit of a Mountain, Irregular in Shape</td>
<td>55</td>
<td>8/11</td>
</tr>
<tr>
<td>Other / Trade Route / Well-Served</td>
<td>Low Elevation (&lt; Q2), Low Prominence (&lt; Q2), Associated with Primary or Secondary Trade Routes, Along a Major Waterway</td>
<td>47</td>
<td>8/11</td>
</tr>
<tr>
<td>Other / Trade Route / Elevated Pass</td>
<td>Low Elevation (&lt; Q2), Elevated (&gt; Q2), Along a Major Waterway, Agricultural Productive Land</td>
<td>29</td>
<td>5/11</td>
</tr>
<tr>
<td>Other / Outpost / Isolated or Rural Fortress</td>
<td>Not Directly Associated with a Major Population Center, Low Elevation (&lt; Q2), Low Prominence (&lt; Q2), Agricultural Productive Land, On a Low Hill or Low-Lying</td>
<td>23</td>
<td>6/11</td>
</tr>
</tbody>
</table>

Examining quantitative differences between the regional and supra-regional levels in the cluster analyses, there are a number of interesting trends. For instance, in regions with more water present (e.g. Britain and Japan) differentiation between coastal, riverine, and lacustrine castles were lost during cluster creations, especially for castles that were low-lying. In contrast, areas with less water, like Sicily and Iberia, show a greater degree of separation between riverine and coastal environments. Likewise, higher population densities surrounding castles appear unimportant within the European samples (i.e. samples within Europe regionally and supra-regionally at the exclusion of colonial contexts), but when examined as an aggregate sample (i.e. total sample) plays a substantial role in defining castle clusters. This is likely due to the greater number of megacities in Asia than in Europe.66

66 Megacity association in Europe has a cumulative magnitude $[\Sigma v_{mag}]$ for the first three principal components of 0.16, whereas in Asia $\Sigma v_{mag} = 0.28$, for example, and cumulative Eigenvector loadings for location in center of a settlement, and location in a city, are also higher in the Asian sample.
Further differentiating the castles of Europe and Asia, the subsample of Total Asian Castles shows more division between countries than those found in Europe where clusters span countries and regions. This is with the exception of the Gaelic castles of Scotland, which typically separate out completely from other castles of Britain and Wales in the UK Sample, and cluster with Sicilian and Iberian castles in supra-regional and total samples.

While interesting, geographically specific differences were not the norm for our analyses with the exception of the above-mentioned differentiation in Scottish Castles from their British and Welsh counterparts in the regional UK sample and the clear differentiation between Japanese and Indian castles in the Total Asia Sample. Clusters with cooccurring traits commonly reappeared in different subsamples, and often combined accordingly in larger ones. Likewise, in regional subsamples the same qualitative designators were frequently assigned to multiple groupings in clusterings of nine or more. Similarly, certain divisions between comparable groupings at the regional level almost disappear in larger subsamples. Thus, we believe that regional subsamples were adequately characterized with fewer clusters while larger subsamples and the total sample were well characterized with more. Though expected, as a larger sample will logically have more variation than a smaller one, we do not believe that this facet of cluster analysis biased our results based on similar repetitions in co-occurring traits within all subsamples.

In general, each subsample analyzed, whether European, native Asian, or colonial, had several clusters indicative of water control, defensive retreats for local populations, and control over important trade routes. This supports the idea that castles were used by Houses to control resources. However, PCA generally shows the factors defining the variability in principal components, and thus influencing the creation of clusters, were those that could
have been analyzed as continuous data had we not put them into quartiles. According to Eigenvectors, the two natural aspects of the landscape, viewsheds and elevation, were significant predictors of castle groups. Though relative importance of these inputs varied by region, they were typically key inputs for any analysis. That being said, while PCA shows that clusters were more heavily influenced by natural aspects of the landscape (i.e. elevation, viewshed, etc.), subjective interpretation of clusters more often identified constructed features, such as trade routes and urban environments, as defining ones. Thus, there appears to be a connection between the appearance of certain man-made features with certain types of castles that exist in combination with the less obvious natural factors that lead to the creation of clusters. It is likely that certain types of landscapes affected a number of factors pertaining to social organization including the presence of certain types of settlements and infrastructure, as well as the role a castle held within a settlement, and the function of the Noble House living within the castle.

2.6. Typology

Without a unique number of clusters best fitting the data, yet patterns in cluster creation, we argue that qualitative analysis is necessary to inform the characterization of castles. Drawing from the results of our k-means cluster, PCA, and qualitative assessments, we propose eight types of castles indicative of potential use, and the social standing of the House residing within them. Each type presented has a functional use for an elite class wishing to control land, labor and resources, even if their architecture might not make this abundantly clear. They have been descriptively arranged below in accordance to their relationship with major waterways on one end, and hilltops on the other, with more isolated or trade-based examples in the middle. We believe this helps to illustrate the continuum
castle building rests on. However, there are likely various other ways to order these that may make as much sense. Examples for each type have been given with coordinates in decimal degrees provided to allow readers the opportunity to examine the landscape around each castle for themselves. These types are:

2.6.1. Type 1- Water-Based Urban Defense or Elite Compound

Most castles of this type are Early Modern coastal fortifications. Optimally placed to control access into ports and typically having a large viewshed, these structures often act as the defenders of major port cities. Sitting on prime real-estate, a small number of fortified, semi-residential warehouses and elite palaces may fit in this category as well. This type of castle may be owned by either states or individual Noble Houses to help protect maritime investments and thus control water-based trade. Within the sample 81/459 castles fell into this category with notable examples including the Castel Sant’Angelo in Licata, Sicily.
(37.100750°, 13.931696°), Cullera in Spain (39.166040°, −0.249874°), and the Castillo San Salvador de la Punta in Havana, Cuba (23.146140°, −82.357593°; Figure 2.2a).

2.6.2. Type 2- Water-Based Control Point and Trade Hub

Castles located within urban areas optimally placed to control goods moving along waterways, be they riverine, lacustrine, or coastal. Their placement makes them ideal for Noble Houses looking to extract wealth in the form of tax from their surroundings, and thus elevate the status of those who control them through the acquisition of wealth. Within the sample, 75/459 castles fell into this category with examples including Barnard in England (54.543419°, −1.926503°), Cheb in the Czech Republic (50.081225°, 12.365953°), and Himeji in Japan (34.839289°, 134.693978°; Figure 2.2b).

2.6.3. Type 3- Water-Based Trade or Border Control

Strategically positioned castles used outside of major population centers for the control of coastal, riverine, and lacustrine junctures. As waterways were heavily used to transport goods during the Middle Ages (Wickham, 2016), these structures would have essentially acted as the tollbooths and check points of their day (cf. Painter, 1956; also see Creighton, 2002: 43), controlling the movement of goods along heavily used waterways. Without an abundant source of revenue from a large surrounding town, one assumes those examples built on the coast, such as the Torre Normanna, in Sicily, were built by the state with more frequency than by individual Noble Houses. Along major waterways on the interior, however, these structures would have been extremely profitable for individual Noble Houses to own. Within the sample 133/459 castles fell into this category including Goodrich in England (51.876812°, −2.615887°), Brucoli in Sicily (37.285523°, 15.186576°; Figure 2.2c), and Gagron in India (24.625901°, 76.188221°).
2.6.4. Type 4- Isolated Fortress or Semi-Rural Retreat

These castles occupy the places conjured up when thinking about Dracula (Stoker, 1897) and his castle. They are isolated fortresses away from settlements, often designed as places of refuge for retreating armies and fallback points for fieldworkers. They are remote, so are likely undesirable to Noble Houses wishing to elevate their status and only inhabited by more impoverished members of the nobility or state officials. Examples may include communally owned refuges, thought to be built by North African communities entering the Iberian Peninsula during the Islamic conquest (see Rotolo and Civantos, 2013; Glick, 1995), and examples owned by royalty seeking places of isolation. Within the sample 58/459 castles were typed this way including Radyne in the Czech Republic (49.681023°, 13.465114°), Serra in Spain (39.682765°, −0.414194°; Fig. 2d), Calatras in Sicily (37.849256°, 13.134393°), and Rajgad in India (18.245870°, 73.682316°).

2.6.5. Type 5- Frontier Fortress or Trade Hub

These castles are located on major overland trade routes running through dense settlements. They are not associated with major waterways but are nonetheless optimally placed for the control of overland transit as either tollbooths or border control checkpoints would be today. While one would expect that the lack of water-based resources would make these castles only viable for states, a fair number are still owned by Noble Houses. Within the sample 13/459 castles fell into this category with examples including Atalaya in Spain (38.631806°, −0.861008°; Fig. 2e) and Basvakalyana in India (17.884260°, 76.948463°).

2.6.6. Type 6 - Urban or Semi-Urban Simple Refuge

Similar to Type 7, these are hilltop fortresses not connected to the outside world through primary or secondary roads, or by association with major waterways. They are rare,
as most urban or semi-urban environments only develop due to trade. However, they do exist, though more often in pop culture as secret bases for nefarious agents than in the past. In reality these castles were often state-owned strongholds built as fallback points of last resort during invasion or, more rarely, high elevation elite strongholds. Only 7/459 castles fell into this category within the sample. Noted examples include Bezdez in the Czech Republic (50.539096°,14.719996°), and Caltabellota in Sicily (37.578430°,13.215569°; Figure 2.2f).  

2.6.7. Type 7- Urban or Semi-Urban Control Point and Refuge

These are the typical hilltop castles associated with the theory of *incastellamento*. However, while *incastellamento* focuses on the defensive aspects of castle building, this type demonstrates that these hilltop castles do not often develop without some sort of primary or secondary roadway and/or major waterway associated with them. As such, there is an aspect of environmental control implicit here, where the Noble Houses of a militarized elite class can be assumed to be protecting wealthy hilltop population centers in return for tribute. Therefore, beyond the obvious relationship to Mediterranean theories of *incastellamento*, motivations for constructing Type 7 castles likely also dovetail with established European theories for the rise of military elites in the Early Middle Ages (see Duby, 1982; Francovich and Hodges, 2003; Wickham, 2016). Furthermore, during periods of conquest (e.g. the Norman conquest of Sicily, the Reconquista of Iberia, etc.), the defensive nature of these castles and their interconnection with overland trade routes probably made them prized.

---

67 Note that some of the results for this category may be due to minor changes in the placement of roadways or inaccuracies in some of the data used for analyses. This group may, therefore, be even more anomalous than it appears now with some examples better fitting with Type 7 castles. This category may be useful for describing castles in the early modern era then it is for discussing them as they were when built.
possessions for controlling land, labor, and resources (cf. Kolb et al., 2019). This would suggest continuity between the behavioral practices leading to the construction of fortified residential structures prior to colonization and/or Christian conquest and the establishment of classic medieval castles. Within the sample, 65/459 structures fell into this category with noted examples including Palmela in Portugal (38.566154°, −8.899731°), Salemi in Sicily (37.818306°, 12.800315°; Figure 2.2g), and Kittur in India (15.600429°, 74.791143°).

2.6.8. Type 8- Urban Fortress or Government Center

Large castles found in major urban centers. Many are on hilltops making them ideal as urban fallback points. In contrast to similar castles found in Type 7, these structures are always located in major/mega cities and were likely built and owned by the state rather than individual Noble Houses in Europe. In other places, such as Japan, only the most powerful of elites could hold these castles. In most cases they likely acted as seats of power, allowing for the control of trade, prestige manufacturing, and the populace. While a robust category, post-industrial urban sprawl sorts some castles, such as Crookston in Scotland, into this type spuriously. Within this sample 27/459 castles are included with noted examples being the Alhambra in Spain (37.177089°, −3.591531°), Prague Castle in the Czech Republic (50.090902°, 14.401522°; Fig. 2h), and Matsuyama in Japan (33.845552°, 132.765751°).

2.7. Distribution of castle types

Naturally, castle types are not equally represented in all regions (see Figure 2.3), and some regions lack some types of castles altogether. Both topology and historical particulars play a role in how represented each type of castle is on the landscape. For example, in the total sample the number of water-based defenses far outnumbers any other type of castle (Figure 2.3). This is likely because well represented countries in the total sample, like Japan,
Britain, and the Czech Republic, have many water sources and built a proportionately larger number of low-lying castles aimed at controlling riverways. In contrast, regions with less available water sources, like Sicily and the Iberian Peninsula, represent less of the sample. These localities often built more Type 7 castles (Urban or Semi-Urban Control Points and Refuges). This tendency for Mediterranean nations to build in naturally fortified places is possibly due to a combination of factors including fewer rivers and more frequent invasions during the High Middle Ages.

Nonetheless, the ubiquity of all eight types of castles in topographically similar regions speaks to the idea that castle building is a cross-cultural behavior, rather than a historically particular phenomenon exclusive to Western Europe. Furthermore, many of these
castle types indicate placement reflective of archaeological theories for castle development favored in regions where one type of castle is dominant. For instance, the prevalence of Type 7 castles in Mediterranean samples goes hand in hand with the theory of incastellamento. We argue this suggests that: 1) previous theoretical standpoints hold more validity than some postmodern scholars believe, and 2) a multi-pronged approach to understanding castle development is necessary.

Figure 2.4: Decision Tree for placing castles into appropriate types.

2.8. Decision tree

Despite the many factors that went into the creation of our typology, we found that placement within each type could be determined based on a few key traits. To that end, we developed a decision tree (Figure 2.4), a flow chart comprised of if-then statements, for practical typing of castles both in the field and as code for statistical programing. To make the tree simple and comprehensive, several of the factors that went into our cluster analysis
were condensed into single categories. Starting at the top of the decision tree, we define “mountain top” as any castle on a mountain or in an elevated position, as opposed to on a low hill or low lying. “Within or adjacent to a large settlement” was considered any castle in close proximity to a settlement of >50 structures, while “association with a city” was any castle within a settlement of >500 structures. “Along a major trade route” was considered to be within 1 km from a primary or secondary roadway, and “extreme elevation” was considered any castle greater than the mean elevation for the total sample. Likewise, “large size” was anything greater than the mean for area in the total sample. All other categories included were as defined for the inputs in the cluster analyses (see Table 2.1).

As geographic conditions vary across regions, we allow for multiple pathways to the same castle type. We believe this gets at the intent or behavior behind building certain types of castles more than splitting them apart by distinctive topological characteristics would allow. Therefore, castles like the Castello Sant’Angelo, in Licata, Sicily, and the Castillo San Marcos, in St. Augustine, Florida, (contemporaries built by the Spanish Empire) were seen as similar Water-Based Urban Defense or Elite Compounds (Type 1) despite obvious differences in the landscape they were placed.

2.9. Change over time

As presented thus far, our typology helps illuminate cross-cultural similarities in the societal functions of castles based on placement. However, because castles exist as part of dynamic House Societies that are ever changing, one must also expect that changes occur in the types of castles favored by elites over time. In early to mid-20th century studies, these changes were often implicit. For instance, traditional military based interpretations (e.g. Hogg, 1981; Pettengill, 1979; Toy, 2006) often saw castle placement leaving more naturally
fortified positions in favor of low-lying areas coinciding with advances in military technology (i.e. when artillery no longer made placement on a hilltop advantageous). Similarly, models for *incastallamento* saw the rise of fortified hilltop settlements driven by seigneurial authority developing around the 8th century, with the appearance of castles at their center being an early stage in an evolution that spanned the next six centuries (Bazzana et al., 1988; Boone and Benco, 1999; Glick, 1995; Guichard, 1976; Toubert, 1973). Once these positions were no longer relevant for political dominance over the surrounding area, typically due to the land having been settled over generations, the importance of these structures in a defensive context waned as military focus turned to national boundaries, typically along the coast (cf. Hogg, 1981; Kirk, 2017). More recent approaches, like that of Quirós Castillo (2016, 2013), have largely turned away from evolutionary models for castle development but still see change over time as predictable and rooted in historical developments.

In spite of each of the above-mentioned theoretical frameworks having testable hypotheses at their core, Northwestern European scholarship, particularly in England, has largely shunned models that imply large-scale change in castle development over time. Finding them largely inapplicable to the geographic regions they study, these scholars have turned to specific, historically driven analyses for individual castles (e.g. Askew, 2016; Coulson, 1991, 1979; Johnson, 2018, 2002). Here, we argue that the subsequent division that has arisen between the opposing theoretical viewpoints in Northwestern European and the Mediterranean castle studies has largely been driven by the increased focus on regional

---

68 Liddiard (2005) discusses a similar architectural trend with the diminishment of siege warfare in England at the same time.
studies and attempted extrapolations to wider geographic regions where context specific models do not work. At the heart of this problem, castles within regional studies are often narrowly defined. Thus, extrapolation becomes a problem because analyses are based on precise definitions that may not be shared across geographic boarders. Instead, we propose that castles must be seen as a polymorphic architectural form, common to a wide variety of cultures, and built in similar localities to represent a diverse body of militarized elite Houses.

To determine whether our typology could identify change in location preferences over time similar to those proposed by theoretical models favored in the Mediterranean, we obtained a series of “foundation” dates for a subsample of 135 castles in Britain, the Czech Republic, Iberia, Scotland, Sicily, and Wales. These dates were based on the earliest evidence for a fortified elite residence at each castle location, often giving earlier dates than the construction of the castles we were studying. We argue the use of these early dates is appropriate because they reflect castle building behaviors irrespective of period, thus providing examples reflective of cultural change over time. Furthermore, as elite competition is often seen as a primary mechanism for change in House Societies (cf. Chesson, 2003; Johnson, 2007b), we opted to ignore regional divides in favor of a pan-European analysis potentially more indicative of elite interaction than intraregional studies typically allow.

To negate differences in sample size, castle foundation dates were placed into categories reflective of broad eras with data normalized based on count within a specific era. These categories were given relative chronological names such as Bronze Age (prior to the 1200 century BC), Iron Age (1200–200 BCE), Roman Age (200 BCE – 500 CE), Low Middle Ages (500–900 CE), Early High Middle Ages (900–1200 CE), Late High Middle Ages (1200–1500 CE), and Early Modern Era (1500–1900 CE). As the focus of this paper is
castle development, foundation dates after the 10th century CE were broken into more
detailed periods than earlier periods’ foundation dates. The authors acknowledge that labels
given to earlier eras do not reflect archaeological periods, like the Iron Age, which differs
between the Mediterranean and Central Europe. Nonetheless, to analyze change in castle
types across Europe over time, and encompass early foundation dates, general categorization
was necessary.

