

Natural Society: Analyzing the Environmental Impact on Social Structures  
Through the Megalithic Tombs in the Boyne Valley

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by  
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## ABSTRACT

This thesis analyzes the influence of climate change on the social structures of the late Neolithic and Early Bronze Age society in the Boyne River Valley in Ireland. One of the many factors that affect society, especially in early groups, is the environment and climate stability. Furthermore, how social systems and structures work is revealed most clearly when those systems are placed under stress, such as climate change. To analyze these potential effects on social structures, this thesis analyzes research done by other scholars on the megalithic Passage Tombs in the Boyne River Valley – primarily Newgrange, Knowth, and Dowth – to understand the social structure of the Neolithic society that built them and the differences in how the Beaker People of the Bronze age used them. Although the discussion on the late Neolithic in Ireland and the Boyne Valley society is lacking, I argue the evidence that does exist currently suggests that a hierarchical social structure, which developed during the advent of farming, eventually shifted into a new social structure, coinciding with a climatic change.

## INTRODUCTION

Dawn of the Winter Solstice breaks over the horizon. The fields and hills of the Boyne River Valley in Ireland steadily fill with light, a sight the early people of Ireland would have gathered to see 5,000 years ago. You turn and behind you is a great hill, with an enormous quartz wall gleaming in the rising sun. Passing marked stones, you enter the chamber to find a narrow stone hall that leads to three chambers. A stone basin sits at the entrance, filled with more quartz, and a swirling design wraps itself around the rock facings. You walk, head low, through the 22-meter-long channel and enter a chamber at the very back. Suddenly, light fills the hallway, perfectly illuminating a three-pronged spiral at the back of the earthen pit.

Needless to say, the sight is a remarkable one, today and throughout the past. Newgrange and the other Megalithic Passage tombs of Ireland stand as a reminder of the accomplishments of early agrarian societies. Why did they build the fantastic burial chambers, though? What were they used for and what did they signify to the people at the time? How did the use of these chambers change overtime? This thesis will evaluate archaeological theories related to the influence of geography and environment on the structure of Boyne Valley society during the late Neolithic and early Bronze Age from 4300 – 1900 B.C.

Along with social and historical contexts, the environment can contribute to the formations of more complex rituals and social systems in a society. These environmental influences are especially visible when social systems are placed under stress, such as during climate change. Similarly, a society gains more agency over its environment as food production increases with farming. In the Boyne River Valley of Ireland, there is a change in the archaeological record and use of the megalithic tombs, which suggests a

change in the social structure. This shift also correlates with a change in climate to be much wetter. The change in climate may have been the cause for the social shift if the wetter conditions caused previously used cereals to not be viable, therefore stressing the system by creating a lack of resources. Other factors, such as cultural diffusion can play a greater role in influencing societies as the group expands. Similarly, the fall of a civilization can also result without the influence of a significant climatic event. However, this thesis will focus on the potential environmental influences.

Due to the lack of research done in Ireland, data is limited to a select amount which may cause a skewed conclusion. McLaughlin points out, there is large amounts of unpublished data, with most radiocarbon data tested within the last decade and that most researchers focus on the Early Neolithic instead of the shift to the Bronze Age (2016:121). Furthermore, as Bishop (2015) points out, radiocarbon dating from farms all over the British Isles has not been extensively tested. The lack of data effects the study below because the results from those tests could say whether the previous subsistence technique failed. Another factor is the lack of written history from this period. The actual nature of what the people of the Boyne Valley and Ireland were doing and why is unknown. Therefore, studies rely on the archaeological record to piece what may have occurred together. Recent DNA analysis has been used to combat the inaccuracies; however, the new research still presents further questions (Pedreschi et al 2014; Dowd 2016). The research below will therefore be working between the discrepancies of research and historical debates. The argument presented is therefore a case study of a single prehistoric event and must be considered within the context it is found. A similar process of research can be conducted for other groups; however, the individual context of

each area must be considered. As field research was not conducted specifically for this project, the argument below relies on the data collected by others to build upon the discussion of prehistory in Ireland and the environmental influences on societies.

## THE PRE-HISTORY OF IRELAND

In order to understand how the Late Neolithic was structured in the way it was, the history of Ireland leading up to the discussed period is provided below. This data is important to see how the people were relating to the environment at the onset of occupation of Ireland.

During the period proceeding human occupation, Ireland was blanketed in ice. Glacial sheets during 16,000 B.P., also called the Last Glacial Maximum, covered the land, making occupation nearly impossible. It was not until 13,000 B.P. that humans began settling parts of Europe (Dowd 2016:158). This settlement phase is later than that of Britain. Archaeologists have found evidence of Paleolithic settlements around modern Wales, West Scotland, Scandinavia, and Iberia from around the same time. It is likely that hunters had visited Britain and Ireland for a few months at a time in order to hunt horse and reindeer during the Pleistocene-Holocene transition and then return to their villages on the mainland. After the Last Glacial Maximum, cold adapted mammals, that either migrated to Ireland or survived from previous times, emerged. Bear, giant deer, mountain hares, and arctic lemming began populating the area and aided in the pull of humans to the island for hunting. Soon after, people moved to Ireland by boats and by the Scotland land bridge to hunt the sparse faunal populations there.

As the climate warmed and people spread, the previous hunters were able to settle more permanently. Recent analysis of human-worked bear bone, roughly dating to 12,500 B.P. by Dowd and Carden (2016) demonstrated the presence of people in Ireland before erected settlements at Mount Sandel during the Early Mesolithic. The bear patella found in Alice and Gwendoline Cave of Southern Ireland, had interned crushing marks

from lithic tools, suggesting chopping through the knee to strip the carcass for use (Dowd 2016:161). The bear may have also been targeted specifically for ritualistic use in a similar fashion as mainland European groups (Dowd 2016:160). The continuation of the tradition is evidence for where the people were migrating from. Similarly, the dates from the bear patella coincide with warming climate conditions across all of North Western Europe, which allowed people to stay longer in areas that were previously only useful during particular seasons (Deifendorf et al. 2006). The correlation between warming climate and the movement for people is another example for the influence of the environment on human history.