![Figure 2.5: European castle placement by time original fortified structure was erected. Sample of 135 castles the authors felt confident in founding dates for from Britain, the Czech Republic, Iberia, Scotland, Sicily, and Wales. Data has been fit into categories defined as Iron Age (1200–200 BCE), Roman Age (200 BCE – 500 CE), Low Middle Ages (500–900 CE), Early High Middle Ages (900–1200 CE), Late High Middle Ages (1200–1500 CE), and Early Modern Era (1500–1900 CE). Data are presented as percentages to account for differences in sample size.](image)

Our results (Figure 2.5) show two very interesting trends. First, the construction of
Urban or Semi-Urban Control Points and Refuges (Type 7) exhibits two temporal peaks that
align with 1) Iron Age Hillfort (or Oppida) building and 2) *incastellamento* in Late Antiquity/the Low Middle Ages. Thus, it is likely that these phenomena share many characteristics that can be explored through general anthropological models for a comparative understanding. Second, the construction of Water Based Trade and/or Border Control castles (Type 3) demonstrates an inverse bell curve between the Roman Age and the Early Modern Era. Based on our sample, this is likely reflective of a diminishment in Christian trade across the Mediterranean, previously explored through cultural-historical models (cf. Kirk, 2017; Wickham, 2016, 2004). However, the resurgence in these castles, coupled with the explosion in Water Based Urban Defenses or Elite Compounds (Type 1), in the Early Modern Era likely reflects not only increased trade, but also substantial government investment in heavily fortifying the coastlines of Iberia, Sicily, and to a lesser extent Britain, Scotland, and Wales (Clements, 1999; Hogg, 1981; Kirk, 2017; Maurici et al., 2008; Maurici, 1985; Mazzarella and Zanca, 1985; Smith, 1968). Thus, one sees the growth of strong nationalized control over boarders as related to an increase in investment for water-based castle types.

Despite obvious trends in the non-colonial, pan-European dataset, these patterns are less apparent in regional subsamples. This may be due to smaller sample sizes in some areas, or may suggest that some regions show much less variation over time than other regions, as is likely the case in Britain. Further exploration is needed to understand how this typology can be implemented at a regional scale. Regardless, we believe the patterns in this dataset aid in understanding the construction of fortified elite residences in parts of the world that lack

69 Note that when the sample is examined outside of these bins and in a strict time series, the twin peaks turn into one peak during late antiquity. We believe this is a function of our sample and that the bins are more reflective of real trends.
detailed historic accounts or thorough archaeological investigations. Just as the original outline for the House Societies Model used the social structures of medieval Europe to better understand those of the Kwakwaka’wakw (Lévi-Strauss, 1982), we believe that understanding the relationship between historical particulars and change in castle types favored over time in Europe can help illuminate similar social changes in non-European cultures where castle building is common but surviving written and oral histories are not. In particular, we believe this model may be applicable to understanding fortress building in the Pacific, where examples of fortified monumental architecture have been noted in such places as Fiji (Field, 1998) and New Zealand (McCoy and Ladefoged, 2019) and active study into their establishment is currently underway.

2.10. Discussion

While castles exist in locations where militarized elite classes rose to power throughout the world, few comparative studies have been attempted. This is likely for the same reason that little modern comparative work on feudalism has been done, because “the very real points of similarity tend to be obscured by the use of… term[s] loaded with Western connotations” (Glick, 1979). Here, we argue that similarities in castle building must be embraced, rather than ignored. Castles in each of the disparate regions analyzed here all have one thing in common, the control of a finite resource needed for individual Noble or Aristocratic Houses to survive and propagate over time. Whether that resource is a labor force, as is likely the case with Type 7 castles, or the movement of goods, as seen with Type 2 castles, landscape acts as an ideal medium from which to launch a comparative study.

As a starting point for a new theoretical direction for castle studies, we argue that the presented typology accurately characterizes variation in castle development cross-culturally,
viewing castles as part of an anthropological phenomenon. Specifically, we argue that militarized elite Houses around the world built castles to control specific resources in a manner analogous to the development of corporate residential groups in prehistoric contexts (cf. Hayden and Cannon, 1982). While castles control unique resources that vary from place to place, almost all were built as a functional control point on the landscape. These control points would either be owned by the state (i.e. a Royal House) or individual Noble Houses, but in either case they existed to support the House’s need to defend itself, compete and/or cooperate with other houses, and produce the resources needed for its biological components to thrive and propagate.

Further work may refine this typology and could categorize different types of castles into a rank order, reflecting the social standing of Houses within a society. For example, the sample used for the creation of our typology demonstrates that Type 1 Castles - Water Based Urban Defense or Elite Compounds - are more regularly built by the state than individual Noble Houses (Figure 2.6). This likely indicates that, while castles are material manifestations of a militarized ruling class meant to defend the populace (cf. Duby, 1982; Wickham, 2016), some locations were more difficult for lesser Houses to maintain than others. Therefore, we argue that some types of castles are likely untenable as control points for land, labor, and resources until higher order Houses, such as Royal Houses, were strong enough to enact a more generalized strategy for defending larger land holdings than even a powerful individual Noble House could previously.

In some regards, the notion that the castle functions as a control point runs contrary to popular British arguments that focus on unique cultural purposes for building castles (see Prior, 2006). However, similar ideas to the ones we propose here have been suggested
regularly over the past seventy years. For instance, Painter (1956) likened the construction of castles along major trade routes in central France to the construction of tollbooths today, and Christie (2008) proposed that some castles in Central Italy were built to control the movement of livestock. Likewise, waterways were vital transportation routes in medieval Europe (Wickham, 2016), and castles built along them would naturally be control points. With the considerable scholarship on medieval water-based trade in England (e.g. Jones, 2000; Oksanen, 2017), it is surprising that more English castellologists have not grappled with the central role English castles likely played in trade, and have instead chosen to focus on the symbolic and cultural roles of seigneurial residences (e.g. Johnson, 2002).

![Figure 2.6: State-owned vs. non-state-owned castles by type from a subsample of 152 castles. Dark blue is state-owned and light blue is non-state owned. The chart demonstrates the propensity for the state to invest in more defense-oriented castles than independent Houses.](image)

One potential reason for a move towards social, rather than functional, explanations of castle development in England may be visible within our typology. Of the major European regions examined in this analysis, British, Scottish, and Welsh castles exhibit the most investment in water-based castles and the least amount of change in types through time.
Therefore, it may be that differences in castle design and placement have been overemphasized at the expense of explorations into the startling continuity in castle placement that is seen nowhere else in Europe. In contrast, the Mediterranean shows significant change over time, with the development of urban or semi-urban hilltop castles during the Low Middle Ages and the subsequent cessation of construction for these castles in favor of their coastal counterparts. While this regionalized separation in scholarship follows localized trends for each region’s castle development, the function for these castles remains largely the same: to act as resource control points for the advancements of militarized elite Houses.

2.11. Conclusion

Over the past half century English language castle studies have increasingly focused on the symbolic aspects of castles (see Platt, 2007), narrowing the definition of castles to that of a modern socio-temporal category favored by a select group of castellologists. We argue that this does not accurately reflect the thoughts and actions of castle builders, and fails to take into account cross-cultural similarities seen within the wider anthropological phenomenon of castle building (cf. Boone, 2009; Quirós Castillo, 2014). While this differs from trends in Mediterranean castle studies, ideas from the middle part of the 20th century, like incastellamento, similarly remain the dominate theoretical perspective in Southern Europe with little innovation in interpretation over recent years. Despite common preferences for diametrically opposed paradigms, some scholars have attempted to eroded these longstanding theoretical approaches. Unfortunately, critiques and syntheses exist as an amorphous set of suggestions rather than a coherent theoretical framework.
This paper formalizes some of the more amorphous aspects of castle studies into a single, coherent theoretical framework. Taking a socioeconomic, landscape-based approach rooted in the House Societies Model, we built a typology for castles based on common features of the landscape around them. Through a qualitative examination of the results for a series of cluster analyses, we derived eight distinct types of castles seen the world over. These types exist on a spectrum, with water-based defenses on one end, fortified hilltop settlements with castles at their center on the other, and “tollbooths” along trade roots in between. To operationalize our typology, we then developed a decision tree that can easily be employed either in the field, for micro-regional analyses, or for coding castle types, as would be necessary for more macro-regional analyses.

Favoring generalizable anthropological models over unique cultural-historic ones, we view our results as a replicable starting point for developing new directions in castle studies. One that see the construction of castles in medieval Europe as part of the same anthropological phenomenon which lead to the construction of colonial fortresses in Cuba and feudal castles in Japan. In essence, we argue that castle building is behavioral, rather than historically particular, with similar social developments producing similar outcomes. This approach helps to dispel the popular myth of European superiority and uniqueness. In this regard, the HSM acts as a sort of Middle Range Theory (cf. Binford, 1983) for castle studies, bridging the gap between theoretically disparate analyses to include diverse approaches. As fortified elite residences, we argue that castles, and the landscapes they are placed upon, exhibit physical traits that permit the Houses residing within them to defend themselves, cooperate and compete with each other, and to ensure the production needed for the social
unit to survive; allowing for conquerors to control land, labor, and resources, and ensure the continued survival of the House across generations.

2.12. Acknowledgements

No specific funding sources were used for the completion of this project. We would like to thank Drs. James Boone, Michael Kolb, Christopher Lippitt, and Loa Traxler for their continued support on this project. Additionally, we would like to thank Kristina Machen, Alexis O’Donnell, and Joseba López de Ocáriz Casas for their valued input. Finally, we would like to thank the editors at the Journal of Anthropological Archaeology and the anonymous reviewers for their suggestions pertaining to this paper. Any mistakes were, of course, our own.
Chapter 3: A Clustering of Castles: Grouping Structural Features to Examine Change Over Time within a House Societies Model

By: Scott D. Kirk, Evan S. Sternberg, Lexi O’Donnell, Kristina Machen (Whitney), and James L. Boone

3.1. Introduction

Since the conception of castle studies, going back almost to the European Middle Ages, fortified elite residences have often been studied through the lens of their architecture in specific cultural settings. In most cases they are differentiated by region (i.e., Germanic, Slavic, French, etc.; cf. Kilimnik and Kholodova 2014; Kaufmann and Kaufmann 2001) based on vague notions of outward appearance, often rather unscientifically, and with elements of the romantic and/or military history deeply ingrained in their interpretation. Most scholars, due to the regional foci inherent in archaeological and historical work, largely ignore the similarities in castles that bind them together as a unique group of monuments. In fact, castles are common to many cultures, not just those of medieval Europe (cf. Kirk et al. 2020). The Japanese have constructed castles (cf. Schmorleitz 1974; Toshitaka and Takahiro 2017; Turnbull 2009), castle building continues in European cultures into the Early Modern Era (cf. Deagen 2010, 2002; Johnson 2002), and even structures such as Spanish colonial missions have linkages to the castle-like fortified churches of the Latin West (cf. Blake and Smith 2000; Harrison 2004).

To understand castles, we must study them as a behavioral adaptation common to many House Societies the world over (cf. Kirk et al. 2020). Defined as the fortified residences of military elites found largely in preindustrial societies, the structures referred to as castles by people of a common Euro-American background exist on a continuum, with
origins stemming deep into the past, analogies in non-western cultures, and variations reaching the Modern Era. These modern examples can be seen with the reuse of medieval castles and the construction of castle-like fortresses in World Wars I and II (cf. Hirst 1997; Hogg 1981), as well as with the use of “modern” castles (i.e., castles that have been destroyed and rebuilt centuries later) emblematic of heritage, particularly in Japan (cf. Benesch and Zwigenberg 2020). In short, castles are not defined by a particular period or culture, but by similar elements emphasized by militarized ruling elites in anthropological contexts. Their functions are often somewhat universal, in spite of contextual differences. They control arteries of communication and trade, they serve to protect those living around them, and they stand as territorial markers that convey cultural meaning to those who interact with them.

This paper seeks to explore: (1) How similar castles and castle-like structures (hereafter referred to as castles for brevity) are across cultural/linguistic boundaries and over time, and (2) The relationship between a castle's social function, architecture, and placement on the landscape. Recording the presence/absence of 217 architectural features within a sample of 391 castle incarnations from a variety of contexts (Table 3.1, Figure 3.1), castles are grouped in accordance with k-means cluster analyses performed on: (1) The total sample of castles (referred to hereafter as the World Dataset), and (2) Castles from the four European

---

70 Examples of castles reused during the World Wars in this dataset include the Castle of Santa Caterina in Favignana, Sicily, and Dover Castle, in England, to name just two.

71 This last aspect ties into something that Kolb (2019) ascribes to monumental architecture in general.

72 This includes a small number of landscape features discussed in Data and Methods.

73 Discussed in Data and Methods.
regions comprising most of the data (referred to hereafter as the European Dataset). Results suggest two overlapping approaches to understanding differences in castles that can largely be discerned based on function and their position on the landscape, illustrating that even when the focus of castle study is on architectural features, landscape plays a central role in castle development.

<table>
<thead>
<tr>
<th>Region</th>
<th>Total</th>
<th>Unique Instances</th>
<th>With Incarnations</th>
<th>Medieval Castles</th>
<th>Early Modern/Converted Forts</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>247</td>
<td>391</td>
<td>192</td>
<td>100</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bermuda</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Cuba</td>
<td>11</td>
<td>13</td>
<td>0</td>
<td>12</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>37</td>
<td>65</td>
<td>41</td>
<td>3</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Iberia</td>
<td>43</td>
<td>79</td>
<td>51</td>
<td>19</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Mainland Italy</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>7</td>
<td>10</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>7</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Sicily</td>
<td>46</td>
<td>64</td>
<td>32</td>
<td>10</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Taiwan</td>
<td>7</td>
<td>10</td>
<td>0</td>
<td>7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>51</td>
<td>98</td>
<td>60</td>
<td>23</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>25</td>
<td>31</td>
<td>0</td>
<td>16</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1: Number castles in total and by region. Data broken up to see the number of unique instances and the number used for testing with different incarnations (single castles that have multiple temporal phases that can be parsed out). Note that Medieval Castles, Early Modern/Converted Forts (including presidios), and Other (fortified churches, missions, converted palaces, coastal towers, medieval palaces, converted baglios, converted museums, etc.) contain different temporal incarnations of the same castle.
3.2. Theoretical Background

Delving into the academic literature on castle studies, one is immediately struck by how most of the work written in the English language since the 1980s is within the postprocessual framework proposed by Coulson (e.g., 1979, 1991, 2004) and further expanded by Johnson (e.g., 2002, 2007a, 2007b, 2018). Rejecting earlier military-based frameworks for linear or evolutionary castle development (e.g., De La Croix 1972; Hogg 1981; Toy 1955), many British and American scholars have opted to focus on the symbolic, rather than the functional, aspects of castle design (cf. Askew 2016; also see Prior 2006: 1-26 for an overview). In their arguments they often cite features from British castles that hinder the physical use of defensive attributes (such as arrow slits that are impossible to use; cf. Johnson 2010: 192-198) as “proof” that many castles were never designed to be functional. However, these references rarely look for correlates beyond the confines of the British Isles – and sometimes northwestern France – with most examples coming from a period of relative
regional stability (see Liddiard 2005: Figure 35). Yet not all Anglo-American castle specialists feel that this paradigm shift has been appropriate. In fact, Platt (2007) has even gone so far as to suggest that castle studies have been hijacked by the Coulson-Johnson point of view.

Whatever one’s theoretical leanings might be, it is hard to say that this perspective has not constrained what is considered an appropriate analytical framework for castle studies in the English literature. Academic undertakings in other languages, such as Spanish (e.g., Catalán et al. 2014), French (cf. Bazzana et al. 1988), Italian (e.g., Maurici 1992; Toubert 1973), and Czech (e.g., Durdík 2005), are markedly more varied with insights into castle building that, though largely cultural-historical in nature, are much more cross-culturally applicable.74 Indeed, if one looks at what little literature on Japanese castles has been published in English (e.g., Schmorleitz 1974; Turnbull 2009) this becomes apparent. In fact, many of the ideas that have been proposed for Japanese castles are discussed in this work. Yet these parallels, and parallels between recent mainland European work and early 20th century English work,75 are often largely ignored in modern English language studies. When earlier English work is discussed, the authors often hold the earlier work as incorrect or ineffectual, but do not support this conclusion with proper scientific testing.

Recently, Kirk et al. (2020) have taken a more anthropologically comparative approach to castle studies, proposing that much of the variation in castles is not intrinsically

74 See, for instance, Quirós Castillo and Salazar (2018) and Quirós Castillo (2016) for discussions on incastellamento in northern Spain that would be comparable to developments in other parts of the Mediterranean.

75 Note that early 20th century English work was largely much more comparative, drawing examples from across Europe without focus on Britain in particular.
based on historical context but rather is tied to two key factors: (1) The castle’s social role in the House Societies Model (HSM, discussed below), and (2) Its placement on the landscape. In doing so, Kirk et al. (2020) have attempted to reorient English-language research away from a focus on the British castles of the eleventh through fourteenth centuries and towards a more broadly applicable, scientific understanding of castles as a cross-cultural phenomenon. Defining castles in the same way that this paper does, they suggested that these monumental, fortified residences exist on a spacio-temporal continuum as a behavioral adaptation taken by militarized elite classes the world over. Their results—a typology of eight different landscape-based classes—largely fit with many of the analytical standpoints taken by mainland European scholars today. Two trends in particular become clear from this approach: (1) That castles are most often located at the heart of commercial arteries, typically along major waterways that would have acted similar to modern interstate highways (cf. Kirk et al. 2020; Wickham 2016), and (2) That the development of castles at the center of fortified hilltop settlements, similar to models of incastellamento in the Mediterranean (cf. Bazzana et al. 1988; Boone 2009; Boone and Benco 1993; Quirós Castillo and Salazar 2018; Toubert 1973), represent an important aspect of castle building for most populations outside the British Isles.

Incastellamento is, of course, one of the great debates in European archaeology (cf. Augenti and Galetti 2018; Creighton 2012). Many scholars have speculated that medieval castle building may have had its roots in the agglomeration of settlements around hilltop

---

76 This may suggest that castles could have acted in a similar way to the toll booths of late 20th century America (cf. Painter 1956).
fortresses between the eighth and eleventh centuries,\textsuperscript{77} and it was initially believed that elite houses could even achieve feudal domination over dependent communities from these strongholds (cf. Boone 2009; Creighton 2012; Quirós Castillo 2016; Toubert 1973). However, similar patterns of castle development exist in non-feudal contexts as well, especially in Islamic Spain (cf. Bazzana et al. 1988; Boone 2009; Boone and Benco 1993; Glick 1995), putting the relationship between hilltop castles and feudal dominion somewhat in doubt, and suggesting a more universal cause for the development of these fortified hilltop settlements. Likewise, Kirk et al.’s (2020) landscape-based approach seems to suggest that, while \textit{incastellamento} may have played an important role in the social development of medieval Europe, it almost certainly was not the progenitor of medieval castles due to similar analogues in the deeper past (e.g., Greek Castles [cf. Cerchiai et al. 2002; Militello and Santoro 2006] and Iron Age Oppida [cf. Fernández-Gotz et al. 2014; Moret 2018]).

Naturally, the relationship between ancient strongholds and their medieval counterparts can be called into question as, even though castles are often built over earlier fortresses, establishing a continuity between the people who built them is frequently problematic. For instance, Maurici (1992) points out that while many Sicilian castles are sited over earlier strongholds, most seem to experience periods of abandonment between the classical and medieval eras.\textsuperscript{78} Nonetheless, the behaviors that went into castle construction are often remarkably similar, leading Kirk et al. (2020) to suggest that, based on dates pertaining to the earliest possible foundation of castles, there seems to be a sort of cyclical

\textsuperscript{77} Also see Francovich and Hodges (2006) for an analysis of fortified hilltop settlements without a focus on castles.

\textsuperscript{78} This may be partly based on local conventions based on little evidence for habitation being interpreted as abandonment.
favoring of certain locations over time that can likely be attributed to changes in the roles and responsibilities of elite houses. Building on this, it seems likely that castle use and design also change over time in relation to temporally differing landscape preferences, making it exceedingly important to assess the development of castles through multiple theoretical and analytical standpoints that evaluate castle building as part of a continuum.

3.3. Research Questions

In this paper, we seek to explore the development of castles through an architecturally based approach. While landscape can act as a great unifier, architectural features, however broadly defined, can potentially do more to highlight differences between regions and over time. Thus, in this study we ask:

1. Do castles cluster into logical groups based on broad, architectural features?
2. Does regional variation come into play (i.e., are English castles different from Sicilian castles and are both different from Japanese castles?)
3. Do castle groupings based on architecture show change over time?

3.4. Castles as Houses

As fortified elite residences, we argue that castles, and the aforementioned research questions, are best approached through the lens of the HSM (Kirk et al. 2020). Originally proposed by Claude Lévi-Strauss in his Way of the Masks (1982), the HSM has garnered considerable archaeological attention since the 1990s for its utility in delineating social relationships through the archaeological record (e.g., Beck 2007; Chesson 2003; Gillespie 2000; González-Ruibal and Ruiz-Gálvez 2016; Joyce and Gillespie 2000). Within this model, the House is defined as a social unit that acts as an individual in terms of land, status, and property (Kirk et al. 2020; Joyce and Gillespie 2000; Lévi-Strauss 1982). Through the
entanglement of humans, things, and the environment (cf. Hodder 2020), the estate inhabited by the House becomes its material manifestation (cf. Joyce and Gillespie 2000; Kirk et al. 2020), which both changes to meet the needs of subsequent generations and constrains what it is possible for them to accomplish.

Yet, while Houses act as individuals in respect to agency (cf. Dobres and Robb 2000), they differ from the typical understanding of agency in that they are conceived as immortal in the minds of those who claim allegiance to them.79 This immortality is maintained through rules that keep land and wealth consolidated (e.g., primogeniture; see Boone 1983), often leading to a surplus of resources within the House. Given enough surplus, value-laden monumental residences will appear on the estate,80 which often bear totems, mottos, and architecture symbolic of the House’s identity and role in society. While symbolic, however, much of the architecture embedded in these structures is also functional, designed to meet the needs of the House. For instance, if a House’s role in society is to protect lesser Houses, as was the case with the medieval nobility of both Europe and Japan, defensive features will arise to help members of the House carry out their duties. When built by Houses that hold comparable roles within their respective societies, the result is typically the construction of residences that are remarkably similar, such as castles.81 Modification and variation,

79 As we are looking at general patterns, we also acknowledge but do not actively investigate that while Houses act as individual agents, they are also comprised of actors/agents with sometimes competing interests that can run counter to the overall position of the House in a particular social context.

80 These residences range in form and function from the Long Houses of the Kwakwaka’wakw discussed by Lévi-Strauss (1982), to the castles of medieval Europe.

81 Of course, environmental constraints such as available building materials must also be taken into consideration.
therefore, are best understood as resulting from nuances in specific responsibilities and change in the social roles of Houses over time. These changes often reflect socio-historical events, and can often be measured in terms of investment into what Kirk et al. (2020) refer to as the Three Pillars.

In order to survive and propagate intergenerationally, Houses – and the societies they exist within – must have both biologic and material features that reflect three central roles or pillars (Kirk et al. 2020). These include: (1) Defense, (2) Social Reproduction, and (3) Production, and were used to describe the roles of individuals within medieval societies by Georges Duby (1982) with his Three Orders. Here, we argue that these pillars must also be seen in terms of social maintenance for the House. In the Noble Houses of early medieval Europe, for example, primogeniture dictated that the eldest son take on the military role as heir to the estate, while younger sons were channeled into ecclesiastic or purely military roles. In less wealthy Houses this may have even been taken a step further, with sons beyond the fourth or fifth forced to become part of the laboring class if their families did not have sufficient capital to ensure more prominent roles for them in society. These divisions served to keep both material and immaterial wealth concentrated within the estate, and demarcated the social roles and responsibilities of children by birth order and means.

In a parallel manner to the social distinctions made by primogeniture, early medieval European castles were often built to highlight the militaristic role of the son who would

---

82 The Three Orders originally divided medieval French society into those who fight, those who pray, and those who toil (Duby 1982).

83 At the dawn of the High Middle Ages (10th-12th centuries), first-born sons were often sent to fight in foreign wars to keep the head of House safe until his demise, at which time the heir would return.
inherit, downplaying their other functions. That is not to say that these castles were exclusively focused on defense. Elements of social reproduction necessary to convey culture could still be seen in features like chapels and frescoes on castle walls, and elements of production were often seen all around the castle. Yet these were not the focus of the castle in the early part of the High Middle Ages (10th-15th centuries). It was only over time, as regions became more stable with the rise of centralized power structures replacing localized authority (cf. Kirk 2017), that the military roles of the eldest son became somewhat honorary and human-thing-environment entanglement (cf. Hodder 2020) lead to an accentuation of the non-defensive roles of castles. This centralization of authority largely came about through competition between local elites leading to a consolidation of power into fewer Houses with more resources available for signaling status (cf. Church 2012; Wickham 2016; Wilson 2016).

Furthermore, this consolidation of power into a few Houses, and the elaboration of their residences, can be seen cross-culturally, bearing equal importance for understanding the rise of the Shogunate (cf. Deal 2006; Friday 2004; MacFarlane 2003) as it does for understanding the rise of certain noble Houses in Europe (cf. Dewald 1996; Kann 1974; Wilson 2016). 84 Thus, in viewing the development of castles as the result of competition between Houses, at least in part, castle building becomes an adaptation to socio-cultural and environmental needs common to preindustrial societies the world over.

84 Perhaps the best example of this can be seen with the rise of the Hapsburg Empire (cf. Kann 1974).
3.5. Hypotheses

Examining the development of castles based on broad architectural features over the past two thousand years from the framework illustrated above, we anticipate that castles will:

1. Group together cross-culturally, independent of divides that have been imposed on them geographically.

2. Illustrate chronological changes indicative of regional competition between Houses.

3. Relate to landscape in terms of how changes in locational preference correspond with broad architectural changes.

3.6. Data and Methods

To investigate these hypotheses, we used two k-means cluster analyses based on the presence/absence of 217 architectural features found in a sample of 247 castles from around the world, comprising the World Dataset. Of these, 177 castles were from four specific regions in Europe; these were used in both the World Dataset and a dataset of their own, referred to as the European Dataset.

3.6.1. Architectural Data

Architectural features included were those considered both: (1) Reflective of one of the Three Pillars, and (2) Cross-culturally common in castles. Examples include such things as arrow slits, outer walls, and drawbridges (defense), chapels, frescoes, and nook seating (social reproduction), and blacksmith forges and kitchens (Production). Additionally, a small number of neutral features, largely pertaining to construction materials, were included to see if regional variation was somewhat driven by available resources. Feature selection

85 For the total list of features and castles used in this study, access our data at https://doi.org/10.5061/dryad.zpc866t7v
was done heuristically, including as many broad categories as the authors could identify at the onset of data collection. Likewise, features that were highly specialized and seen only in one particular region were not considered, though features common to Europe but not Asia were. As some castles had multiple temporal phases that could easily be parsed out, we entered multiple datapoints for them, bringing the total sample size to 391 castle “incarnations,” as we call them, with 306 for our European Dataset. For consistency, and because some features – such as barbicans – are often ill-defined with examples differing widely across socio-cultural/regional divides, all data were collected by a single analyst, Scott Kirk.

Data were collected by first conducting a representative review of reference materials (academic and grey literature, virtual tours, etc.), recording features present in a spreadsheet based on these references, and then ground-truthing a majority (90%) of the structures to assess the accuracy of these data. On-site inspections were important, as many features described in the references for a given castle were not currently, or clearly, present, particularly for the English sample. These features were often cited as “necessary” for castle operations, with potential locations ascribed to them, but upon visitation no evidence was found. Due to the possibility that these features could have been located in associated villages off castle grounds (indicative of a patron-client relationship between the elite House

---

86 To be clear, a castle incarnation is the castle as it stands during the century it is interpreted as representative of. Some castle incarnations are the last century of renovation, others are the centuries in which new wings are built making the older and newer incarnations viably separate.

87 This data was revisited and expanded on shortly before publication of this paper.

88 This was sometimes based on comparative data but, at times, seems more attributable to the fancy of mid-20th century scholars and local communities.
living within the castle and one of its dependents), those features without sufficient evidence to at least suggest their existence were disregarded for this study. A small portion of recorded features (n=6), such as prominence over the landscape and direct association with a river, were more related to landscape than architecture. However, as these features were selected by castle builders as an integral part of castle placement and design, were often modified, and were necessary for the House to meet its needs, such an overlap was acceptable given the research interest. Furthermore, other features, such as the construction of portions of castles into bedrock and the use of internal farmland, were also governed by the landscape selected by castle builders, thus highlighting the inextricable link between architecture and landscape.

3.6.2. Castle Selection

Castles used in this study—like features included—were also selected heuristically from diverse contexts the world over. The selection process was largely governed by three factors: (1) Availability of information, (2) Public access for ground-truthing, and (3) Opportunity to visit. Not all castles studied, or even all castles visited, were used in this study. Only those castles that had appropriate/representative data were used. The four regions of Europe—where most data were collected—were selected as representative of

---

89 It should go without saying, however, that if interpretations were based on archaeological or historical evidence with nothing visible upon visitation, such as historic records indicating a room for a blacksmith and provisions for a forge with no extant remains having ever been found, they were still included.

90 Also note that different iterations of the cluster analyses were performed with comparable results, suggesting a certain robusticity to our study.

91 Those castles that were more than only their foundations and had literature describing what has been found archaeologically. In short, there needed to be enough data for a representative recreation to be made without a reliance on imagination.
Europe because they represent broad swaths of the subcontinent with demonstrably different cultures and landscapes. Although traditionally castles are studied within temporal confines (e.g., medieval, renaissance, etc.), this study includes quite early examples, such as the Castello Eurialo outside of Syracuse, Sicily, Italy, and modern examples as well, such as Deal Castle in England.\textsuperscript{92} We argue that this is necessary to explore the development of castles as immortal representations of the House. In essence, even castles that have been converted into manors or museums have preserved aspects about the Houses who built them, and how those Houses changed over time. Furthermore, because the lines between the late medieval castle and the early modern chateaux are often blurred (see Creighton 2012; Kirk et al. 2020),\textsuperscript{93} we see temporal divisions, in this case and for the purposes of our study, as somewhat arbitrary.\textsuperscript{94} To better explore the behavior of castle building (i.e. the fortification of elite residences for a militarized ruling class), rather than its historic context, certain examples of fortified elite residences were also included that, while castle-like, are typically not considered castles in their own right (see Figure 3.2). These include Early Modern Fortresses, such as the Castillo San Marcos in Florida,\textsuperscript{95} and Early Modern coastal towers,

\textsuperscript{92} The presence of officer’s quarters allows for Deal Castle to be considered a fortified elite residence, and its development based on changes in state-owned castles further strengthens this argument. In essence, Deal Castle was still a royal House run by the king or queen’s representative.

\textsuperscript{93} Early Modern Chateaux are here seen as when the more defensive elements of the castle start being removed. Windows may be inserted into walls that are lower to the ground, outer walls may be slighted to provide better views of the surrounding landscape, etc.

\textsuperscript{94} Of course, that is not to say that all temporal divisions in all studies are arbitrary. As always, context plays a key role in anthropological and archaeological investigations.

\textsuperscript{95} Note that many Early Modern Fortresses are still referred to as castles by Spanish and Italian scholars and the people who built them (as is evident by the prefix castillo/castello).
such as the Torre Lingy, in Trapani, Sicily. While Early Modern coastal towers are often a far cry from what people think of as castles, they are not altogether dissimilar from some of the Scottish tower houses that are often considered castles and, at times, are more like mini-fortresses in and of themselves. For instance, the Castle of Cofano, in western Sicily (built in the mid-16th century),96 while considered a castle, is not much larger or functionally different than the tower of Chorrera, in Havana, Cuba (built in the early 17th century). Likewise, this dataset includes a small number of European fortified churches in Spain, Sicily, and Romania, as well as Spanish colonial missions and presidios in Northern Mexico and the American Southwest. Again, while not considered castles proper, they exist as fortified elite residences sharing many of the same features as medieval European castles (cf. Harrison 1990, 2004; Quesada 2010; Williams 2004).

96 The castle of Cofono was not actually included in the data for this study based on lack of information on the interior.
Figure 3.2: Monumental fortified residences other than traditional medieval European castles included in this sample. Top left- Himeji castle, top right-Castello Sant’Angelo, Licata, bottom left- Torreon Chorrera, and bottom right - Gran Quivera Mission

It could be argued, of course, that these later structures should not be included for a variety of reasons, foremost among them that they do not represent fortified elite residences in the same way that the medieval castles do. However, we would argue that this is not the case. Even the most modern, militarized constructions, such as El Morro in Havana, Cuba, typically have private quarters for officers and their families.97 Furthermore, Spanish missions are, conceptually, “Houses of God,” with residential components for the priest who administers to both God and His flock. Likewise, not all medieval castles acted in such a formal way, with many being held by a castellan for a Noble House that rarely, if ever,

---

97 Apart from Fort Dorchester in South Carolina.
visited. Therefore, these later structures were included to test our hypothesis that castle building is a behavior seen cross-culturally with broad similarities. We argue that, in order to adequately investigate this, we needed a representative set of structures that were castle-like but not castles in the traditional sense. This enabled us to examine if there was, in fact, an inherent distinction in mathematical groupings between castle-like structures and castles proper.

3.6.3. Potential for Bias and Remedial Actions

As castles typically change in configuration over time, sometimes even generationally, finding structures representative of the early part of the High Middle Ages, or getting at an original design, was often extremely difficult. Therefore, while castles were typically recorded as representative of the century in which the last major renovation was carried out, relative importance in data collection was ascribed to castles that were abandoned or had clear components dating to before the 13th century. Only those castles with renovations indicative of new construction apart from an older core,\footnote{As was the case with Dover Castle, which was successively added to over the past millennium, leading to the current configuration that shows structures from World War II in the outermost parts, while leaving the medieval keep in its center relatively intact.} or the renovation of single wing that left alternate parts of the castle intact,\footnote{As was the case with Krivoklat Castle in the Czech Republic.} were included using multiple data points representative of more than one century. Likewise, the level of preservation for any given feature/building was also problematic for accurate data collection. Certain features, such as outer walls, preserve better than others, such as frescoes. And, as with this example, differential preservation largely fell along the lines of defensive vs. social reproductive or productive, with more defensive features preserved than any other type. However, we believe...
the use of presence/absence data within broad, representative categories, as opposed to
feature count within narrower categories, helps to negate this bias in that, typically, many of
the categories that are most affected by preservation bias are often known to have existed
through historic or archaeological investigations, though the specifics are often murky.
Finally, examining castles in aggregate (as opposed to individually), and the large sample
size created through the use of castle incarnations also help to validate our results in that,
while an individual castle may be inaccurately encoded, the general pattern should be the
same.100

3.6.4. Analysis

Data were analyzed using k-means cluster analyses following the algorithm of
Hartigan and Wong (1979) in R (R Core Team 2020).101 We began our analyses by grouping
our two datasets (the World Dataset and the European Dataset) into between 2 and 12
clusters. While testing for the optimum number of clusters in archaeological contexts is often
done by using elbow graphs (e.g. Ladefoged and Pearson 2020), this method demonstrated
no clear optimum number of clusters for our datasets.102 We then moved on to numerical
testing methods using the R package NbClust (Charrad et al. 2014), which resulted in the
calculation of eight indices including: Hartigan’s (1975), C-Index (Hubert and Levin 1976),
Ball’s (Ball and Hall 1965), point-biserial (Ptbiserial; Milligan 1980, 1981), Dunn’s (1974),
Gamma (Baker and Hubert 1975), SDbw (Halkidi and Vazirgiannis 2001), and Gplus (Rohlf

100 Note that we also performed analyses on modified datasets and produced roughly the
same results, suggesting that our tests were robust enough to account for error.