As time progressed, Mesolithic hunter-gatherers, likely from Scotland, migrated to the still warming Ireland and began occupying the upper regions of the island from 8,000 B.C. to 3,720 cal B.C. (Deifendorf et al. 2006; McLaughlin et al 2016). Mesolithic colonizers in the latter half of the period began to bring domesticated animals, including cattle, from Neolithic Britain. The Final Mesolithic, characterized by rough stone tools around 6,700 cal B.C., ends with the introduction of more intense agricultural practices from mainland Europe (McLaughlin et al. 2016:124).

The Neolithic was characterized by agriculture and the rise of a new hierarchical society evidenced by the start of Megalithic tombs and shift in housing data. The Neolithic period in Ireland ranges from 4,000 to 2,500 cal B.C. and is represented by 1,150 radiocarbon dates from 177 sites (McLaughlin et al 2016:121). By 3,720 cal B.C., agriculture, including domesticated livestock and crop farming, had made its way into North Western Ireland. The start of the cultivation of cereals corresponds with rectangular housing during the Neolithic “House Horizon” (McLaughlin et al 2016:125).

Carbon dating from Ceide Fields, a prominent agricultural area in north, solidified the dating of agriculture to this time. With the rise of agriculture, more solidified groups began forming in Ireland, based around hierarchical social systems typically accompanied with agrarian societies (Hassan 2009:52). The rise of megalithic structures followed the formation of the sedentary societies in Ireland and Britain, implicating the groups were gaining more than enough energy from farming. Early portal, court, and two passage tombs have been loosely dated in the time of 3,700 – 3,570 cal B.C. (McLaughlin et al 2016:125). As resources became more available with farming, the population grew and hierarchical chiefdoms became the relative norm in Ireland. Megalithic structures required large-scale organization, which is evidence for this new social structure. The intense shift in the housing and burial methods contrasts to the earlier settlement period where little is seen, which is evidence for the drastic ways the new subsistence technique and social structure shaped the Neolithic period.

By the Middle Neolithic, a shift in housing practices occurred and larger Passage Tombs began appearing. From 3,640 – 3,400 B.C., marked by Whitehouse (2014) and McClatchie (2014), the disuse of rectangular houses and settlements dominated by “complexes of pits and midden material,” and the distribution of these sites is more widespread throughout the island (McLaughlin et al 2016:127). However, the rate of settlements declined as compared to earlier in the Neolithic. Similarly, the building of port, court, and early passage tombs also declined, and a continued use of previous monuments characterized the period (McLaughlin et al 2016:128). These results correspond with deforestation rates around the same time. It is possible that there was a shift in practices during this time as well. However, by 3,400 cal B.C., a sudden

flourishing of megalithic passage tombs, used as cemeteries, accompanies a lack of settlement data visible in the archaeological context (McLaughlin et al 2016:128).

The late Neolithic appears to have been a resurgence of earlier housing and ritual use of the megalithic tombs. Dating to 3,000 cal B.C. until 2,500 cal B.C., it began with the “rise of settlement signals and the end of main phase burials in passage tombs” although ritual use appears to have continued longer through the evidence of grooved pottery ware (McLaughlin et al 2016:130). Settlement complexes of pits, postholes and spreads along with cremation pits, individual burials, burials in cairns, and reuse of megalithic structures depict the lives and resting places of the late Neolithic people (McLaughlin et al 2016:130). Timber became an important building material in settlements again, although not as frequently as in the early Neolithic. Smyth (2010) discusses these “Timber Circles” and their ritual and domestic interpretations as these wooden henges also characterize the time. However, they have not been well dated, so their association is not well understood (McLaughlin et al 2016:130). While the latter half of the Neolithic is blurry due to the lack of data available, it is possible to tell that the people during this time were still holding onto the traditions of the early Neolithic.

## THE BRÚ NA BOINNE

The Brú na Bóinne, anglicized to the Boyne Valley, represents the height of the Megalithic tomb-building phase during the Neolithic in Ireland. Eogan (1997:11) describes the Neolithic economy at Newgrange as mixed farming that must have been highly stable in order to develop into a community that could engage in “non-productive activities” like megalithic tomb building. In total, there are 843 Neolithic tombs that dot Ireland’s surface, 26% of which are categorized as Passage Tombs (Pendergast 2016:5). The most prominent of the Megalithic Tombs are the three great Passage Tombs of the Boyne River Valley. As seen in figure 1, Knowth, Newgrange, and Dowth, run East to West along with their smaller satellite tombs, follow along the lowland hills of the Boyne River Valley. Roberts (2015) argues that the collective site demonstrates significant changes and advancements during cultural and economic growth in the Neolithic. The sites in the Boyne Valley paint these megalithic builders as a well-organized society who partially developed in response to a rise of population. Roberts (2015:45) argues that the development of these sites resulted in a culmination of Neolithic tradition, and presents the idea that there is a significant correlation between the act of building the passage tombs as a part of the Boyne Culture Group. Furthermore, Pendergast (2016:116) considers these developments as “doctrinal religiosity” that coincided with new ambitions for the society. By doctrinal religiosity, Pedergast is describing a hierarchical system that

controlled the overall development of the growing population through the use of ceremonies at the tombs in the Boyne Valley.