101 This corresponds to what was done by Kirk et al. (2020).

102 Note that we tested to see if larger numbers of clusters (up to 100) showed different
results. They did not.
These specific indices were chosen to minimize the number of calls to NbClust and streamline repeated testing by utilizing as many supported indices as practical. We also wished to test indices that made different assumptions about the shape of the data, in order to see if any unascertained factors were at play. Once we determined the optimum number of clusters through the use of Ball’s Index, analysis of scatter plots, and qualitative interpretations, biplots were constructed which also derived Principal Component Analyses (PCA) for each of our datasets. These were then mined for eigenvectors to examine cluster results more closely.

3.7. Results and Interpretations

Results for our study show two distinct but thematically overlapping methods for categorizing castles based on architectural features. Both seem to correspond heavily with castle placement on the landscape, grouping castles into broad categories that do not clearly differentiate between regional or functional divides.

3.7.1 Optimization and Principal Components

Of the eight tests performed for optimization (Table 3.2), we argue that only three produced reliable results since two indices – SDbw, and Dunn – were predicated on the assumption of compact, separate clusters which do not appear in our datasets, and two – Gamma and Gplus\textsuperscript{104} – tended to go to the maximum value when allowed to go beyond 12 clusters.\textsuperscript{105} Thus, the most reliable indices for our research questions appear to be Hartigan’s,

\textsuperscript{103} These tests were only run through 12 clusters. We suggest that more than 12 clusters would have proved difficult to interpret and potentially meaningless in their utility.

\textsuperscript{104} Dunn would also frequently go to the maximum value.

\textsuperscript{105} Indicating poor discriminatory value.
C-index, Ball, and PtBiserial, which typically selected three as the optimal number of clusters. Interestingly, in every iteration,\textsuperscript{106} Ball’s Index would indicate three clusters as optimal, while Hartigan’s and PtBiserial could vary by indicating either three or four depending on iteration.\textsuperscript{107} Furthermore, as Ball’s index allowed for more overlap between clusters, with the most reliability through iteration, we argue that this index best reflects castle clusters since their architectural configuration was, at least partly, governed by individual tastes and preferences which may have led to a degree of overlap that was hard to mathematically parse out in the other indices.

<table>
<thead>
<tr>
<th></th>
<th>Hartigan</th>
<th>Cindex</th>
<th>Ball</th>
<th>PtBiserial</th>
<th>Dunn</th>
<th>SDbw</th>
<th>Gamma</th>
<th>Gplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Data</td>
<td>4</td>
<td>MAX</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>11</td>
<td>MAX</td>
<td>MAX</td>
</tr>
<tr>
<td>European Data</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>9</td>
<td>MAX</td>
<td>MAX</td>
<td>MAX</td>
</tr>
</tbody>
</table>

Table 3.2: Analyses done on potential clusters of 2-12. Max refers to the tests simply selecting the highest number of clusters.

Additional evidence for three clusters being optimal was found through visual interpretation along more qualitative and semi-quantitative lines. For instance, scatter plots of the first and second principal components demonstrated the largest degree of discrimination at three groups, with test runs beyond this illustrating much more overlap. Likewise, three classes were also the easiest to interpret from a human standpoint. To understand which architectural features were instrumental in differentiating clusters, a Principal Component Analysis was used which helped to visualize the maximum variance between interrelated components (Pasini 2017). This was primarily accomplished by examining the biplots of the first and

\textsuperscript{106} By this we mean using both datasets, condensed versions of both datasets using different features, test data, and allowing for more clusters.

\textsuperscript{107} C-index served as a “minority report,” rarely going to the maximum tested number of clusters, but also rarely agreeing with any of the other indexes.
second principal components with the ten greatest-magnitude eigenvectors, to see which variables had the most influence on each cluster (Figure 3.3)\textsuperscript{108}. Both datasets demonstrate clear trends resulting in the creation of two different, but largely overlapping, typologies that make for interesting interpretation of castle development.

Figure 3.3: Scatterplots with the ten most significant PCA eigenvector loadings.

3.7.2. The European Typology

Using the European Dataset focused on the four regions of Europe with the most data, and three clusters for the reasons discussed above, the results of the k-means analysis can be typed as:

\textsuperscript{108} This was performed on the same data as the k-means cluster analysis, and was not used to dimensionally reduce those data prior to that analysis.
3.7.2.1. Defensively Focused Castles:

Most structures within this type are hilltop fortresses, architecturally oriented towards defense, and often surrounded by communities that would have been fortified for much of the European Middle Ages. These castles would largely fit with models for *incastellamento* common in the Mediterranean,\(^{109}\) with examples including the first incarnations for the castles of Erice (Figure 3.4, top left) and Caccamo in Sicily, as well as Jaen in Southern Spain. While common across Europe, it seems that the UK has fewer examples, though Chepstow and Guildford are included and similar enough to what is found in other parts of Europe. Of course, these examples were all initially built by invaders hoping to consolidate territory, seeming to suggest that these structures and locations are highly desirable as footholds for conquerors (cf. Kolb et al. 2019). Thus, it may be that rather than *incastellamento* occurring organically during Early Middle Ages, as Toubert (1973) suggests,

---
\(^{109}\) Not to mention castle Types 6 and 7 in Kirk et al.’s (2020) typology.
these castles might have arisen out of strategic necessity, more like what Prior (2006) argues in *Norman Art of War*.

Within the PCA, one of the features that served as a predictor for inclusion into this group was that the structure is in a “currently ruinous state.” If our interpretation that these castles were often used for holding territory, prior to the development of stable kingdoms, then the inclusion of this attribute may indicate that this typology is sensitive to chronological changes that castles go through in relation to socio-historical events. Nonetheless, there are irregularities in this type. For instance, the early incarnations of Aljaferia, in Northern Spain, and Eynesford, in Southern England – which are both low-lying structures near rivers – fall into this group. We believe these irregularities are somewhat spurious, and largely based on few extant remains that point to: (1) A larger focus on defense, and (2) The state of preservation (i.e., the defining features of this type).

### 3.7.2.2. Showcase Castles:

Structures found in this group were largely those with a higher focus on palatial elements. These were definitively built to signal that the Houses within them belong firmly on top of the social “pecking order.” They include such examples as the Zisa in Palermo, Sicily, the Alhambra in Granada, Southern Spain, and Cesky Krumlov, in the Czech Republic (Figure 3.4, top center). Many belong to royalty, and while some are only lightly fortified, the use of landscape often makes up for architectural shortcomings (such as with Cesky Krumlov). Furthermore, architectural elements included in these structures — such as arrow slits, gun ports, and isolatable tower keeps — often harken back to the House’s role in former military enterprises through citation (cf. Mattson 2016), underscoring that while
structurally defensive elements might not be entirely functional, those living within the castle are fully prepared to defend it.\textsuperscript{110}

3.7.2.3. Water-way Castles:

These are most often low-lying castles, associated with rivers and coastal settings. Typically, these structures have more elaborate, palatial elements to them. They are the type of castle that is most common in the UK, and are exemplified by such structures as Flint, in Northern Wales, and the Tower of London (Figure 3.4, top right). However, that is not to say that they do not exist in other regions or serve to separate the UK from the rest of Europe. For instance, the Czech example of Cheb, in western Bohemia, and the Castello Ursino in Catania, Sicily, both demonstrate a certain amount of similarity with the castles of the UK. In essence, the perceived division between the castles of the UK and those of the Mediterranean or central Europe seems to be largely based on \textit{apriori} belief, landscape, and environmental differences. Therefore, regional variation in the number and type of castle present might go a long way in helping to explain why some English scholars have such a radically different view of castle studies from scholars who focus on the mainland,\textsuperscript{111} such as the authors of this paper.

3.7.3. The World Typology

When more cross-culturally comparative data was added to the sample, an obvious temporal division between structures became apparent. Again, Ball’s Index indicated that

\textsuperscript{110} Whether or not they can do this in reality is an entirely different story.

\textsuperscript{111} By this we are referring to the English perspective that each castle must be studied in its unique context rather than within a developmental model. Essentially, within the British sample in this paper and within Kirk et al. (2020) there seems to be little evidence for large scale developmental patterns in contrast to what is observed on the European mainland.
three clusters were the optimum configuration,\textsuperscript{112} with similar separation between clusters seen in scatter plots and easily interpretable types emerging just like with the European Typology. However, within the World Typology it seems that Water-way castles from the European Dataset were largely redistributed between Defensively Focused Castles and Showcase Castles, while a new type emerged centered around Early Modern Fortifications. The cross-cultural typology is as follows:

3.7.3.A. Border Control Castles:

For the most part, this type is comprised of Early Modern Fortifications and Coastal Towers, such as Deal Castle in England, the Castillo San Marcos in Florida (Figure 3.4, bottom left), and Torreon Chorrera in Cuba. However, some examples – such as Cortegana and Evoramonte on the Spanish/Portuguese border – attest to the inclusion of medieval designs, suggesting that Border Control Castles are still, fundamentally, castles and not a new form of monumental fortification. When examining the results of the PCA biplot and eigenvector loadings, one of the major determining factors in placing a castle in this group is the presence of “structural elements built to support cannon.” Thus, it seems that technological progression, rather than general defensive behavior, is what drives the separation of this group apart from earlier examples.

3.7.3.B. Defensive Fortresses:

These castles are largely a combination of Defensively Focused Castles and Water-way Castles from the European Dataset with only two exceptions. They are mostly comprised of those castles that were built for defense, and include such structures as

\textsuperscript{112} Similarly, three tests did not find an appropriate differentiation between clusters while Ptbiserial agreed with Ball’s Index for the selection of three clusters.
Calatubo, in Northwestern Sicily (Figure 3.4, bottom center), Guadix in Southern Spain, and Beeston in the UK. Unfortunately, this is largely an amorphous group with the overriding factor seeming to be that they are built more for defense than costly displays of wealth related to the House’s position within society. Interestingly, most of the missions and presidios included in this sample seem to fit within this cluster. We argue that this is likely due to scarcity of local resources, leading to the consolidation of different types of monuments into single forms. In the case of missions, for example, this consolidation would include the monumental residence of an elite House (i.e. a religious leader and his dependents), town walls, and the community church into a single structure. Thus, inclusion in this group may imply a certain degree of similarity between medieval castles and frontier fortifications for an underlying reason, the need to manifest each of the Pillars with a limited set of localized resources.

3.7.3.C. Palaces:

This group combines Showcase Castles and Water-way castles with no exceptions. All castles included here are more elaborate than their counterparts in the World Typology. They include such examples as Alnwick in Northern England, Manzanares el Real in central Spain (Figure 3.4, bottom right), and Frydlant in the Czech Republic. They are often associated with rivers or the coast, which likely speaks to how the Houses who built them acquire the wealth needed for the elaborate residences included here.

3.8. Discussion

Both typologies provide a lot of insight into the behaviors behind castle building and their changes over time, suggesting three types for each fitting slightly different criteria. We argue that this implies vernacular differences people commonly ascribe to castles based on
temporality and/or regionality are rather ephemeral (see Creighton 2012; Kirk et al. 2020). In many ways, it seems that landscape defines the castle more than architecture. Thus, the placement of a castle is a good predictor for what sorts of features a castle might have and how elaborate it could potentially be. Yet, there is more to it than that, since the needs of the House are met through the interactions between architecture and landscape.

3.8.1. Relation to the Three Pillars

As the physical manifestation of the Houses that built them (cf. Joyce and Gillespie 2000; Lévi-Strauss 1982), castles need to have components that fulfill certain functional roles assuring continued survival over generations (Kirk et al. 2020). Just as people serve as fighters, priests/teachers, and laborers in medieval societies (cf. Duby 1983), castles must have defensive elements, cultural signifiers, and productive elements built into them as well. As the House changes over time in relation to what is needed, the castle may change to reflect that culture-history. These changes appear more prominently in the architecture of the House, allowing for the inhabitants to renovate in a way that allows their estates to change between types over time; however, landscape changes less, giving clues as to the original use of the residence built upon the estate. When examined within the typologies presented here, we argue that the European Typology, in particular, demonstrates a strong relationship with this theoretical concept.

While all castles are built and maintained by a militarized ruling class, the European Typology demonstrates that Houses within that class focused on different pillars, thus demonstrating more variability than is commonly attributed to them. Naturally, Defensively Focused Castles were built by those focused on the protection of the populace, while Showcase castles were built by those with a greater focus on social reproduction, keeping the
community together through strong displays of wealth, prosperity, and learning. Water-way Castles, by contrast, are those that served the strategic function of extracting wealth from the land, and therefore focus on production. We would hypothesize that these castles are most often held or commanded by lesser Noble Houses, and present a means for them to elevate their social status in society, which would provide sufficient explanation regarding how some of these structures become incredibly elaborate over time.

Likewise, looking across the dataset, one can see that most regions have relatively proportionate numbers of castle types with the exception of the UK, which is dominated by the Water-way castle. There are several potential reasons for this, not least of which that England is an island with abundant interior waterways. However, the implication here is that, based on consistency within the types of castles found on the British Isles, the Houses of the English elite (and potentially the Welsh and Scottish though more work should be done to confirm this) may have held a remarkably higher level of standardization in their social roles than seen elsewhere in Europe.

3.8.2. Change over Time in the European Dataset

Because locational preferences change over time (cf. Kirk et al. 2020), and not all castles stay the same type for their entire use-life, broad patterns emerge indicating shifts in castle type favorability. The general pattern seen within this typology is that of three largely overlapping bell curves (Figure 3.5, left). Defensively Focused Castles present some of the earliest examples, increasing in number over the medieval period and peaking in the 15th century. It would seem, at least to some extent, that *incastellamento* did not end in Europe until after the close of the Middle Ages, as these defensive hilltop fortresses continued to be built and renovated throughout this period, and even into the Early Modern Era. Water-way
Castles emerge as the next rather uneven bell curve, appearing in the 12th century and arguably maintaining a high degree of importance between the 14th and 17th centuries. In reviewing the subset of UK data (Figure 3.5, bottom right), one can see that this pattern may be partially driven by their strong presence in the UK. Lastly, Showcase Castles do not seem to present strongly until the 16th century and continue to be renovated through to the present, demonstrating a left-skewed distribution indicative of how castles have been renovated into chateaus and become museums.

Of course, differences in region are not the only way of looking at these trends. Splitting the dataset between state-owned and non-state-owned castles, one can see that it is the non-state-owned castles driving these patterns. Indeed, the castles of the state (Figure 3.5, top right) show remarkable variability over time with no true patterns to their construction and renovation. In contrast, those castles owned by other entities (i.e. Noble Houses, Holy Orders, Scottish Clans, etc.; Figure 3.5, center right) demonstrate a much clearer separation between bell curves. We believe this pattern illustrates the process by which localized land-owning elites began to lose their active roles in internal regional conflicts, transitioning into roles where extraction of local resources from the land became a more viable option for wealth than plunder, and then finally garnering enough wealth to compete with one another in displays of social signaling (cf. Church 2012).

---

113 More graphs can be seen in our supplemental data: https://doi.org/10.5061/dryad.zpc866t7v

114 Interestingly, while this has been discussed in the English literature (e.g. Johnson 2007), it is not what is seen in this dataset.
Figure 3.5: Castles from the European Typology demonstrating temporal trends. Clockwise: the total European Dataset on the top left, a subset showing just the temporal patterns in state-owned castles on the top right, a subset showing the temporal distribution of castles belonging to non-state entities including individual noble Houses, Holy Orders, Clans, etc. on the center right, and a subset showing both state and non-state castles in the UK on the bottom right.

3.8.3. Change over Time in the World Dataset

Similarly overlapping bell curves are present in the World Dataset as well (Figure 3.6, top left). Again, Defensive Fortresses represent the earliest examples that peak during the 15th century and then suffer a sharp decline in construction and renovation not seen in the European Typology. Palaces, in this case, began to appear in earnest around the 14th century and peak in the 17th century. Finally, Border Control Castles began to appear in the 16th century and then peak in the 18th century. The transition between Defensive Fortresses and Border Control Castles, we argue, was largely due to two factors: (1) Widespread introduction of gunpowder and the need to adapt accordingly with both offensive and defensive technologies (cf. Hogg 1981; Pentigill 1979), and (2) Use of colonial landholdings.
as – ostensibly – testing grounds for the newest military designs and technologies.\(^{115}\)

Furthermore, when split between state and non-state castles (Figure 6, bottom left and center), there seems to be opposing patterns of investment, with the castles of the state investing in both Defensive Fortresses and Palaces until the 16\(^{th}\) century when that investment turns heavily towards Border Control Castles, while those of non-state entities largely transition from favoring Defensive Fortresses to favoring palaces. This latter transition corresponds with a shift from localized to centralized authority, which would have largely defanged landed elites (cf. Kirk 2017), prohibiting conflict at the local level.

Figure 3.6: Castles from the World Dataset showing temporal trends. Clockwise: The total World Typology on the top left, a subset including the castles of the Spanish Empire on the top right, a subset including the castles of the British Empire on the center right, a subset including the castles of the Czech Republic on the bottom right, a subset including all non-state-owned castles on the bottom center, and a subset showing all state-owned castles on the bottom left.

\(^{115}\) For instance, the fortifications of Havana, Cuba and San Juan, Puerto Rico were constantly being modified to fit with the most advanced military theories of the day (cf. Chartrand 2006; Niglio 2014; Zuniga 2004), and the
These general patterns are largely reflective of the transition from kingdom to empire that occurred across much of Europe between the 16th and 19th centuries. Examining how these patterns break down in imperial contexts, one can see that the Spanish Empire (Figure 3.6, top right) shows the clearest transition from the Defensive Fortresses, which would have been used in the Reconquista, to a heavier investment in Border Control Castles; while the castles of the British Empire (Figure 3.6, center right) seem to demonstrate much more variability. This division may be due to a more directed approach towards empire building taken by the Spanish Empire in contrast to a more laissez-faire attitude taken by the British. Nonetheless, the Czech Republic (Figure 3.6, bottom right), part of the Holy Roman Empire but with no clear overseas ambitions, demonstrates a clear right-skewed distribution of Defensive Fortresses, a left-skewed distribution of Palaces, and no Border Control Castles.