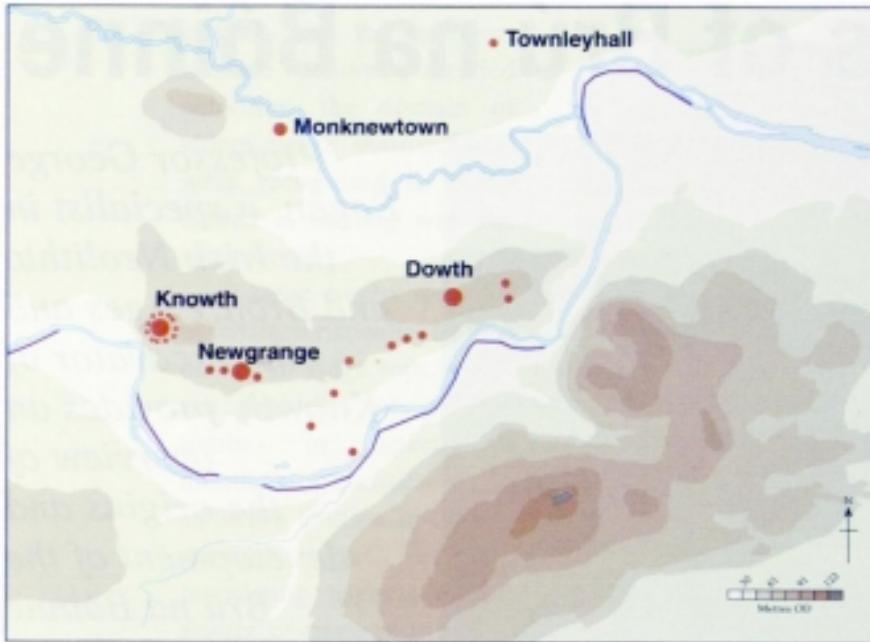


Figure 1. The layout of the Passage Tombs in the Boyne River Valley. From Eogan. (1997).

Before the Passage Tombs were built, large family farms occupied the area and had already deforested the land for grazing and wheat cultivation (Eogan 1997:9). Studies from the Bricklieve and Moytirra Passage Tombs noted that the forest had been burned and suggest farming in the Neolithic may have consisted of slash and burn or used as leaf fodder for animals (Mount 1996:3). This phase of clearance was followed by a regeneration of the forests in the Middle Neolithic when the building of Passage Tombs began. Mount (1996:3) suggests that the regeneration phase resulted from more permanent field boundaries, which would have correlated with the formation of more distinct groups, such as the Boyne Culture Group.

The main phase of building in the Boyne Valley began roughly 5,300 – 5,500 years ago and the tombs are generally consistent examples of the Boyne Culture style. In the valley, the largest passage tombs range from 80-90 meters in diameter, with the smaller ones around 10 meters (Roberts 2015:49). Stone and quartz were gathered from

the north and south up to 60 kilometers away, where more Boyne Style structures were found (Roberts 2015:49). There are 41 known Passage Tombs in the Boyne Valley which is evidence for the significance of the culture group in the area. Most are smaller tombs that disperse in different ways around three great cairns, the closeness and visibility of which suggest the power of the builders (Stout 2010:198-199). All the great cairns also contain inclusive outside features, such as external flattened façades, presumably to accommodate pilgrims coming to the area (Stout 2010:200). The consistency of the outside platforms is evidence that the rituals that were likely preformed in the area had a similar structure throughout the site and were distinct to the group there.

The most prominent of the tombs today is Newgrange. Four satellite tombs

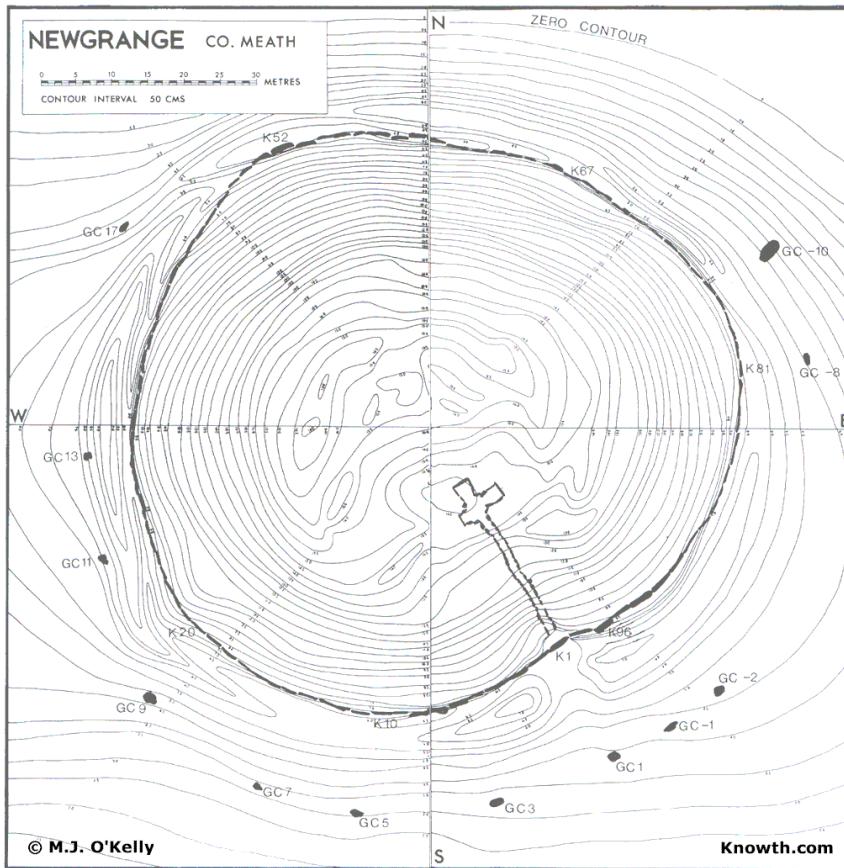


Figure 2. Depicted is a topographical map of Newgrange and the chamber within. The layout of the kerbstones is also shown. From O'Kelly (1984).

accompany Newgrange on its hill, two of which were built before the central cairn.

Intense outdoor ritual activity continued into the late Neolithic when it became enclosed

by another stone henge (Stout 2010:205). Figure 2 depicts the layout of Newgrange and the surrounding kerbstones. Furthermore, it was built on top of a previously used nomadic wooden henge, indicating that the social structure before farming did not rely on strict hierarchical social systems. Farming at the site is disputed due to the lack of saddle querns and grain rubbers at the tombs suggests that cereal processing did not take place there (Mount 1994:433). Woodman (1985) argues that the site was used seasonally, while Cooney (1987, 1991) argues the valley could have supported a large sedentary population throughout the Neolithic. Depending on who was correct would change the nature of Newgrange. However, it is clear from the technological advancements needed to build such an incredible structure that the passage tombs were central to the Neolithic society and evidence of the hierarchical social structure.