3.8.4. Hypothesis Testing and Utility

While these analyses demonstrate clear transitions over time, and suggest a relationship between castle type and landscape, the exact nature of this latter association remains rather vague. Predicting if a particular castle will fit into a certain cluster within either typology is often rather difficult if it does not match an archetype. As demonstrated by the trouble many of the cluster optimization tests had in defining different classes, it seems a large number of castles fall into a grey area between groups.\textsuperscript{116} While the three classes within each typology used here presented the most logical number of groups from any of our tests, it may be heuristically beneficial to explore further refinements. For instance, if one were to desire a quick categorization of castles, one may be able to extrapolate from these results that the more qualitative characterizations of Hilltop Fortresses, Showcase Castles, Water-way

\textsuperscript{116} This is part of why Kirk et al. (2020) suggest castle building occurs on a continuum.
Strongholds, and Border Control Points are infinitely more practical. Yet, this categorization would lack the quantitative justification that we argue our interpretations possess.

Nonetheless, determining an appropriate typology for castles seems to be largely reliant on research questions and points of discussion. For the purposes of this paper, we believe that our findings support our hypotheses that: (1) Castles group together cross-culturally irrespective of regional or linguistic divides, (2) There are certain chronological phases to castle development, with changes seeming to indicate regional competition between Houses, and (3) These chronological phases loosely relate to changes in landscape preferences. Each of these topics could be further examined in papers of their own, but generally seem to conform with ideas put forth about increased ostentation in Houses following the 16th century (cf. Johnson 2007; Kirk et al. 2020), ideas pertaining to incastellamento (cf. Augenti and Galetti 2018; Boone 2009; Boone and Benco 1993; Glick 1995; Quirós Castillo 2016; Toubert 1973), and a shift towards increased centralization and border protection (cf. Clements 1999, Hogg 1981, Kirk 2017; Maurici et al 2008). And all this is in addition to demonstrating no clear distinctions between the structures included here based on vernacular, temporal, or regional distinctions – providing a typology that picks up on trends already discussed in the literature that does not rely on culture-history in its foundation. Thus, for the purposes of this paper, no further refinements were required.\footnote{On a cautionary note, the authors want to stress that, however refinements are made, they must be done with logical constraints. For instance, refining the typology to better reflect divisions in England and then extrapolating to the whole of Europe without quantitative reasons would not be appropriate.}
3.9. Conclusion

While this study has, in many ways, gone against the grain of contemporary English language castle studies – which tend to take a more postmodern approach towards extrapolating meaning from castle design (e.g. Askew 2016; Coulson 2004, 1991, 1979; Johnson 2002) – it is not without precedent. The use of “new,” data-driven approaches\textsuperscript{118} to castle studies have become increasingly popular, largely due to the increased availability of geospatial software packages like ArcGIS (e.g., Kirk et al. 2020; Kirk 2017, 2016; McManama-Kearin 2013; Swallow 2016) supporting emerging geospatial analytical methodologies. While this study does not exactly follow the geospatially oriented trend, it does follow a precedent set by Mathieu (1999), who also used well-established mathematical formulae to study castles in a new light. Using k-means cluster analyses on two separate architectural datasets, we argue that: (1) Castles fall into roughly three groups indicative of either the marriage of landscape and function (European Typology) or technological change over time (World Typology), (2) Regional variation in broad architectural patterns for castles have little effect on the outcomes of cluster analyses, and (3) Larger, cross-cultural samples show greater temporal variation than smaller, geographically confined ones. Furthermore, we posit that the patterns seen with the European Typology are principally due to social changes, with investment in the Three Pillars changing in relation to socio-political events such as the coalescence of modern nation states and the loss of power on the part of localized elites previously discussed by Kirk (2017).

\textsuperscript{118} We put “new” in quotations here because much of the technology that is widely being used to innovate archaeological approaches has been around since the 1960s, though it has only recently become widely available for academic and commercial use.
3.10. Acknowledgements

We would like to thank Kelly Tseng for supporting the lead author during the data collection and analysis of this paper as well as the lead author’s dissertation committee including Loa Traxler, Christopher Lippitt, Michael Kolb, and Osbjorn Pearson. William M. Balco also deserves acknowledgement. Any mistakes are, of course, our own.
4.1. Introduction

Despite the romanticization of castles in the national mythologies of Western civilizations, the most straightforward definition of a castle is that of a fortified elite residence (Kirk 2020; Morris 2016; Prior 2006). This definition fits well with the view of military historians who see elite status as intricately tied to military service (e.g. Brown 1954; Duby 1982; Prior 2006; Wickham 2016) and the development of castles as a technological arms race to counter advancements in artillery (e.g. Hirst 1997; Hogg 1981; Thomas 1912; Toy 2006). However, over the past few decades many scholars have questioned the proposed linear development of castles, instead focusing on the historically particular and/or social roles of castles (e.g. Askew 2016; Coulson 2004, 1991, 1979; Johnson 2002). Despite this shift in interpretation, both opposing viewpoints largely still lack: (1) A fine-grained quantitative approach regarding diachronic architectural change (Johnson 2018, 2010, 2002); and (2) A pan-European, multiregional comparative design (Creighton 2012).

In this paper we employ a series of quantitative measures to investigate how castle architecture was adapted to suit the needs of elites across Europe between the tenth and nineteenth centuries. Reaffirming that the castle is a House (Kirk 2020, In Review) – and that directional change in certain features of the House is not only possible through human-thing-environment entanglement (cf. Hodder 2020) but likely based on past research showing clear temporal changes in castle types over time (cf. Kirk et al. 2020, In Review) – we examine architectural transformations through the lens of Claude Lévi-Strauss’s (1982) House Society
Model (HSM). This model sees the House as an institution or, ‘corporate body holding an
estate made up of both material and immaterial wealth, which perpetuates itself through the
transmission of its name, its goods, and its titles down a real or imaginary line’ (Lévi-Strauss
1982: 174). Giving the House agency, residential structures become material manifestations
of the House (Beck [ed.] 2007; Chesson 2003; Joyce and Gillespie 2000; Lévi-Strauss 1982;
Lewis et al. 1997). To survive and perpetuate across generations, the House requires that its
members and associated aspects of material culture fulfil three fundamental roles, or pillars,
analogous to the needs of living organisms. These pillars are: (1) Defense, (2) Social
Reproduction, and (3) Production (Kirk 2020, In Review). As the House develops over time,
the need to invest in each of these roles, or pillars, changes in accordance with outside
pressures and influence largely precipitated by competition between houses for material

Using a sample of castles spread out across the Czech Republic, Iberia, Sicily, and the
United Kingdom, we demonstrate how elite competition caused castles to develop along
similar trajectories in accordance with the three pillars across dissimilar European ecological
and cultural zones. Rejecting the notion that castles served far too many different purposes in
diverse contexts to be understood as part of the same phenomenon (cf. Johnson 2002; Morris
2016; Wheatly 2015), we lay out a series of hypotheses (Table 4.1) based on previous
research to investigate: (1) how competition between royal houses may have led to increased
military focus in state-owned castles (cf. Hirst 1997; Hogg 1981; Toy 2006), (2) how
competition between noble houses potentially led to increased social and productive aspects
connection between elite status and military service may have contributed to the retention of
defensive architecture within non-state castles over time through social memory or citation (cf. Askew 2016; Mattson 2016), and (4) how competition between elites across Europe may have helped to solidify similar trajectories in castle design across regional divides. Using the European dataset of Kirk et al. (In Review), – which consists of presence/absence data for a sample of 177 architectural features reflective of broad, functional categories within castles – we began our analysis by placing architectural features into groups reflective of the three pillars (defense, social reproduction, and production). We then used these designations to build a series of indices demonstrating a ratio between time and investment in each pillar. Data was then regressed as a means of hypothesis testing, and results were interpreted in the context of well known, pan-European historical trends.

<table>
<thead>
<tr>
<th>Hypothesis 1</th>
<th>H₀: Metrics pertaining to defense increase over time in state-owned castles as artillery is increasingly used in battle.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H₁: There is either no significant change or a decrease in metrics pertaining to defense for state-owned castles over time.</td>
</tr>
<tr>
<td></td>
<td>H₂: All castles show similar changes in defense.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothesis 2</th>
<th>H₀: Metrics pertaining to Social Reproduction and Production increase over time in non-state castles as noble houses compete for limited resources and social status.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H₁: There is either no significant change or a decrease in metrics pertaining to Social Reproduction and Production over time.</td>
</tr>
<tr>
<td></td>
<td>H₂: All castles show similar changes Social Reproduction and Production.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothesis 3</th>
<th>H₀: Defensive features continued to be incorporated into non-state castles as other aspects of the House increased in number.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H₁: Non-state castles show a decrease metrics pertaining to the number of defensive features incorporated within them over time.</td>
</tr>
<tr>
<td></td>
<td>H₂: Non-state castles show an increase in defensive features relative to the number of non-defensive features incorporated in them over time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothesis 4</th>
<th>H₀: Regional differences between trends are minimal, suggesting competition may have served to keep castle development similar on a pan-European scale.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H₁: Regional differences were significant enough to suggest that competition between noble houses across regional divides was minimal.</td>
</tr>
<tr>
<td></td>
<td>H₂: Certain aspects of castle development show similar, pan-European developments while others do not, suggesting that there was a certain amount of inter-continental competition but that most competition took place at the regional level.</td>
</tr>
</tbody>
</table>

*Table 4.1: Formal hypotheses for evaluating how competition between elite Houses drove architectural change in castles.*
4.2. Theoretical background: The House Societies Model

The original purpose of the HSM, as proposed by Claude Lévi-Strauss, was to better understand kinship relations. Comparing the social organization of Native American tribes in the Pacific Northwest, Noble Houses in medieval Europe, and feudal elites in Japan, Lévi-Strauss (1982: 163-187) reasoned that: (1) humans do not necessarily organize themselves into groups based on blood relations but rather into Houses based on real and fictive kin, (2) these Houses compete for a limited set of resources; (3) over time, the social unit of the House takes on an enduring personality of its own enshrined through mottoes and/or totems; and (4) certain characteristics of the House can be ascribed to its individual members based on that collective personality. While the extent to which these principles apply may vary across different societies (Boon: 1990), there can be no denying that they almost perfectly characterize the kingdoms of medieval Europe; so much so that they have become central tenants to the retelling of medieval life in pop culture such as HBO’s 2011-2019 Game of Thrones.

In studies of the House, economic wealth and the identity are maintained through material means, primarily through the establishment of physical structures and associated material accoutrement, which become part of the House’s social organization (Beck [ed.], 2007; Gillespie, 2000; Joyce and Gillespie, 2000). Culture—as the means by which people relate to, and pass information between, one another—and material—as the physical embodiment of the House—have a symbiotic relationship. Accepting that castles are a manifestation of elite Houses, representative of seigniorial authority (cf. Lewis et al., 1997), it is presumed that castle architecture is indicative of the needs, responsibilities, and social organization of the elites that built them. These needs can be broadly understood in relation
to the three pillars, with investment in each pillar changing in relation to the context in which an elite House is situated, its need to reflect status, and available resources (Kirk et al. 2020, In Review). As Houses modify the environment to achieve these goals, the HSM must be paired with Niche Construction Theory (NCT; cf. Arroyo-Kalin 2017; Laland and O’Brien 2010; Odling-Smee et al. 2013; Odling-Smee et al. 1996) to better understand the built environment.

Over time, improvements to the features of an estate are made for prior landscape modifications to remain relevant. Viewed through the theoretical framework of human-thing-environment entanglement, Hodder (2020) has suggested that these improvements lead to directional change, citing Morris’s (2010) work with the Index of Social Development as an example. Within the HSM, entanglement becomes the mechanism through which the built environment arises and changes to the physical organization of the House occur. Focusing on investment in each of the three pillars, we argue that trends should arise that parallel socio-historical developments. Examining defense, or the mechanisms through which both the physical and social aspects of the House ward off attack, one can better understand how volatile Houses perceived their surroundings to be. Looking at Social Reproduction, or the means by which the House transmits information to the outside world and knowledge from one generation to the next, one can determine the extent to which wealth was able to accumulate in one place as well as which social markers elites considered vital for signaling status and rank. Finally, an investigation into productive elements, or the means in which the House generates foodstuffs, goods, and revenue, can help illuminate the relationship between castle and community.
4.3. Historical Justifications

Seen through the HSM, castle building is a behavior common to elite Houses that rose to prominence through military means (cf. Kirk et al. 2020, In Review). This viewpoint is justified by certain unifying historical circumstances within medieval European societies which include: (1) the governing roles of the military elite (cf. Duby 1982; Wickham 2016) and (2) a reliance on localized power structures (cf. Kirk 2017). As kingdoms began to unify and grow in power during the latter half of High Middle Ages (10th-12th centuries), it is generally thought that people stopped moving around the landscape as frequently as in previous centuries (cf. Pettengill 1979). However, through an exchange of elites (see Creighton 2012; Wickham, 2016), the practice of primogeniture (cf. Boone 1988, 1983), and the movement of skilled laborers and architects (see Taylor, 1986), the kingdoms of medieval Europe continued to share a similar cultural background that transcended state boundaries. Therefore, the proliferation of castles between the 10th and 15th centuries demonstrates that certain aspects of medieval European elite society can be considered pan-European in spite of popular arguments in English literature to the contrary.

Anthropologically, the construction and use of castles demonstrates the most direct link between practices pertaining to the stability of the house - i.e. arrangements for intermarriage, inheritance, and labor acquisition – and the development of residential structures reflective of the social unit residing within them. Primogeniture, as a means of keeping the wealth of the House intact (cf. Boone 1988, 1983), was likely an important impetus for the spread of castles, consolidating the most vital possessions of the estate into a highly defensible, centralize position and designating the first born son as the head of House as the sole inheritor. Those that would not inherit (namely unlanded males) often fought for
new lands and built new castles in strategic locations to both control the movement of people and goods across the landscape (Christie 2008; Creighton 2002, 2012; Kirk et al. 2020; Mathieu 2001; Morris 2016; Painter 1956; Prior 2006) and establish junior branches of the House which they would control. This practice not only served to bolster the income of these junior branches, but also to strengthen the larger social unit through alliances; likely playing a role in the later formation of more centralized medieval kingdoms and Early Modern nation states.

As territories became increasingly consolidated, the use of castles within military conflicts greatly diminished (see Liddiard 2005). This left defensive structures at the heart of kingdoms, particularly those owned by non-state entities, to focus on social and economic competition with one another. Thus, from the 14th century onward, the castles of individual Noble Houses can be seen as growing more lavish over time, with Alnwick castle in Northern England serving as a perfect example. However, the active connection between elite status and military service likely meant that, despite increased investment in other pillars, defensive architecture was retained, either as atavistic features or citation (cf. Mattson 2016). Meanwhile, competition between centralized (i.e. state-level) governments along frontiers and in colonial settlings lead to the continued use of castles as military fortresses (see, for example, Deal Castle in southeastern England); with structures built for defending territory likely showing increased investment in defensive features as a means of countering advances in artillery. Thus, it can be postulated that there was a bifurcation in castle development sometime between the 14th and 16th centuries where state and non-state castles adopted differing strategies that have partly been explored by Kirk et al. (2020, In Review).
4.4. Methods: Measuring Change Over Time

To explore each of our hypotheses, we took a multifaceted, quantitative approach. Using the European Dataset of Kirk et al. (In Review; https://doi.org/10.5061/dryad.zpc866t7v), we categorized architectural features in accordance to the three pillars, labeling them as defensively focused, socially reproductive, or productive, with neutral features dropped. Assuming that directional change (cf. Hodder 2020) in investment for each pillar was likely, based on previous studies examining how castles relate based on landscape and architectural features (Kirk et al. 2020, In Review), we developed a series of indices to illustrate general trends in castle development. Results were analyzed two ways, first by averaging index values by century, and then plotting and regressing them. The results of this latter analysis were tested for robusticity and compared to the results of nonparametric tests. Finally, these tests were rerun on four “condensed datasets,” which dropped different features with each iteration and, at times, combined certain features that were functionally similar (e.g. arrow loops and gun ports). Statistically significant, consistent trends were interpreted as indicative of linear change over time for the purposes of refuting the null hypotheses.

4.4.1. Castle Selection

As per Kirk et al. (In Review), castles were chosen from four study regions representative of non-neighboring, disparate environments to obtain as broad a sample as possible. Geographically defined as (1) the Czech lands of Bohemia and Moravia, (2) the Iberian Peninsula, (3) the island of Sicily, and (4) the British Isles (excluding Ireland), these regions all have their own unique cultural backgrounds and topography. In total, 177 individual castles were analyzed, with each considered representative of the century in which
their last major building phase was completed. As some castles had a series of building phases that could easily be parsed out, these castles were recorded as being representative of multiple phases of construction, bringing the total sample to 306 “incarnations” (Table 4.2), as we called them.

<table>
<thead>
<tr>
<th>Region</th>
<th>Distinct Castles</th>
<th>Total Phases</th>
<th>State Phases</th>
<th>Other Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>25</td>
<td>38</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>Iberia</td>
<td>32</td>
<td>51</td>
<td>33</td>
<td>18</td>
</tr>
<tr>
<td>Sicily</td>
<td>32</td>
<td>46</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>UK</td>
<td>43</td>
<td>69</td>
<td>26</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>204</td>
<td>89</td>
<td>115</td>
</tr>
</tbody>
</table>

Table 4.2: Sample size for castles in each region. Phases indicate different building events that can be parsed out, allowing for an increased sample size. For a complete listing of castles analyzed and the raw data, see https://doi.org/10.5061/dryad.zpc866t7v

4.4.2. Index Development and Hypothesis testing

To measure material investment in each pillar, data for 177 of the 217 architectural features collected by Kirk et al. (In Review) were used to establish four indices. These indices included: (1) The Index of Strength (IOSt), measuring investment in defense; (2) The Index of Social Reproduction (IOSR), measuring investment in signaling social status and transmitting cultural knowledge/values; (3) The Index of Production (IOP), measuring investment in transporting, storing, and refining raw materials; and (4) The Index of Focus (IOF) measuring how balanced defensive features were in relation to features of Social Reproduction and Production. Calculations for indices and which hypotheses they served to test can be seen in Table 4.3. Each index was used in much the same way as Morris (2010) used the Index of Social Development, beginning with the aggregation of index values into single trend lines to assess linear change in investment for each pillar over time. As this method masks variability in castle development, we also utilized scatterplots for each region.
and the total sample with the dependent variable (y) as the index value and the independent/explanatory variable (x) as the incarnation of each castle. To test whether changes were statistically significant, linear regressions were run in R (R Core Team 2020) for the entire sample, by region, and by whether they were state-owned or not.