Knowth, which lies to the west in the valley, is

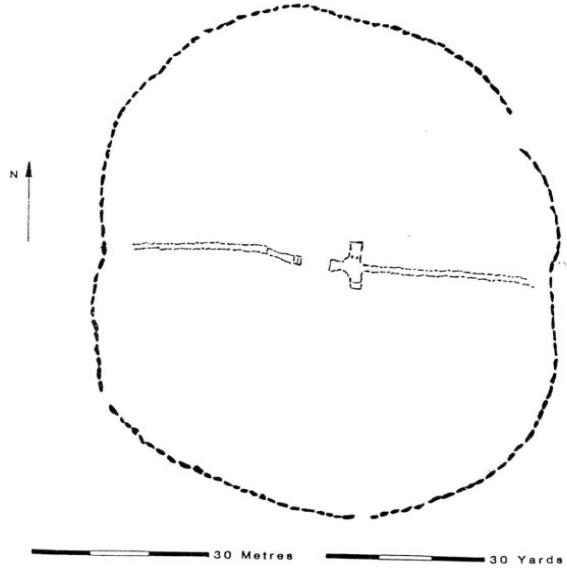


Figure 3. Ground plan of the Knowth Passage Tomb. From Eogan (1986).

the largest of the passage cairns and continues to highlight importance of Megalithic tombs through its construction. Like Newgrange, some of the surrounding tombs, set in a circle around the great cairn, were built before and after the main phase of building of

Knowth. Knowth was also built over a previous Nomadic site (Stout 2010:200). From the Iron Age until the medieval period, the main cairn was used as a fort and largely destroyed in the process (Roberts 2015:53). Originally, there were two entrances, as shown in figure 3, that each lead to separate chambers. The western path has been more extensively researched than the eastern due to the damage done on the cairn.

Dowth, lying to the east of Newgrange, is the least excavated of the three great passage tombs. Unlike the other tombs, Dowth's satellite tombs are dispersed unevenly. Only two burial chambers have been found underneath the great cairn, shown in figure 4. One entrance leads to a complex inner chamber with an "unusual arrangement of extension chambers" (Roberts 2015:56). Although there is not as much information on architecture as the previous tombs, the current evidence is enough to connect Dowth to the culmination of the hierarchical social structure that organized the rest of the Boyne Culture Group.

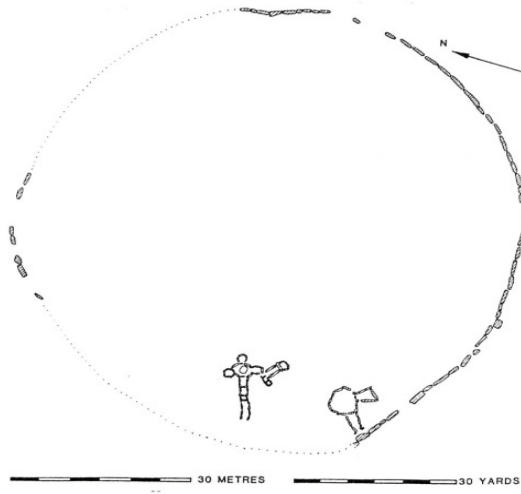


Figure 4. Ground plan of the Dowth Passage Tomb. From Eogan (1986).

## SOCIAL CONTEXT

The rise of Megalithic structures correlated with the rising population of the Neolithic age and the continuation of a hierarchical social structure. The building of the larger Passage Tombs is not seen as a sharp break between early monuments but a culmination of the processes (Darvill 1979:327). As suggested by Morris (1974:14), the building in general was likely caused by “developments in different areas as an adaptive response to social demands.” Morris continues to argue that these social demands were due to population pressure. These responses organized the newly settled people and their growing numbers in a way that had not been seen as necessary with the smaller nomadic social groups. Darvill also (1979:320) argues, the change from Court Tombs to Passage Tombs and the shift in the boundaries of settlements depict an elaborate hierarchy that had not existed in Ireland before. These arguments continue to suggest the significance of the Boyne River Valley and the culture group there as a successful social group.

As the people settled more permanently, holy places that had been used by the nomadic groups were settled and used for ceremonial Neolithic structures. This is also true for the Boyne valley (Morris 1974:16-17). The layering of the megalithic structures on top of smaller, open-air structures suggests the Mesolithic, family-based clans did not have an intensely organized and communal system. The Boyne Valley likely acted as an origin point for the new culture group that spread North and South East where we see similar style of work (Darvill 1979). Each complex represents its own mixture of old traditions and the new Boyne cultural patterns, the creation of each reflecting the different level of socio-political organization of the area (Morris 1974:15). Further, each

site has distinct variations despite the overall homogenous megalithic style. In particular, the Boyne Valley has some of the most unique styles in all of Europe.

The technological achievement of the megalithic structures is evidence for the hierarchical agrarian society that used the meaning behind these tombs to enforce its social system. Eogan (1997:11) argues that the Boyne Culture group utilized specialists such as architects, engineers, and leaders to “satisfy ritual aggrandizement.” Further, Darvill (1979:320) theorized the Passage Tombs relied on a group of individuals to maintain the hierarchy instead of an individual person. If he is correct, then it is possible the specialists made up a more elite group, projecting their view of the world onto others through the megalithic Passage Tombs. This theory has come into question because of Darvill’s limited evidence. However, it would explain how a specific population had access to the later material goods that distinguished an upper class in the Bronze Age. This theory could also explain who was buried in the tombs. Without further evidence, though, it is not possible to say for certain.

## THE GREAT CAIRNS AS ASTRONOMICAL MARKERS

The architecture behind each Passage Tomb signifies a deliberate plan to align them with specific astronomical events. The valley boasts dozens of tombs and monuments, most which are oriented to a solar or lunar event. Furthermore, they highlight the social importance of specific calendar days, which may have been used for ceremonies, and the hierarchical system that likely influenced the creation of the tombs. The architectural achievements strongly signify the ability of the people who built them and the way they related to the natural world, making the whole area sacred, and displaying how they understood the cosmos.

Newgrange is one of the most accurate astrological markers in Ireland, and is the least damaged of the three major cairns. On the winter solstice at sunrise, the sun falls through a unique roof box to fill the center chamber down a 22-meter-deep hall (Roberts 2015:55). Further investigation revealed that the tunnel was on a slight gradient to accommodate the bending light of the rising sun. Furthermore, a rectangular stone placed at the entrance of the great cairn produces a shadow over it during the midwinter sunrise. On top of this stone was another triangular one, depicted in antiquarian reports, which would have bent the light of the sun further, directing it to the very back of the inner chamber (Roberts 2015:52). The meticulous placement of these stones suggests the importance of Newgrange as an astronomical marker and the focus the Boyne culture had on the stars as part of their ceremonies.

Knowth's astronomical purpose is less clear than that of Newgrange, but still appears to align with an astronomical event, continuing to exemplify how the culture group related to the cosmos. A large standing stone, similar to the one at Newgrange

causes a shadow to appear at the equinox sunset over the western entrance (Roberts 2015:55). The similarity between Knowth and Newgrange in this aspect makes it appear as though they had a similar social meaning during the Neolithic. Current theories suggest it is to measure lunation periods but “long term onsite observations” would be needed to test the theory (Roberts 2015:54). Morris (1974:14) suggests lunar cycles would come into effect for an agrarian economy and should be considered. If Morris’ argument is valid, we can continue to observe the megalithic structures as representations of astronomical observations made by the hierarchical system.

Even though Dowth has not been as thoroughly researched, it is still obvious the passage tomb correlates with an astronomical event. Aptly named Dubad, “house of Darkness” in ancient times, it is oriented toward the midwinter sunset (Roberts 2015:57). By marking the longest night of the year, the tomb highlights the significance of change in seasons as the days begin to grow longer.

Outside of the great cairn complexes are the smaller satellite tombs, many of which have astronomical orientations as well. Although many have been destroyed, 10 of the 28 cairns have identifiable orientations while 5 have significant solar positioning (Roberts 2015:59). Cairn T, on the highest hill overlooking the valley, aligns with the equinox sunrise when a decorated chamber at the back of the cairn is illuminated. Nearby, Cairn L is oriented toward the cross-quarter position while Cairn V appears to also align with the winter solstice (Roberts 2015:60). Many of these observations would have required years devoted to learning to understand the flow of the stars, moon, and sun, and taken time to engineer the tombs so perfectly. The author argues those making these observations and designing the tombs would have been a part of the elite social

group. Overall, the architecture of the tombs in the Boyne River Valley is evidence for a large, hierarchical community that used the sites for worship, astronomical calendars, and as a feature allowing the surrounding people to connect to each other.

## ART OF THE TOMBS

The art displayed within the Boyne Valley is specific to the Boyne Culture Group, and, even though it is very abstract and lacks direct interpretations, the symbols still signify the unique importance of the site. Not only do the structures contain the largest amount of Neolithic art in Europe, but the Boyne Valley also has its own distinct style in comparison to the rest of Ireland. Roberts (2015) notes the carvings are distinct in quality and design from any of the previous art found in Ireland. His point indicates the Boyne Valley group were operating in a significantly different manner than the groups who previously inhabited the area. This difference is evidence for the new social structure that began in the Neolithic.

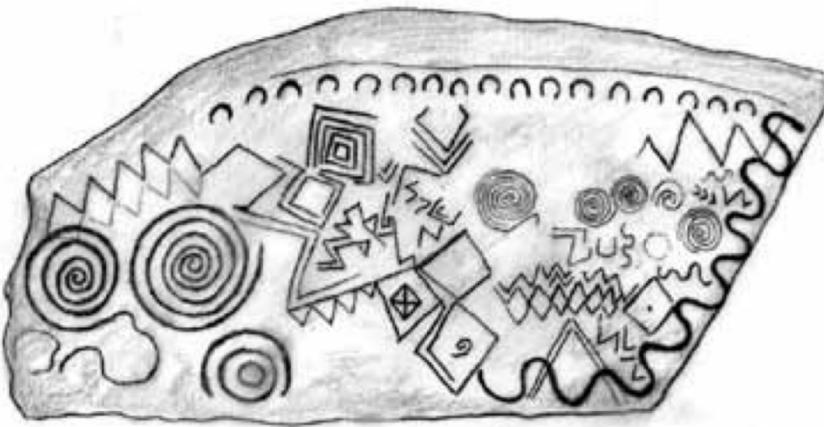


Figure 5.  
Example of  
megalithic art  
from Kerbstone  
SE2 at Knowth.  
From Roberts  
(2015).

The art in Newgrange contains some of the most complex pieces. 84 panels of art have been recorded and are placed throughout the complex. Kerbstone K18 has the most intricate spiral pattern in Megalithic art and hidden panels can also be seen which suggests they were created before the site (Roberts 2015:47). Knowth contains the largest amount of kerbstones and megalithic art in Europe, surpassing Newgrange significantly in size and variation of symbols. With 250 panels of art, which Figure 5 depicts, Knowth

is the most significant when examining the unique art of the late Neolithic (Roberts 2015:47). The art found on the few surrounding Kerbstones at Dowth is much less extensive than the previously discussed sites. With only 30 panels of art, the predominant markings on these stones are cup marks and circles, also called “sun symbols”. One Kerbstone, shown in Figure 6, is referred to as the “Stone of the Seven Suns” due to its depiction of seven sun symbols, possibly relating to the seven astronomical points that were visible in the night (Roberts 2015:57).