<table>
<thead>
<tr>
<th>Index</th>
<th>Formula</th>
<th>Hypotheses Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index of Strength (IOSt)</td>
<td>Value = ( \text{Sum (Defensive Features Present)} ) 14*</td>
<td>Hypotheses 1 and 4</td>
</tr>
<tr>
<td>Index of Social Reproduction (IOSR)</td>
<td>Value = ( \text{Sum (Cultural Reproductive Features Present)} ) 12*</td>
<td>Hypotheses 2 and 4</td>
</tr>
<tr>
<td>Index of Production (IOP)</td>
<td>Value = ( \frac{\text{Sum (Features of Production Present)}}{8*} )</td>
<td>Hypotheses 2 and 4</td>
</tr>
<tr>
<td>Index of Focus (IOF)</td>
<td>Value = ( \frac{\text{Sum (Defensive Features)} - \text{Sum (Socially Reproductive Features)} - \text{Sum (Productive Features)}}{\text{Sum (Total Recorded Features)}} )</td>
<td>Hypotheses 3 and 4</td>
</tr>
</tbody>
</table>

*Table 4.3: Formulas for calculating the four indices used in this paper and which hypotheses they served to test. * = total possible features in a specific category, e.g. there are 14 possible defensive features out of which X were present.*

Linear Regression was used because it is a widely understood method for assessing the relationship between dependent and explanatory variables. An adjusted R2 value of >0.05 and a coefficient p-value of >0.05 were used to determine statistical significance. To test the robustness of these results, we added a squared quadratic term of the time variable (i.e. incarnation2) in STATA15 (Statacorp 2017). This allows for control of potentially non-linear effects of time on the regression. If regressions that do not control for time in this way are robust, when time is squared, the sign of the coefficient should stay the same (i.e. negative or positive) – although the coefficient may change slightly – with p-values remaining either significant or non-significant depending on initial results. Additionally, we also added a dummy variable (0: not a duplicate; 1: duplicate) to control for a castle appearing more than once in a regression (i.e. multiple incarnations).
4.4.3. Feature Selection and Condensed Datasets

Slight inter-regional variations on certain themes, differential preservation, and ambiguity in certain terminologies necessitated that we condense our feature list into aggregate groups to measure similar linear trends across regional divides. Presence/absence data was considered superior to feature count as a means of mitigating preservation biases. A multivariate exploration of the original feature data will be made in Kirk et al. (In Review).

4.5. Results

A complete record of the results can be obtained from: https://doi.org/10.5061/dryad.zpc866t7v. Both averaging and linear regressions demonstrate clear trends which partially support the hypotheses presented above. For instance, when the sample was examined as an aggregate there was an overall increase in investment for socially reproductive and defensive features in castles across Europe, indicating that the null hypotheses for Hypotheses 2 and 3 could not be accepted. This was especially true for defensive investment in state-owned castles, which also suggested that the null hypotheses for Hypothesis 1 could not be accepted. However, when examining each region independently, neither the Czech Republic nor the UK yielded statistically significant increases in defensive investment for state-owned castles, though the trend lines established by averaging index values in each region did indicate a general rise in their investment. Thus, just by looking at the IOST, there seems to be enough difference between regions to suggest that some aspects of castle development do not fully share the same developmental trajectories as others. With this being the case, the Ha2 for Hypothesis 4 was accepted, while enough similarities existed between regions – particularly in terms of Social Reproduction in non-state-owned castles – to suggest that there was likely a significant amount of competition
between noble houses across regional divides and that, therefore, the Ha1 for Hypothesis 4 could not be accepted.

4.5.1. Averaging

When averaged, the total sample demonstrates a clear decrease in the overall defensive focus of castles compared to investment in other pillars over time through the IOF, and an increase in investment for defensive and socially reproductive features through the IOSSt and IOSR (Figure 4.1). Likewise, the IOP shows a moderate rise in productive investment over time across Europe. However, while these trends are apparent in the total sample, there is clear variation between regions. For instance, there is a rebound in the defensive focus of castles in Iberia which breaks with the pan-European trajectory by rebounding during the 18th and 19th centuries (a period of time marked by the Napoleonic and Carlist Wars on the peninsula) according to the IOF, the castles of the UK are – typically – more invested in defensive architecture than other regions according to the IOSSt, and investment in social reproduction and production demonstrates a sharper rise over time in the Czech Republic than any other region according to the IOSR and IOP. Nonetheless, differences between the castles of the state and those owned by non-state entities – such as individual noble houses, holy orders, clans, etc. – prove even more interesting. In general, trends seen in non-state-owned castles are relatively smoother than those of state-owned castles, an observation which we argue likely means that competition between non-state-entities likely drives them to produce castles remarkably similar to one another. Likewise, the IOSSt, in particular, seems to demonstrate that state and non-state-owned castles do not necessarily invest proportionately in the same kind of features (Figure 4.2), with the castles of the state investing far more in defense closer to the present than those of non-state entities.
Figure 4.1: Results showing the trend lines for each of four indices (clockwise: [1] The Index of Focus, [2] The Index of Strength, [3] The Index of Strength, and [4] The Index of Production) using averages.

Figure 4.2: Results for the IOSt comparing state and non-state-owned castles.

4.5.2 Linear Regression

While pan-European trends were apparent in averages for the four indices presented above, the results of statistical analyses (Table 4) indicate that there is significant variability in castle development that was not characterized by this method. As previously mentioned,
the IOSt shows a significant increase in defensive investment for the state-owned castles of the Mediterranean but not those of the Czech Republic or the British Isles, thus only marginally supporting Hypothesis 1 (metrics pertaining to defense increase over time in state-owned castles as artillery is increasingly used in battle). Nonetheless, the IOF shows a significant decrease in defensive focus over time in the total sample and that of non-state-owned castles, while the incorporation of defensive features in state-owned castles continued to rise, thus partially supporting Hypothesis 3 (defensive features continued to be incorporated into non-state castles as other aspects of the House increased in number). This finding can be partially explained by looking at the IOSR, which demonstrates a significant increase in socially reproductive features for both the total sample and the subsample of non-state-owned castles, supporting Hypothesis 2 (metrics pertaining to Social Reproduction and Production increase over time in non-state castles as noble houses compete for limited resources and social status). In contrast, the IOP only demonstrates a significant increase in the overall sample and regionally in the Czech Republic, demonstrating another line of regional variability that calls Hypothesis 4 (that regional differences between trends are minimal, suggesting competition may have served to keep castle development similar on a pan-European scale) into question by supporting its null hypotheses. In spite of statistically significant results, the R2 value of most indices demonstrate poor fit to trend lines, indicating that there is still a lot of variability in these models and subsequent interpretation that is not fully accounted for. Nonetheless, regressions with the incarnation2 term and the dummy variable were, for the most part, unchanged; signifying the robustness of these analyses.
<table>
<thead>
<tr>
<th>Region</th>
<th>Index of Focus</th>
<th>Index of Strength</th>
<th>Index of Social Reproduction</th>
<th>Index of Production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R²</td>
<td>Coefficient</td>
<td>P</td>
<td>R²</td>
</tr>
<tr>
<td><strong>Czech</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>0.353</td>
<td>-0.072</td>
<td>&lt;0.001</td>
<td>-0.014</td>
</tr>
<tr>
<td>State</td>
<td>0.144</td>
<td>-0.037</td>
<td>0.090</td>
<td>0.204</td>
</tr>
<tr>
<td>Other</td>
<td>0.530</td>
<td>-0.098</td>
<td>&lt;0.001</td>
<td>-0.020</td>
</tr>
<tr>
<td><strong>Iberia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>-0.001</td>
<td>-0.009</td>
<td>0.340</td>
<td>0.112</td>
</tr>
<tr>
<td>State</td>
<td>-0.000</td>
<td>0.011</td>
<td>0.325</td>
<td>0.124</td>
</tr>
<tr>
<td>Other</td>
<td>0.323</td>
<td>-0.059</td>
<td><strong>0.002</strong></td>
<td>-0.008</td>
</tr>
<tr>
<td><strong>Sicily</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>0.024</td>
<td>-0.021</td>
<td>0.122</td>
<td>0.033</td>
</tr>
<tr>
<td>State</td>
<td>0.008</td>
<td>0.021</td>
<td>0.277</td>
<td>0.120</td>
</tr>
<tr>
<td>Other</td>
<td>0.460</td>
<td>-0.075</td>
<td>&lt;0.001</td>
<td>-0.031</td>
</tr>
<tr>
<td><strong>UK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>0.071</td>
<td>-0.021</td>
<td><strong>0.005</strong></td>
<td>-0.004</td>
</tr>
<tr>
<td>State</td>
<td>-0.028</td>
<td>-0.002</td>
<td>0.858</td>
<td>0.026</td>
</tr>
<tr>
<td>Other</td>
<td>0.187</td>
<td>-0.032</td>
<td><strong>0.001</strong></td>
<td>-0.017</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>0.074</td>
<td>-0.026</td>
<td><strong>0.001</strong></td>
<td>0.022</td>
</tr>
<tr>
<td>State</td>
<td>-0.000</td>
<td>0.007</td>
<td>0.322</td>
<td>0.086</td>
</tr>
<tr>
<td>Other</td>
<td>0.347</td>
<td>-0.060</td>
<td><strong>0.001</strong></td>
<td>-0.004</td>
</tr>
</tbody>
</table>

Table 4.4: Regression results for time (y) and index value (x) by region and ownership. The adjusted R² is provided. Bolded values indicate statistical significance. The highlighted did not remain consistent in tests for robustness.
4.5.3. Condensed Datasets

Once the main data set was analyzed, we repeated the process an additional four times with condensed datasets by dropping certain architectural features from some and combining features with similar functions (like arrow loops and gun ports) in others. Results remained relatively unchanged from the main analyses presented above, supporting our findings.

4.6. Discussion

While general trends in the total sample seem to indicate the validity of the first three hypotheses, there are certain regional variations in the data that make answering Hypothesis 4 (that regional differences between trends are minimal, suggesting competition may have served to keep castle development similar on a pan-European scale) difficult. Ignoring these for the time being, we argue that the most significant implication of this study is that our results largely support both opposing arguments dominating castle studies today: (1) That castles developed as part of a technological arms race to defend against advances in artillery, and (2) That they increasingly acted as a hub for a flurry of social activities. Utilizing the HSM to interpret these findings, castles are both Houses belonging to larger governing superstructures – which transition between localized and centralized power (cf. Kirk 2017) during the time period in question – and material manifestations of the individual social units residing within them. Depending on a House’s role in society/governance – which existed on a spectrum from royalty to local landlord – investment in each pillar differed according to the House’s immediate roles and responsibility to the community surrounding the castle. As the roles and responsibilities of royalty and local elites diverged during the latter half of the High Middle Ages (13th-15th centuries), with royalty becoming more concerned with the
maintenance of state borders (cf. Kirk 2017), so too did investment in each pillar for their respective castles. Thus, distinguishing between the castles that were built or renovated by the state and those that were built or renovated by individual Noble Houses is paramount to deciphering the trajectories that make understanding castle development as an aggregate so difficult.

Beginning with an examination of Hypothesis 1 using the IOSt, developments in the Mediterranean seem to better support an increased investment in defense on the part of the state than other parts of Europe. While England is known for the artillery fortresses of Henry VIII (cf. Harrington 2007; Hogg 1981; Toy 2006), the averages of the IOSt indicate that the castles of the UK were already heavily invested in defense prior to the 15th century, potentially masking the transition towards Early Modern castles more visible in Iberia and Sicily. Likewise, the sample of castles that were state-owned in the Czech Republic was orders of magnitude smaller than that of any other region (n=15, Table 2), suggesting that a lack of significance may be due to sample size. In spite of these possible explanations, however, differences are likely more attributable to historical context rather than data processing or bias. For instance, neither the Czech Republic or the UK had the same trouble with piracy that Sicily and Iberia had (cf. Abulafia 2013; Hess 2010. Kirk 2017; Mazzarella and Zanca 1985); a circumstance which necessitated a shift from the use of inland castles to more coastal defenses across the Mediterranean at the onset of the Early Modern Era and the development of more centralized forms of government for the protection of the general populous (cf. Clements 1999; Giannattasio, Grillo and Murru 2016; Hogg 1981; Kirk 2017; Maurici 1985, Maurici, Fresina and Militello 2008, Mazzarella and Zanca 1985).
These societal and architectural transformations are somewhat unique to the Mediterranean as, while Britain follows a similar architectural trajectory with the development of Henry VIII’s artillery fortresses and later with the use of Martello Towers, neither the Czech Republic or the UK undergo the same sort of centralization in government or reorientation in defensive practices. In fact, both England and the Bohemia (core areas of the UK and the Czech Republic) have much longer histories as independent, unified (i.e. centralized) kingdoms than Iberia (which spent much of the medieval period comprised of separate, often warring, kingdoms) and Sicily (which has a long history of foreign subjugation). Likewise, England and Bohemia arguably developed border fortresses much earlier in time than their Mediterranean counterparts, which had what are referred to as frontier fortresses that pushed boundaries. Thus, while we have shown that there is clearly an increased investment in the defensive attributes of state-owned castles within the Mediterranean (as proposed with Hypothesis 1), the relationship between the development of artillery and defensive investment in the state-owned castles of the UK and the Czech Republic presents a much murkier picture.

In contrast, the trend towards increased investment in social reproduction demonstrated by non-state castles across all regions makes addressing Hypothesis 2 much easier. Argued to be indicative of social competition between elites, it is interesting that earlier castles within the sample demonstrate relatively little investment in this pillar. The reasons for this disparity are likely numerous, but one explanation could simply be that political volatility in the Low and early High Middle Ages (c. 6th – 12th centuries; cf. Wickham, 2016) may have made investment in socially reproductive – or lavish – aspects of castle design less important than defense, given the limited set of resources that localized
feudal lords had available. However, this is only one possible explanation. In contrast, Johnson (2007) has suggested that features related to social reproduction increased in late medieval English Houses as a byproduct of shifting spheres of competition caused by the Reformation. As a similar religious conversion was underway in the Czech lands, this provides a possible explanation for change. However, for this supposition to be relevant across Europe, one would have to accept that competition across regional divides served to drive similar changes in the Catholic lands of Iberia and Sicily, where the same pattern is evident in the IOST, but no such religious conversion was underway.

The idea that competition between elite Houses may have occurred across regional divides is not outside the realm of possibility and is supported when looking at the individual features that went into indices (a topic which we will explore more in a subsequent publication). For example, the presence of great halls in the non-state castles of Sicily, Iberia, and the Czech Republic occurred much later than they do in Britain, suggesting that they may have been an import into these regions. Furthermore, a similar supposition has been made for the appearance of the Tower Keep in Islamic Iberia by Porras (2015). Regardless, competition between elites – both violent and non-violent – seems to be key in understanding changes made to castle design; and the construction and renovation required for Houses to keep up with their evolving roles and responsibilities over generations required money. This opens up in a third area of competition between elite Houses through their ability to acquire resources: either through taxation, as has been discussed by Kirk et al. (2020, In Review; amongst others), or through their own ability to produce goods and incom.

Within the total sample the IOP demonstrates a significant increase in the productive aspects of castle design over time (a trend which does not hold true for Iberia, Sicily, or the
UK in isolation). This increase may, in part, be due to three factors: (1) Differences in the
types of elite Houses that rely on production and changes in their proportion in relation to
others over time, (2) A shift from the use of general features of production (i.e. general
stores, general workshops, etc.) to more specific ones, and (3) A shift from the extraction of
resources from a castle’s surroundings (through taxation/rent) to the production of finished
products. These suppositions are not mutually exclusive and may help explain why some
specific features only appear in certain spacio-temporal contexts (Kirk et al. 2020, In
Review) as well as why trends seen in the total population are not as clear in regional
contexts. Furthermore, despite its low visibility in more regional contexts, the rise in
productive investment seen in the IOP for the total sample seems to relate to a well-
documented decrease in movement across the landscape and a corresponding decrease in real
wages as elites pressed the lower classes into servitude (cf. Pettengill, 1979).

In spite of the regional variations in pillar investment described above, there are
clearly enough commonalities among castles so that they can all be identified as such,
regardless of where, when, or by whom they were built (Kirk et al. 2020). Explored through
Hypothesis 3, we argue the unifying aspect that binds castles together as a unique form of
monumental architecture is defense. Within the sample, no castle was built without some
form of defense in mind, and most were built on earlier fortresses (see Castillo, 2013;
Swallow, 2016); calling into question the notion of the castle as the quintessential “medieval”
fortification (as per Kirk et al. 2020) and often giving them a somewhat standardized
appearance on the outside. As seen through the data presented here, additions to castles –
especially non-state ones – were largely those aspects of culture relevant to elite social status
(i.e. social competition) at the time of renovation, thus serving to drive down defensive focus
even as the defensive features of previous construction events were retained (note that while not always significant, trend lines for the IOSt rarely decline). Indeed, additions to castles may have sometimes even served to diminish the effectiveness of defensive features (cf. Johnson 2002), in essence creating non-functional relics out of elements that were once very practical (though observationally, Scott Kirk has found this to be rarely the case).