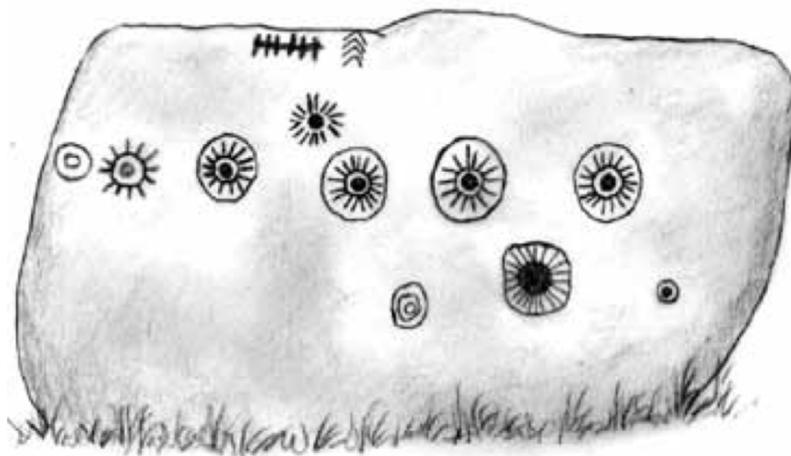


Figure 6. Example of Kerbstone K51, or “The Stone of the Seven Suns,” found at Dowth. From Roberts (2015).

The overall designs throughout the Boyne Valley have been largely disputed in their meaning due to their arbitrary forms. Roberts (2015) describes some of the carvings to have been created through a “pecking” or “scratched” technique and some were even left unfinished. This evidence suggests they were continually working on the tombs. Furthermore, much of the art throughout the tomb is fluid or geometrical, consisting of circular designs with markings inside of them or zigzags, triangles, circles, and lozenges. Eogan (1997:11) argues the shapes are non-representational. However, more complex art is located deepest within the tombs, suggesting they were only visible by specific members of the population (Thomas 1991:11). Therefore, the “reading of the tomb was

different depending on an individual's social status" (Thomas 1991). This suggests symbols would have intrinsic meaning based on where a person stood and where they had access to, further signifying the structure of the social system. However, it is impossible to tell exactly what they meant because there is no written record of what the society intended them to be.

## RITUAL AND RELIGION AT THE CAIRNS

“Monuments bring to mind the absent,” and the landscape of the Neolithic was reconstructed by the building of monuments to do just that (Thomas 1991:9). The Boyne Valley sites functioned likely ritually to focus on organizing the society through ceremonies based on the evidence previously discussed. Morris says the cairns acted as more than tombs by providing a center for ritual activities and a resource for information (1974:10). Using ritual organized the social units in the area, and was necessary to order a “predictable human existence” such as in this agrarian society (Morris 1974:12). By 4000 B.C., megalithic monuments all over Ireland were constructed in a way that directed people into a “particular movement” through which they would relate to the world (Thomas 1991:11). The great cairns in the Boyne Valley were similarly built where the journey inward was the focal point. Here, where burials focused on destroying and rearranging the body, the focus was the monument itself, and the group identity it could give to the community.

Burials in the Passage Tomb cemeteries are the most descriptive evidence of the society and consist almost entirely of cremations. Although the amount of these cremations varies from one tomb to another, the deposits typically consisted of multiple individuals and were deposited in layers between slabs of stone (Eogan 1997:11; Cooney 2014:199). The layering of depositions suggests either a separation of time or group. Some bones were often left unburnt as well. Primarily, these bones would be the skull, which Cooney (2014:201) suggests acts as a tool to represent a shift from “direct experienced memory” to a “referential, collective” memory of the ancestors. One of Knowth’s satellite tombs, site 16, contains one of the best evidences still intact of these

burials. Here, 2 cremation deposits rest between layers of stone and another deposit rests further back in the tomb (Cooney 2014:203). Each deposit contained 1-4 individuals mostly of adults with some non-cremated bone of one neonatal and two infants. Interestingly, the weight of the cremated remains weighs less than what should be expected (Cooney 2014:203). Cooney (2014:203) argues that the specific depositional activity in cremation was used for people of greater social concern that caused the group identity to become etched into the fabric of the Passage Tombs. Through these ceremonies and burials, he says the group could ensure a continuous attachment to the “other” and the ancestors. This direct depositional activity would have also reinforced the social hierarchy.

The burial chambers in the Boyne Valley also contained objects that have been considered grave goods. These objects were likely personal goods ranging from beads of varying material, bone pins, and pendants. However, there is no evidence for tools or weapons along with them (Eogan 1997:11). Pottery vessels were also often found in the chambers with the cremations. Specifically, Grooved Ware Pottery sherds at Newgrange, and other pottery assemblages are evidence the monuments correlated with a culture style throughout Neolithic Ireland (Mount 436). According to Eogan (1997), Grooved Ware Pottery played an important symbolic role in ceremonial activities. The inclusion of the pottery here suggests that while the Boyne Valley had a specific style, they were also connected to the larger culture of the Neolithic. Stone basins sit throughout the passages of the great cairns, but they were moved from their original position so their context to the larger site has been destroyed. Although the exact meaning behind the objects left to

the dead is difficult to decode, we can tell that the Boyne Valley group greatly honored the process of burying certain members of their society.

Structures outside of Newgrange continue to suggest the ceremonial importance of the site throughout the Neolithic. Complexes around Newgrange found by O'Kelly and Eogan consisted of woodhenges, an enclosing clay bank, and free-standing circle of great stones. (Mount 1994:433). There were also 17 hearths found by O'Kelly near open pits and structures, some with bedding trenches, in front of the entrance to the great mound (Mount 1994:433). The bedding trenches seem to represent a domestic presence at the site although Eogan and Cooney argue they were not for permanent use. The exact nature of the structures is under debate; however, they do clearly indicate a use of outside features and furthering construction on the site, possibly for ritualistic purposes.

Sweetman later found evidence for prolonged burning and animal cremation in pits. Inside the timber circles are a large amount of burned pig remains, which Cooney (1987) suggests may indicate the animal's ceremonial importance and the overall economy of Newgrange and the Boyne Valley. Despite being on open land, which is good for cattle, pig remains were still found in much higher concentration, suggesting the animal had a more specific purpose. Pig further connects to other sites in Britain where ceremonial feasting with pig took place. Animal assemblages at Newgrange consisted of burnt and unburnt pig, cattle, dog, sheep, and goat remains (Mount 1991:437). Furthermore, according to Mount, the specific deposition of remains in certain areas of the site suggests each area had a specific role in the ceremony (1991:437). If animal depositional patterns mirrored the human ones inside the tombs they could have served to order social divisions among participants in the ceremonies.

Mount (1991:437) further compares Newgrange to the Wessex henges where animal remains “represented an element of the natural world” and therefore emphasized ritual re-ordering and the exploitation of animal symbolic power. Furthermore, there is comparatively far more meat here than other sites in Ireland without evidence of severe butchering in order to gain all available calories from the food (Mount 1994:441). Therefore, the apparent mass butchering did not take place during times of stress. Aside from pig, cattle remains were found in large quantities, however, the cattle was of a specific age range suggesting they were picked as prime individuals from an outside herd (Mount 1994:441). Specifying the types and quality of animal is evidence the butchering took place when the society could spare resources for elaborate affairs.

All of this evidence serves to suggest large feasts were taking place around Newgrange and likely the other sites of the Boyne Valley. According to Darvill (1979:325), redistribution of resources is important to maintain standards in a hierarchical society and may have been done periodically. Redistribution of goods also maintains an element of peace and connection throughout the social group. It is therefore possible feasts either took place during significant astronomical events or as part of the burial practices.

## SHIFT TO THE BRONZE AGE

The shift from the Neolithic into the Bronze Age is hard to pinpoint due to the disputes in chronology and destruction of the sites. At Newgrange, the original theory behind the animal deposition was Beaker people “squatting” on the land (Mount 1994:433). In the Boyne Valley, Grogan (1991) suggests the Beaker phase commenced after 2580 B.C. and stopped sometime after 2300 B.C. He came to this conclusion by using radiocarbon dates taken from Newgrange and Knowth. Beaker pottery was similarly found within post holes and throughout the site (Mount 1994:435). However, concentrations of pottery were largely mixed together so exact chronology is hard to identify (Mount 1994:435).

While a decline in population, a shift to wetter climate, and decrease in pollen count during the latter half of the Neolithic is not disputed, it is argued whether they were related. The shift was accompanied by a gradual change in the types of tombs used to individual burials suggesting the previous social system and fundamental cultural beliefs shifted as well. According to Morris (1974:15), it appears the cultural elements of the megalithic period were “separated out and recombined” through the new developing social patterns. Through the combined effects of a decreasing Neolithic state, the Bronze Age society was able to continue some of the left-over customs of the megalithic builders.

The original excavations at Newgrange by O’Kelly (1982:1983), found the use of “sod stripping” to provide turfs for the cairn mounts as precipitating a socio-economic decline that devastated the Boyne Culture Group in the valley. The activity that followed the fall was discussed through a very different social context where the Beaker people

had a lower standard of living and subsistence was concentrated on cattle and pig (Cooney 2006). According to those original reports, the extravagance of the tomb building had destroyed the economy. By 2000 B.C., Eogan (1981:52) suggests the Passage Tombs of Ireland had completely gone out of use.

However, the precise nature of Newgrange during the Bronze Age appears to be much more complicated. The finding of Grooved Ware, a specific Neolithic type vessel, at the site in relatively close context to Beaker vessels make any marked break between the Neolithic and Bronze Age difficult to pinpoint (Cooney 2006:699). Cooney (2006:702) brings up the two debates that make it difficult to interpret the chronological events at Newgrange. The argument of when the erection of the stone monoliths around the main cairn took place could indicate the exact nature of the transition. O'Kelly suggests they were built before the Newgrange wall facing collapsed while Sweetman suggests they were erected after the timber henges in front of the tomb (Cooney 2006:702). Depending when the structure was built changes the outcome of the of the site and when the Beaker culture took root, however more analysis needs to be done.

The shift from large communal Passage Tombs, like the Boyne Valley sites, as the primary form of burial to individualized cist tombs depicts one of the most significant changes in culture. From the late Neolithic to the early Bronze Age, the archaeological record consists largely of inhumation, depicted in a cist grave in Figure 7, and cremation burials with very few examples of reuse of older tombs (McLaughlin 2016:130, Eogan 1984). McLaughlin comments that much of the current research in Ireland has been too focused on the Early Neolithic. However, he does say diversification of tombs began in Ireland during the Late Neolithic as tomb types overlap (2016:137). As McLaughlin

suggests, this form of individual burial was introduced to the southern half of the island first by the Beaker People, and spread to the northern half through expansion or diffusion. ApSimon (1986:11) further describes the shift in types of burials as a “decisive change” in social organization where the Beaker People gained prestige through their achievement in life where as the Neolithic groups gained it through lineages. In his opinion, this shift occurred during the Late Neolithic and used the old megalithic tombs in new ways as a form of continuity to “legitimize the new social order” (ApSimon 1986:11).



Figure 8. Example of a cist grave and vessel from Grave no. 6 in the Keenoge, Co. Meath, cemetery. From Waddell (1990).

The grave goods buried in the individual graves further diversified the Bronze Age from the Neolithic and typically reflected the identity of the Beaker People. Often found with the Beaker individuals were highly formalized goods such as beaker vessels,

archer's wristgaards, arrowheads, earrings, belt fastenings, leatherworker and bronze worker tools (Thomas 1991:11). The shift into more formalized grave goods is evidence for a rising individualized class, possibly through the gain of prestigious goods where the body of the individual becomes the most important feature of the burial. Thomas (1991:11) argues the significant change is caused by people viewing the body as representative of the group instead of the physical tombs. Identity was now given in death that related the body specifically to the Beaker group. ApSimon (1986:11), wrote that this change could have taken place due to lower groups assuming the new culture, through aggression of the Beaker people, or through new groups gaining prestige through "prestige goods".