4.8. Conclusion

While the notion of the castle as a fortified elite residence has existed for years (Mathieu, 2001; Prior, 2006), this study represents part of a larger attempt to reorient castle studies by examining them from the theoretical standpoint of Claude Lévi-Strauss’s (1982) House Societies Model (see also Kirk et al. 2020, In Review). The results of this study suggest that, once divided by state and non-state entities, castles throughout Europe share certain general trends which have formed the backbone of two opposing viewpoints within castle studies over the last half century. We have posited that these trends were largely the result of inter-House competition. It has been our position that (1) on average castles built or renovated by the state became more defensive over time in response to advances in artillery, especially within the Mediterranean, (2) castles owned by individual noble Houses show increased evidence of non-violent forms of competition over time reflective of changes in elite roles and responsibilities within medieval European societies, (3) that even castles which were not likely to experience attack largely retained outwardly defensive characteristics, in part because of a shared military background by elites, and (4) that these trends can- more or less- be seen on a pan-European basis.

Beyond Europe, we believe that this theoretical perspective and the quantitative methods used to explore it, can be used in other geographic locales to examine similar
relationships between elite housing and social change. Japan, where the fortified residences of the elite class have long been referred to as castles, would make an excellent cross-cultural comparison as their defensive works largely rose to prominence in much the same manner as their European counterparts (Friday, 2004; Satoh, 1978; Schimorleitz, 1974). Thus, utilizing the HSM opens the door for more broadly comparative, anthropological work that has, up until this point, largely been avoided by modern castle specialists. Furthermore, this paper provides one example of a growing number of counterpoints to the dominant trend in castle studies today, prioritizing a quantitative, etic approach over the more emic ones made popular by late 20th century scholars. We believe that in order to move forward, castle studies must merge both the emic and etic into a discussion about what life was like in the medieval and Early Modern Eras. While results presented here remain somewhat ambiguous, data and qualitative comparison both suggest that there is room for this type of study to grow as a new direction for castle studies.

4.9. Acknowledgements

We would like to thank the following: Drs. Michael J. Kolb, Christopher D. Lippitt, Loa Traxler, Osbjorn Pearson, Emily Jones, Michael Graves, and James Mathieu, as well as Joe Birkmann, Clayton Meredith, Kristina Machen, and Beau Murphy for their continued support and assistance. We would also like to thank Dr. Mo O’Donnell for help with statistics and Kelly Tseng for providing funding. Any mistakes are, of course, on the part of the authors, and more than likely on the part of the lead author.
Chapter 5: Conclusion

5.1. Important Findings

Seeing castles the world over as the physical manifestations of militarized elite Houses, each of these papers has demonstrated that castles are best understood on a spatio-temporal continuum. Indeed, while aesthetically diverse, castles from Islamic Spain to medieval India and feudal Japan inhabit similar landscapes and share many of the same architectural features. Yet while a certain universality in defensive design has been noted for prehistoric fortifications (Keeley et al. 2007; Keeley 1997), scholars focusing on the defensive architecture of historic European cultures tend to ignore similarities in favor of understanding the historically particular. This has not always been the case though. Parallels in the construction of monumental, fortified residences were not lost on the people of the past; and structures that were remarkably similar to the castles of medieval Europe were referred to as such by Europeans who erected them in colonial contexts and encountered them in foreign lands like Japan. Taking an approach more akin to these past interpretations, this dissertation has largely gone against the recent trend in English language castle studies which separates the monumental, fortified residences of medieval Europe from those built elsewhere; highlighting similarities between castles of different regions and cultures, and challenging the definition of the castle as something unique to the European Middle Ages.

One of the central arguments I have made within these papers has been that many castle functions are intricately tied to their placement on the landscape, suggesting an aspect of their development that cannot be completely understood within the historical context of

---

119 For example, machicolations, moats, and arrow loops are all extremely common features of castles, and while they may look different, they all appear in similar contexts and serve the same purposes.
the European Middle Ages. Thus, for a fuller understanding of what castles are, one needs to look beyond regional European studies to examine the behaviors behind castle use and construction within an anthropological framework that allows for cross-cultural comparisons. For this purpose, I have employed a variant of the Lévi-Straussian (1982) House Societies Model (HSM). As discussed extensively throughout this work, within the HSM the House is an institution, a *personne morale*, comprised of individuals related by real or fictive kinship.\(^{120}\) In order to survive and propagate over generations, members of the House must fulfill certain roles and responsibilities related to the three pillars: Defense, Social Reproduction, and Production (Kirk et al. 2020; In Review).

Since Houses act as individuals with respect to namesake, resources, and competition/cooperation, they often enter into arrangements with one another to create higher order Houses – organized in much the same way as those they are comprised of – which form the basis of societies. This agglomeration typically results in a hierarchy between Houses rooted in the division of labor, where some stations are expected to invest more heavily in specific pillars than others to fulfill their roles and responsibilities within society at large. These requirements are normally encoded in the material configuration of residences – in this case castles – through both architecture and placement. Over time socio-political events often precipitate renovations to the estate (i.e. the residence and its surroundings) which are needed to better reflect the House’s ever changing role within higher social orders. However, while residences may exhibit dramatic changes over generations, landscape – being partially comprised of the natural environment which includes such things as valleys, rivers, and

---

\(^{120}\) An example of a House made up of fictive kin would be a monastery, and indeed in the European tradition members of the institution refer to each other through familial terms (i.e. brother).
mountains – is typically more resilient, and can serve to underscore some of the earliest functions of castles.

If one accepts that castles are built to elevate the Houses within them through the exploitation of local resources (c.f. Kirk et al. 2020, In Review), then the construction and abandonment of castles can be tied to the environmental niches that militarized, elite Houses inhabit within a society. Oscillation between favored environments, therefore, illustrates temporal patterns in which castles develop regionally. Given a long enough timespan most regions will develop similar castles as different niches fall in and out of favor. Thus studies over the *longue durée* (cf. Braudel 2012) demonstrate how castles may relate to each other across cultural divides even if regional patterns are out of sync. In fact, many of the specific differences noted here have not pertained to socio-cultural particulars – as the same castle types presented by Kirk et al (2020, In Review [i.e. chapters 2 and 3]) appear across most regions – but rather contrasts between castles built by states and those built by non-state entities.

These findings, in many ways, stand as the antithesis to much of the post-modern work that has been carried out by castle scholars in England over the past 30 years (e.g. Coulson 2004, 1979; Johnson 2002; O’Keefe 2007). However, as Platt (2007) and others have noted, that literature has largely been comprised of revisionist responses to early 20th

---

121 I.e. a castle is built when an environmental niche is most favored by militarized elites and abandoned when its surroundings are no longer viable for the fulfilment of a House’s role within the larger social order they are part of.

122 For instance, different regions may favor coastal castles at different periods in their cultural trajectories but when they do appear, they often have many of the same architectural features (albeit manifesting in aesthetically different ways).

123 Such as individual Noble Houses, Holy Orders, and Scottish Clans.
century views on castle development (e.g. De La Croix 1972; Hogg 1981; Toy 1955) which the results of this dissertation were more closely aligned with. Furthermore, my findings also support many of the theoretical standpoints common to the European mainland, such as that of *incastellamento* (cf. Bazzana et al. 1988; Boone 2009; Boone and Benco 1993; Quirós Castillo and Salazar 2018; Toubert 1973), and even those proposed for non-European castles, such as the typologies commonly used in Japan (cf. Schmorleitz 1974).

While regional differences between approaches and interpretations have been the source of much debate in castle studies, this dissertation presents a potential explanation for their developed; demonstrating that the castles of the British Isles show a remarkable continuity and lack of variability over time which other regions do not possess. Failing to follow patterns common to the rest of Europe, studies which use the castles of the British Isles to infer a general understanding of castle development – such as those of Coulson (2004, 1979), Johnson (2002), and O’Keefe (2007) – can rightly be called into question. As such, this dissertation could potentially lead to a paradigm shift in English language castle studies through its demonstration of pan-European patterns, cross-cultural similarities in castle placement and design, and qualitative explanation for important theoretical perspectives that have been proposed in castle studies over the past hundred years.

### 5.2. In Review: Castles, Typologies, and Change Over Time

Since their inception, castle studies have been dominated by approaches which favor qualitative interpretations based on historical insights. This has led to a hodgepodge of methodological and theoretical frameworks that have become increasingly specific to individual castles or regional groups. In contrast, my doctoral work has taken a more multi-regional, anthropological, and quantitative approach. Seeing castles as a cross-cultural
phenomenon, common to societies with a militarized, elite class and not unique to the European Middle Ages, I began by collecting architectural and geospatial data on a sample of 460 castles and castle-like structures from around the world\textsuperscript{124} to conduct a series of three analyses building off one another. In partial fulfillment of the Anthropology Department’s requirements for a hybrid dissertation, I then wrote each analysis as a separate paper with book end chapters – such as this one – tying them together.

The first paper, “Landscape, Typologies, and the Social Meaning of Castles” (Kirk et al. 2020; Chapter 2) written in conjunction with Evan S. Sternberg and Paulina F. Przystupa, examined common aspects of the landscape around monumental, fortified residences and grouped them together based on co-occurring features. The second, “A Clustering of Castles: Grouping Structural Features to Examine Change Over Time within a House Societies Model” (Kirk et al. In Review; Chapter 3) written in conjunction with Evan S. Sternberg, Lexi O’Donnell, Kristina Machen (Whitney), and James L. Boone, analyzed the architecture for a subset of these structures and determined how they related to one another based on their material manifestations. Finally, the third paper, “Castles as the Houses of the Military Elite: Battle, Social Memory, and Structural Changes in a Selection of Castles Across Europe” (Kirk et al. In Prep; Chapter 4) written in conjunction with Lexi O’Donnell, Evan S. Sternberg, and James L. Boone, assessed directional change (cf. Hodder 2020) in castle development over time using architectural features related to the three pillars and a series of indices.

\textsuperscript{124} Note that the entire dataset did not have standardized data collection. While geospatial information was collected for the entire sample, it was not possible to collect the same amount of architectural data for all 460 structures due to budgetary and time constraints. The number of structures used for architectural analysis was only 247.
While these papers were grounded in the work of previous generations,\textsuperscript{125} each proposed unique methodologies\textsuperscript{126} and interpretations, with findings backed by mathematically derived analyses. In Kirk et al. (2020), for instance, my co-authors and I began our study by recording the presence or absence of 63 different environmental – both man-made and natural – features from a sample of 459 castles around the world (Figure 2.1). These data were then analyzed using a series of k-means cluster routines with results demonstrating logical associations but no clear optimum number of clusters. To classify these structures, we developed a typology with eight different classes derived from our findings and a decision tree for sorting them into each group (Figure 2.4). These types included: Type 1- Water-Based Urban Defense, Type 2- Water-Based Control Point and Trade Hub, Type 3- Water-Based Trade/Border Control, Type 4- Isolated Fortress or Semi-Rural Retreat, Type 5- Frontier Fortress or Trade Hub, Type 6- Urban or Semi-Urban Simple Refuge, Type 7- Urban or Semi-Urban Control Point and Refuge, Type 8- Urban Fortress or Government Center.

From this typology one can see three castle types focused on waterways (arguably in line with production), two that were rather isolated (arguably for displays of social reproduction in most cases), and three at urban centers (arguably for the protection of the populous). Once all castles were placed in their appropriate classes, a subset of 135 European castles with roughly known foundational dates (see Chapter 2.9 for a definition) were analyzed to assess change over time in the niches favored by European Elites within four

\textsuperscript{125} Meaning, primarily, early 20\textsuperscript{th} century British scholars and those on the European mainland. Not the work of post-modern scholars which dominate castle studies today.

\textsuperscript{126} By unique methodologies I am referring to those used in castle studies. The methods presented in these papers are actually well used in other areas of the social sciences.
core study areas (Figure 2.5). The results of this analysis demonstrated a clear transition in favored locations by the mid-point of the High Middle Ages (around the 13th century); where the construction of castles within fortified hilltop settlements (Type 7) gave way to the construction of castles along waterways (Types 1 and 3). What was not clearly articulated by Kirk et al. (2020) was that this transition occurred at the confluence of climatic change in the form of the Little Ice Age (Fagan 2000), social change precipitated by the Black Death (Fagan 2000; Morris 2010; Nicholas 1992), and political change as territories began to consolidate into kingdoms/states (cf. Kirk 2017; Morris 2010; Wickham 2016). Thus, the link between changes in favored niches for castle placement and outside stimuli provide a fertile ground for future research.

However, landscape is not the most common framework for understanding castle development, and is rarely, if ever, used in the way that Kirk et al. (2020) used it. Therefore, for “A Clustering of Castles,” my co-authors and I thought it was necessary to turn our attention to architectural developments. Just as landscape can be viewed as a general unifying factor for understanding similarities between castles (Kirk et al. 2020), architecture is often seen as one that divides people by culture (cf. Kilimnik and Kholodova 2014; O’Keefe 2007). To test this supposition and assess whether cross-cultural patterns existed due to common behavioral practices, data on 217 architectural features were collected from a cross-cultural sample of 391 castle and castle-like structure incarnations (see Chapter 3.6.1 for a definition). Again, cluster analyses were performed for both the total sample, or World Dataset, and a subset from the most representative regions of Europe (the Czech Republic, Iberia, Sicily, and the UK; n= 306), in the sample, referred to as the European Dataset.
Tests for optimization suggested that both datasets were best broken into three clusters with slightly different results (Figure 3.3). Analysis of the European Dataset largely placed castles into classes based on function with relation to the three pillars. Thus, the European Typology consisted of: Defensively Focused Castles (Defense), Showcase Castles (Social Reproduction), and Water-way Castles (Production; Figure 3.4). When the World Dataset was analyzed, however, castles fell into classes that highlighted temporal developments behind castle construction. Within this World Typology, castles were defined as Border Control Castles emblematic of Early Modern examples, Defensive Fortresses characterized by classic, stereotypical examples for what medieval castles should be, and Palaces demonstrating a high degree of elaboration not common to earlier castles. While temporal divisions between classes may have been more obvious in the World Typology, both typologies demonstrated chronological trends in castle development when analyzed over time (Figures 3.5 and 3.6). For instance, the construction and renovation of defensive castles (i.e. Defensively Focused Castles and Defensive Fortresses) in both typologies peaked around the 15th century and declined thereafter. Likewise, castles with more palatial attributes (Showcase Castles and Palaces) were not common until defensively focused castles began to decline.

As both “Landscape, Typologies, and the Social Meaning of Castles” and “A Clustering of Castles” indicated broad, temporal trends, my final paper, “Castles as the Houses of the Military Elite,” converted the European Dataset of Kirk et al. (In Review) into four indices serving to test hypotheses (Table 4.1) derived from mid-20th century British (cf. De La Croix 1972; Hogg 1981; Toy 1955) and continental European (cf. Bazzana et al. 1988; Quirós Castillo and Salazar 2018; Quirós Castillo 2016; Toubert 1990, 1974) literature.
Results mostly supported the assertions made by each hypothesis and demonstrated clear, statistically significant trends across Europe; particularly for those castles not built by the state. In fact, it seems that there is a clear difference in investment for each pillar between the castles of the state and those of non-state entities, with the latter more effected by inter-House competition than the former.

5.3. Localized vs. Centralized Power Structures

While differences between the castles of the state and those of non-state entities have been highlighted by each of my doctoral papers, it is important to note that states have not always represented the monolithic entities that they do today. For most societies, dominant power structures have tended to oscillate between localized and centralized authorities over time (cf. Kirk 2017). Since the 1990s, this oscillation has typically been studied under Blanton et al.’s (1996) Corporate-Network Strategy Model (also referred to as Dual Processual Theory). However, this model was not necessarily designed to understand change in power structures over time, and the nuance embedded in it has often led to a lot of confusion in subsequent literature.

Simplifying Blanton et al.’s (1996) work in a 2017 publication, I proposed the Socio-Economic Expansion-Contraction (SEEC) Model for use in understanding how dominant power structures may transition between localized and centralized authority. To demonstrate the functionality of this model, I analyzed how the Early Modern (16th-18th centuries) shift from medieval castles to an elaborate system of costal defenses in Sicily could be interpreted as a physical manifestation of the transition from localized authority centered around the

---

127 Also see Feinman (2001)
Nobility of the island to centralized authority centered around the state.  

128 Essentially, I argued that the state’s response – in the form of coastal towers – to raiding by barbary pirates and an increased focus on water-based exchange throughout the Mediterranean resulted in a loss of localized power on the part of Sicilian Nobles who had been enjoying a position of privilege from more interior castles for the better part of the Middle Ages (5th-15th centuries).  

129 While this example is characteristic of changing power structures for much of coastal Europe during the Early Modern Era, however, the state was often rather inconsequential for much of the Low Middle Ages (5th-9th centuries) and only rose to prominence as certain elite Houses began to consolidate more resources at the expense of others (cf. Kirk et al. In Review). Indeed, for much of the medieval period, the balance of power could better be characterized by the dominance of localized authority on the part of militarized elite houses (both royal and noble) over the centralized authority of the church (centered around the Papacy in Rome and, for a time, Avignon; see Figure 5.1; cf. Duby 1982; Wickham 2016). This, in turn, became more of a Triumvirate system of political power as the role of royalty became more important across Europe during the High Middle Ages (10th-15th centuries).  

Interestingly, a similar set of historical events can be observed in Japanese history with the rise of local warlords known as Daimyo representing localized authority, and the Emperor representing centralized, religious authority. Over the course of the 12th through 16th

---

128 At this point, Sicily did not have a state of its own but was a part of the Spanish Empire. Nonetheless, it did retain a parliament that sanctioned the building of costal defenses.

129 While local elites enjoyed enormous power for much of the Middle Ages, the Norman and Swabian periods provide exceptions where a strong, centralized authority developed (cf. Bresc and Maurici 2009; Kirk 2017, 2016; Metcalfe 2009; Smith 1968)
centuries, these warlords competed for dominance over all Japan by fighting for the title of Shogun; which represented a separate, secular, centralized authority which was supposedly under the Emperor but in practice often granted greater political power (Deal 2006; Friday 2004). Parallels between medieval Europe and what has been referred to as feudal Japan are fairly common, and while MacFarlane (2003) has compared the specific process outlined above to those of medieval Britain, citing their bounded island environments as one of the reasons why such similarities occur, I would argue that it is really the interplay between militarized elites, balance between localized and centralized authority, and climate that results in similar outcomes throughout the world.¹³⁰

Figure 5.1: The dualistic system of leadership. Image by Betty Kirk.