## THE INFLUENCE OF CLIMATE

It is clear that the shift in social organization during the Late Neolithic and early Bronze Age was significant; however, it is not entirely clear how much the environment influenced this change. In order to discuss further, the argument will compare the Boyne Valley to Chaco Canyon, consider the different discussions against and for the farming potential during this time, and ask what questions still need to be researched.

The abandonment of Chaco Canyon at about 1150 A.D. is comparable to the Boyne Valley since the influence of climate and geography on the society is visible. The hallmark of the Chaco region was “extraordinarily large, massively-built, geometrically formal buildings called “Great Houses” by Lekson and Cameron (1995:185). Great houses were public facilities surrounded by smaller family habitations and usually a Great Kiva. The scale of these settlements implies a hierarchical society similar to that of the Boyne Valley. Goods and people passed through the Chacoan region from every direction, however, Lekson and Cameron (1995:187) mark that the role of the society as unclear. What can be sure is that the Great Houses of Chaco were not pueblos, and would have only housed elite members of the society, if at all (Lekson and Cameron 1995:187). However, this period of economic growth did not last, and eventually drought in 1080s and 1090s caused a decline in the resources available. A second severe drought caused “the final blow” according to Lekson and Cameron (1995:188) in 1130 A.D. Joseph A. Tainter (1989) argues that the economy of Chaco fell after over stretching its resources too far during the droughts instead of changing their ways. Although arguments differ on how and when, there is evidence the Chacoan group migrated to another area in Mesa Verde, which caused the Chacoan region to “balkanize to varying degrees” (Lekson and Cameron 1995:189). According to Hassan (2009), this over-usage of resources despite

the changing climate is what causes a society to collapse. By not adapting to the new climate, the Chacoans could not continue their previous organization and became something new. If the same over-extension of resources happened in the Boyne Valley during a climatic shift, then the influence of the environment becomes much clearer.

Bishop (2015) summarizes the main debates and limitations in analyzing the environmental influences and chronology of Neolithic farming. This argument is key for any paper analyzing the Neolithic because it potentially changes the nature of the period. This is especially true for this enquiry because archaeobotanical data could prove whether the environmental influences were significant enough to affect the nature of Neolithic farming. One argument focuses on the deterioration of agriculture during the Late Neolithic throughout the British Isles in conjunction with climate change while the other argues agriculture remained strong well into the Bronze Age (Bishop 2015). The former of the two relies on the lack of evidence for cereal goods and forest regeneration throughout the British Isles. However, as Bishop (2015) points out, lack of data can be caused by the number of samples taken, focus of archaeologists, and taphonomic reasons. All of which appear to influence the research describing the Late Neolithic farming capacity. Furthermore, woodland regeneration does not account for small-scale, intensive farming plots which may have been used by Late Neolithic farmers (Bishop 2015:836). Likewise, Cooney (2006:701) argues there is no reason to assume the environment significantly changed during the transition between the Neolithic and Bronze Age. This is because the economic potential of the area supported a society as large as the Boyne Valley and would have needed to change dramatically to cause its fall. It is notable, however, that there was a shift in planting barley, a more water resilient crop than wheat,

which may indicate an adjustment to the wetter climate (Bishop 2015:847). If that is an accurate assessment, then the Boyne Valley Group did not remain conservative, which Hassan (2009) argues is why a society collapses during climate change. However, the diversity of the Neolithic climate in the British Isles makes it difficult to identify the exact chronology of farming. Therefore, the relationship to the shift in social structure is difficult to understand as well. According to Bishop (2015), abandonment of agriculture must be taken in the context of local environment and social factors. This means more research on the Boyne Valley itself needs to be done in order to have a clear picture.

Despite the lack of evidence in the Boyne Valley, other sites may indicate a general trend of what happened. Mount (1996:3) argues for a fundamental change in Neolithic agriculture practices based on the landscape use in the Bricklieves Passage Tombs in Ireland. If this assessment is accurate, then the agriculture may have been shifting elsewhere in Ireland as well. Mount's (1996:7) study argues that the Bronze Age people left the plateau in which the tombs of the Neolithic rested, a similar shift that appears in the Boyne Valley. This may have been because of the loss of tree cover and the development of blanket peat in the area which caused the people to stay away from the highland areas (Mount 1996:7). These environmental factors would be even more significant if they were caused by the previous subsistence techniques of the Neolithic, such as land clearance. A decline in agriculture preceded the movement off the plateau during the Late Neolithic. Mount (1996:7) says the correlations between monuments and environmental events remain to be tested, however.

## CONCLUSION

Overall, without more specific data relating to the Boyne River Valley it is hard to say with certainty whether a climatic event did influence the shift of the Bronze Age away from the Megalithic Passage Tombs. Based on the current evidence, it appears more likely that the shift into the Bronze Age correlated to a change in climate, but it is not visible in the data how greatly it influenced the society. In order to continue analyzing these influences, future research on the chronology of farming in Ireland needs to be completed. These studies can include archaeobotanical research on seeds used, where, and how many, and what types of subsistence techniques continued into the Bronze Age.

Current evidence also suggests the shift occurred gradually due to the introduction of new material goods through the Beaker People that caused a new social identity to form. An increase of cultural exchange between the Beaker People and the Boyne Culture Group may have influenced the society more. This could have been caused by invasion, peaceful integration, or cultural diffusion through exchange of goods. However, more research on the nature of the movement of the Beaker People needs to be done as well.

Despite the inconclusive nature of this study, the possibility of environmental influence on societies is evident. The Neolithic revolution in Ireland would not have taken place had the conditions for farming not been present. Similarly, this type of environmental analysis can still be used for modern societies in order to prepare for changes in climate. One thing is for certain however, societies are continually influenced by the surroundings, natural and cultural, and fluctuate depending on how groups react to time of stress. This thesis has evaluated the shift between the Late Neolithic and Bronze Age use of the megalithic Passage Tombs in the Boyne Valley, and while it has found the

shift in use depicts a change in social organization, the environment influences remain to be clearly tested.

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