¹³⁰ Not that this same process was also discussed in the introduction within the purview of the HSM.
In essence, societies organize themselves favoring one power structure over the other in response to socio-economic and climatic events. As all parties involved want to gain power, and none want to lose it, agents representative of their respective Houses will try to minimize risk when making political advancements. In regions with strong central authority, political advancement is often limited due to the risks of losing one’s position, while in regions without such a strong central authority, such as medieval Europe and the frontiers of North America, agents within localized power structures are able to act in a way that allows them to make greater gains with fewer risks. Thus, if one combines the SEEC Model with Resilience Theory (cf. Redman 2005; Redman and Kinzig 2003), the oscillation between localized and centralized power structures can be directly attributed to the reorganization phase in the feedback loop, responding to a release brought on by both socio-political and climatic events, and helping to bring about another exploitative phase in societies.

5.4. Trends over the Longue Durée

Like the role of the pillars within the House, the oscillation between localized and centralized authority also manifests in the way residences develop. In times of political and economic stability or affluence, centralized power structures tend to develop and dominate societies, and estates typically become more dedicated to the specific social roles of the Houses that build them. In contrast, when resources are scarce, localized power structures tend to dominate, and there is greater balance in the representation of each pillar within the House. For instance, turning to colonial examples, Havana – a major economic hub for the Spanish in the New World – has castles and a city wall for defense, cathedrals and a governor’s mansion for social reproduction, and plantations in the surrounding area for production. In contrast, the Presidio San Saba in Texas – on the fringes of the Spanish
Empire – demonstrates how elements of all three pillars condensed into a single structure much like is seen with European castles throughout the Middle Ages.

Figure 5.2: Model showing how the pillars combine and separate over the Longue Durée.

This principle can be modeled and seen over the *longue durée* (cf. Braudel 2012). Beginning with Roman Europe, for example, one sees the same pattern as is evident in Havana; Roman cities often had dedicated forts, palaces, and temples that were monolithic in nature. However, following the collapse of the Western Roman Empire in the 5th century AD, these separate structures seem to condense into fortified hilltop settlements with castles serving as multi-purpose buildings at their centers (cf. Francovich and Hodges 2006). Thus, during the Low Middle Ages there is a merging of different monumental building types reflective of different pillars into single structures/compounds with elements of all three. At the onset of the High Middle Ages around the 10th century, in contrast, castles became more discreate, less for public defense, and incorporated palatial elements into their design necessary for social signaling. True separation between these structures does not seem to
occur in Europe until the Early Modern Era;\textsuperscript{131} and while this separation is maintained in more prominent colonial outposts, there seems to be a reversion to building structures reflective of all three pillars in more remote areas along the frontier. As it stands at present, this model is more of a “just-so story” (cf. Codding and Jones 2017) based on historical understanding within Europe, but future work can help quantify these interpretations so that these processes are be better understood world over.

5.5. Tying it all together

I believe my dissertation – and the three papers included therein – goes a long way towards understanding the development of castles as an anthropological phenomenon common to societies where militarized elites rise to prominence through localized power structures. As the physical manifestation of the Houses who built them (cf. Lévi-Strauss 1982), castles can be used to examine broad patterns in social organization that define a wide array of societies throughout the world during the medieval period.\textsuperscript{132} As such, this dissertation helps to redefine medieval studies as something that is more than just the study of Christian Europe. Through these three papers I have investigated cross-cultural similarities in where castles are placed and architectural design that transcend geographic and temporal cutoffs usually set in place by Medieval Studies.

\textsuperscript{131} Though it is not necessarily standardized across Europe. For instance, Spain, Italy, and Romania retain fortified churches well into the 20\textsuperscript{th} Century.

\textsuperscript{132} I would suggest that, to better differentiate newer interpretations from classical ones, the Middle Ages be redefined as a widespread societal reorganization caused by the interplay of climatic and social events. With this being the case, the Middle Ages would stretch from the end of the Roman Optimum (around the 5\textsuperscript{th} Century AD) through to about a century after the Medieval Optimum (around the mid-point of the 14\textsuperscript{th} century).
As I have argued earlier, limitations to the study of the social sciences imposed by figures of authority often stand as a detriment to advances in our understanding of the world. For Medieval Studies to survive as a discipline, I would argue that there must be a broadening of the field to include more cross-cultural comparisons. Though found in different regions, built by different peoples, and stretching over an enormous amount of time, each of the fortified elite residences included within these papers have served roughly the same purpose, and their definition as a castle should no longer be denied.
References

Abulafia, David

Aldenderfer, Mark S., Blashfield, Roger K.

2020  What is Anthropology, electronic document, accessed 2 March 2021,

Anderson, William
1970  *Castles of Europe from Charlemagne to the Renaissance.* Elk, London.

Arnold, Bettina and Manuel Fernández-Götz
2018  Agency in Architectural Choice: The Heuneburg Hillfort as Monument and
      Metaphor. In. *Understanding Ancient Fortifications: Between Regionality and
      Connectivity*, edited by Ariane Ballmer and Manuel Fernández-Götz, Dirk P. Mielke,

Arroyo-Kalin, Manuel, David Wengrow, Dorian Q. Fuler, Chris J. Stevens, and Michele
      Wollstonecroft

Ashbee, Jeremy A.

Askew, Rachel
2016  Biography and Memory: Sandal Castle and the English Civil War. *European Journal

ASTER Validation Team, 2013. ASTER global DEM validation summary report. METI,
      NASA and USGS in cooperation with NGA and other collaborators.
      [https://lpdaac.usgs.gov](https://lpdaac.usgs.gov)

Asur, Feran and Sevket Alp
2020  Landscape Analysis and Regain Functionality of Fulistan Garden in the Historic Van

Augenti, Andrea and Paola Galetti (editors)
2018  *L’incastellamento: Storia e Archeologia.* Fondazione Centro Italiano di Studi
      Sull’Alto Medioevo, Spoleto.
Babbie, Earl R.

Bachrach, B.

Baker, Frank B. and Lawrence J. Hubert

Ball Geoffrey H. and David J. Hall

Banning, E. B.

Barron, Manuel

Bazzana, Andres, Pierre Cressier, and Patrice Guischard

Beck, R. A. (editor)

Bell, Alison, Donald Gaylord, and Kristin Sharman

Benesch, Oleg

Binford, Lewis R.
1983 In Pursuit of the Past: Decoding the Archaeological Record. Thames and Hudson, New York.
Birngruber, Klaus and Christina Schmid (editors)  
Oberösterreichisches Landesmuseum Linz, Linz.

Bjerregaard, Mikael M.  

Blake, Kevin S. and Jeffrey S. Smith  

Blanton, Richard E., Gary M. Feinman, Stephen A. Kowalewski, and Peter N. Peregrine  

Blanton, Richard  

Boas, Adrian J.  

Bolender, Douglas J.,  

Boon, James A.  

Boone, James L  


Boone, James L., Nancy L. Benco  

Borić, Dusan  

Brabbs, Derry  

Braudel, Fernand  

Bresc, Henri and Ferdinando Maurici,  

Broughton, Jack M., Michael D. Cannon, and Eric J. Bartelink  

Broughton, Jack M., Michael D. Cannon, Frank E. Bayham, David A. Byers  

Brown, Michael  

Brown, Peter  

Brown, R. Allen  

Brownsworth, Lars  
Burns, Robert I.  

Cab, Marcos Noé Pool  

Capelli, Cristian, Valerio Onofri, Francesca Brisighelli, Ilaria Boschi, Francesca Scarnicci, Mara Masullo, Gianmarco Ferri, Sergio Tofanelli, Adriano Tagliabruni, Leonor Gusmao, Antonio Amorim, Francesco Gatto, Mirna Kirin, Davide Merlitti, Maria Brion, Alejandro Blanco Verea, Valentino Romano, Francesco Cali, and Vincenzo Pascali  

Carston, Janet. and Stephen Hugh-Jones (editors)  

Catalán Raul, Patricia Fuentes and Jose Carlos Sastre (editors)  
2014  *Las Fortificaciones en la Tardoantigüedad.* La Ergástula, Madrid.

Cerchiai, Luca, Loreno Janelli, and Fausto Longo  

Charrad Malika, Nadia Ghazzali, Veronique Boiteau, and Azam Niknafs  

Chartrand, Rene  

Chaucer, Geoffery  

Chesson, Merideth S.  

Chibnall, Marjorie  
Christie, Neil

Church, Michael.

Clavell, James

Clements, William H.

Coaldrake, William H.

Codding, Brian F. and Terry L. Jones

Core Team,

Coulson, Charles


Crabtree, Pam J.

Creighton, Oliver

Crichton, Michael  

Cullum, Pat  

Curry, Andrew  

Deagan, Kathleen  

Deal, William E.  

De La Croix, David, Eric B. Schneider, and Jacob Weisdorf  

De La Croix, Horst  
1972  *Military Considerations in City Planning: Fortifications*. George Braziller, New York

Dewald, Jonathan  

Dobres Marcia-Anne, Robb John A  

Duby, Georges  

Dunn, J.  

Dunnell, Robert C.  
Durdík, Tomas

Duus, Peter

Early, Abraham

Fagan, Brian

Feinman, Gary M.

Fernández Gótz, Manuel, Holger Wendling, and Katja Winger (editors)

Fernandez-Morera, Dario

Field, Julie S

Follett, Ken

Francovich, Riccardo and Richard Hodges.

Friday, Karl F.

Gillespie, Susan D.

Glatz, Claudia and Aimee M. Plourde


Google Inc. 2019 *Google Earth Pro (Version 7.3.2.5776 (64-bit)).* [Software]. Google Inc., Mountain View, CA.


Halkidi M., and M. Vazirgiannis

Hall, John Whitney

Harrison, Peter
2004 *Castles of God*. The Boydell Press, Rochester

Hartigan J.A.

Hartigan, J.A., Wong, M.A.,

Hayden, Brian and Aubrey Cannon

HBO
2011 *Game of Thrones.*

Hedenstierna-Jonson, Charlotte, Anna Kjellstrom, Torun Zachrisson, Maja Krzewinska, Veronica Sobrado, Neil Price, Torsten Gunther, Mattias Jakobsson, Anders Gotherstrom, and Jan Storå

Herold, Hajnalka

Hirst, Paul

Hodder, Ian


Hodges, Richard and David Whitehouse

Hodges, Richard

Hogg, Ian

Honigmann, John

Hubert, Lawrence J., Joel R. Levin

Jamieson, Elaine

Jesch, Judith

Johnson, Matthew


2002  *Behind the Castle Gate: From the Middle Ages to the Renaissance*. Routledge, New York.
Jones, Emily

Jones, Evan T.

Jones, John

Joyce, Rosemary A. and Susan D. Gillespie (editors),

Kann, Robert A.

Kantner, John and Kevin J. Vaughn

Kaufmann, J.E., Kaufmann, H.W.,

Keeley, Lawrence H., Marisa Fontana, and Russel Quick

Keeley, Lawrence H

Kennedy, Hugh,

Ketchen, David, J. and Christopher Shook

Kilimnik, E.V. and L.P. Kholodova
Kirk, Scott D., Lexi O’Donnell, Evan S. Sternberg, and James L. Boone
In Prep. Castles as the Houses of the Military Elite: Battle, Social Memory, and Structural Changes in a Selection of Castles across Europe.

Kirk, Scott D., Evan S. Sternberg, Lexi O’Donnell, Kristina Machen (Whitney), and James L. Boone
In Review A Clustering of Castles: Grouping Structural Features to Examine Change Over Time within a House Societies Model. Journal of Archaeological Method and Theory.

Kirk, Scott D, Evan S. Sternberg, Paulina F. Przystupa

Kirk, Scott

Knight, Ian
2009 Maori Fortifications. Osprey, Oxford.

Kolb, Michael J., Scott D, Kirk, and William Balco

Kolb, Michael J.

Konstam, Angus

Kronenfeld, David B., Giovanni Bennard, Victor C. de Munck, and Michael D. Fischer (editors)

Ladefoged, Thegn and Richard Pearson,
Laland, Kevin N., Michael J. O’Brien

Lawrence, T.E.

Le Goff, Jacques

Lévi-Strauss, Claude

Lewis, Archibald R.

Lewis, Bernard

Lewis, Carenza, Patrick Mitchell-Fox, and Christopher Dyer

Liddiard, Robert (editor),

Liddiard, Robert

Little, Becky
2018 How Hate Groups are Hijacking Medieval Symbols While Ignoring the Facts Behind Them. *History*. Electronic document, accessed 12 December 2021,

Loveluck, Christopher
Macfarlane, Alan  

Malory, Thomas  
1485 *Le Morte d’Arthur*.

Martin, George R. R.,  

Mathieu, James R.,  

Mattson, Hannah V.,  
2016 Ornaments as socially valuable objects: Jewelry and identity in the Chaco and post-Chaco worlds. *Journal of Anthropological Archaeology* 42, 122-139.

Maurici, Ferdinando, Adriana Fresina, Fabio Militello (editors).  

Maurici, Ferdinando  

Maurici, Ferdinando.  

Mazzarella, Salvatore, Renato Zanca  

McClain, James L.  
McCormick, Michael

McCoy, Mark D. and Thegn N. Ladefoged

McManama-Kearin, L. K.

McNeill, Tom

Metcalfe, Alex

Milligan, Glen W

Militello, Fabio, Rodo Santoro
2006 *Castelli di Sicilia: Città e fortificazioni.* Kalós, Palermo.

Molinari, Alessandra,

Moret, Pierre

Morris, Ian
2014 *War! What is it Good For?: Conflict and the Progress of Civilization from Primates to Robots.* Farrar, Straus and Giroux, New York.
Morris, Marc

Mortimer, Ian

Nicholas, David

Nicolle, David
2009  *Saracen Strongholds 1100-1500*. Osprey, Oxford.

Niglio, Olimpia

Nossov, Konstantin
2006  *Indian Castles 1206-1526*. Osprey, Oxford.

O’Callaghan, Joseph F.


Odling-Smee, F. John, Kevin N. Laland, and Marcus W. Feldman

In Prep. Social determinants of health and wealth at Freedman’s Cemetery, Dallas, Texas.

O’Driscoll, James

O’Keefe, Tadhg

Oksanen, Eljas
Oliver, Neil
2014 *The Vikings*. Pegasus Books, New York

Omoush, Maen

OpenStreetMap contributors,

Osborne, James F. (editor),

Painter, Sidney

Pasini, G.

Pettengill, John S.

Pirenne, Henri

Platt, Colin

Porras, Alberto G.

Prawer, Joshua
Price, Neil

Price, Neil, Charlotte Hedenstierna-Jonson, Torun Zachrisson, Anna Kjellström, Jan Storå, Maja Krzewińska, Torsten Günther, Verónica Sobrado, Mattias Jakobsson, and Anders Götherström

Prior, Stuart

Quesada, Alejandro
2010  *Spanish Colonial Fortifications in North America 1565-1822*. Osprey, Oxford.

Quirós Castillo, Juan Antonio and Igor Santos Salazar.

Quirós Castillo, J.A.,


Ramey, Lynn

Redman, Charles L. and Ann P. Kinzig.

Redman, Charles L.

Reynolds, Cerisa R.
Richards, Colins., Richard Jones, R. (editors)

Richards, John F.

Rohlf, F. James

Rosen, Stephen P.

Rotolo, Antonio and José Maria Martín Civantos

Sánchez, M.B.,

Satoh, Shigeru

Sauer, Carl

Schuessler, Jennifer

Schutz, Herbert

Schwalbe, Emily A.
Scull, Christopher  

Schmorleitz, Morton S.  

Seward, Desmond  

Sherratt, Andrew  

Skaffari, Janne  

Smith, Denis M.  

Stayer, Joseph R.,  

Stiner, Mary C., Avi Gopher, and Ran Barkai  
2011 Hearth-side socioeconomics, hunting and paleoecology during the late Lower Paleolithic at Qesem Cave, Israel. *Journal of Human Evolution* 60, 213-233.

Stoker, Bram  

Stokes, Laura P.  

StataCorp.  
2019 *Nonparametric Regression*. Electronic Document, accessed 15 March 2019,  
https://www.ocf.berkeley.edu/~manuelb/week6/LectureNotes06.pdf  
2017 *Stata Statistical Software: Release 15*. StataCorp LP, College Station.

Swallow, Rachel  
Taylor, Arnold
2015  *Caernarfon Castle*. CADW, Cardiff.

Thomas, A. Hamilton

Toshitaka, Morito and Miyamoto Takahiro
2017  *Castles in Japan*. Mitsumura Suiko Shoin Publishing Co. Ltd., Kyoto

Toubert, Pierre
1990  *Castillos, señores y campesinos en la Italia medieval*. Critica, Barcelona.

Toy, Sidney
1957  *The Strongholds of India*. William Heinemann LTD, Melbourne.

Trabraham, Chris and Adrian Cox

Turnbull, Stephen

Twenge, Jean M., Sara Konrath, Joshua D. Foster, W. Keith Campbell, and Brad J. Bushman
2008  Egos Inflating Over Time: A Cross-Temporal Meta-Analysis of the Narcissistic Personality Inventory. *Journal of Personality* 76(4), 875- 901.

Ugan, Andrew, Jason Bright

Ure, John

Viollet-Le-Duc, Eugene-Emmanuel
Ward-Perkins, Bryan

Washburn, Oliver D.
1957  *Castles in Spain.* La Impresora, Mexico.

West-Eberhard, Mary Jane

Whalen, Brett

White, Leslie A.

Wickham, Chris

Williams Jack S.

Wilson, Peter H.

Wheatly, Abigail M.

Wrangham, Richard

Zúñiga, Antonio R
2004  *La Ciudad De Los Castillos: Fortificaciones y Arte Defensivo en La Habana de los Siglos XVI al XIX.* Asociacion Cubana de Amigos de los Castillos, Havana.