

SOLAR ALIGNMENTS AND THE RITUAL STRUCTURES OF NEOLITHIC ORKNEY

By

Megan Kasten

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Megan Kasten, B.S.

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The Neolithic period arrived around 4000 B.C. in Britain, along with pottery, domestication of animals and plants, and a burial mound tradition from Continental Europe. This tradition quickly spread throughout the British Isles. Within a few hundred years it had taken hold of Orkney, a group of islands off the northeast coast of Scotland. This landscape is dotted with both numerous burial cairns and a few stone circles from the Neolithic time period. Archaeologists have recently taken to studying the alignments of these structures to comment on the proposed rituals that were performed, especially those that were centered on the solstices. By comparing the orientations of these structures, one can determine whether they were related in religious purpose or if there was no connection whatsoever. I will be comparing these megaliths on both a typological and regional basis to determine these possible spatial relationships.

ACKNOWLEDGMENTS

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INTRODUCTION

The Neolithic period began around 4000 B.C. in Britain when new ideas, including that of pottery, animal husbandry, plant domestication, and the construction of passage graves, came from continental Europe. Although it is now known that the subsistence pattern of these people was primarily focused on the herding of cattle and some exploitation of cereals, the ritual landscape remains relatively unknown (Whittle 1999). It is often said in archaeology that if one cannot be sure of the purpose of an artifact, chances are it was either a gaming piece or was a ritual object. Without the assistance of written records, it is virtually impossible to determine the intricacies of religious life from this time period.

Because of the difficulties in determining the religious practices of the Neolithic, astronomical alignments have been the focus of some study, even in the Victorian era. The orientations of Stonehenge with the moon and sun were studied by Rev. Edward Duke of Lake House, Sir Norman Lockyear, and Gerald Hawkins, to name a few (Burl 2007). It makes sense to look for these alignments; they permeate both past and current ritual practices. The east-west orientation of the body is a common way to identify both ancient and modern Christian burials (Jordan 1982). Sometimes the alignments instead indicate an imitation of nearby topography, as is found in the case of the Sacred Rock of Machu Picchu (Highland Adventures 2012).

However, some of the more recently proposed theories seem to be overreaching. In 2008, Mike Parker Pearson suggested that perhaps Stonehenge and a nearby woodhenge were involved in a ritual procession following the River Avon during the Midwinter and Midsummer solstices. In this example, the woodhenge would have symbolized the living descendents while Stonehenge

stood for the dead ancestors. This idea is an attractive one that offers a detailed answer, but the fact is that Parker Pearson drew these ideas from a culture in Madagascar (Snodgrass 2008). Although the idea of ancestor worship has been used to describe the British Neolithic, lending this theory too much validity borders on the fantastic. One can assume that, along with the burial tradition and other attributes of the Neolithic, religious ideals probably diffused with the new material culture.

The Neolithic did not reach Orkney, a group of islands off the northeast coast of Scotland, until around 3500 B.C. (A. Ritchie 1985). The landscape of Neolithic Orkney is similar to that of England because it has been altered by both passage graves (referred to henceforth as cairns) and stone circles. Similar theories mirroring that of Stonehenge have been proposed for the Ring of Brodgar, one of Orkney's most famous stone circles. It has even been demonstrated that Maes Howe, a large megalithic cairn, has been aligned with the Midwinter sunset (an orientation it apparently shares with Stonehenge). It is for these reasons that I have decided to look at Orkney for insight into Neolithic rituals practiced in Britain. Cairns, as burial structures, are very clearly associated with death. In Parker Pearson's example, stone henges were associated with death and rituals of renewal. If celestial alignments were important in Neolithic ritual, because these structures share a common theme, it can be inferred that these structures would share related rituals and similar alignments.

There have been a few studies concerning the alignments of megalithic structures in Orkney, usually focusing on a southeastern alignment, where the sun rises on the Midwinter solstice. A figure created by D. Fraser incorporates all of the alignments of the known cairns at that point into one diagram (Davidson and Henshall 1989) (Figure 1). All that one can determine from this is that most cairns are aligned somewhere between south and east, but that not all of

them are. Rodney Castleden even goes so far to say that southeast is considered a “common orientation for Neolithic tombs in general” (Castleden 1992:306). My own analysis suggests that this is an overly generalized statement.

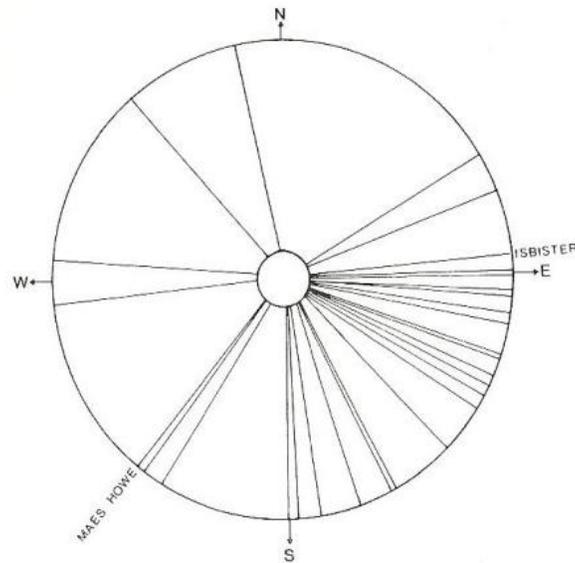


Figure 1. Fraser's Diagram demonstrating Orkney Cairn Alignment.
(Davidson and Henshall 1989: Figure 30)

One can assume that, because of their iconographic and widespread nature across Britain, stone circles were related in the rituals associated with them. If a southeastern alignment does play a large part in rituals pertaining to death, one would expect similar alignments between the structures involved in these rituals. This study will compare the alignments of both the cairns and henges of Orkney to determine whether they were involved in similar rituals, or if orientations were one of the primary foci of these structures at all.

CHARACTERISTICS OF THE NEOLITHIC

Unlike other cultures, as Britain transitioned into the Neolithic time period, the people remained relatively mobile. To this day there is little evidence for permanent settlements. What archaeologists do know concerning this time period indicates that in addition to wild resources exploited since the Mesolithic, the Neolithic people were now herding cattle and sheep. It is thought that the causewayed enclosures that are found across southeastern Britain's landscape were used as a sort of corral to aid in butchering practices at certain times of the year (Whittle 1999). The focus on herding contributed to the amount of deforestation that occurred. In terms of plant domestication, Whittle also mentions that stands of grain might have been cultivated in limited amounts. There have been a few more permanent structures that date to the Early Neolithic, including those found at Lismore Fields and Balbridie, but the purpose of these structures, as either residences or places with ritual significance, is still hotly debated (Jones and Rowley-Conwy 2007; Thomas 2004). In the case of Orkney, it appears that the population was less mobile. The houses of Orkney are permanent because they are built of the most readily available material, stone. They still herded sheep and cattle, but the circumscribed nature of the islands made permanent housing more efficient. Even though the Neolithic Orcadians were sedentary, plant domesticates were still exploited at a minimal level; their diet was instead supplemented by marine resources (Whittle 1999).

Pottery became regionalized quickly as it was introduced to Britain. As time went on, the regional types were replaced by the types known as Grooved ware and Peterborough, which were followed soon by the Bronze Age Beaker tradition. This transition has become important in Orcadian archaeology. The shift from Unstan ware (the regional pottery of the Early Neolithic

in Orkney) to Grooved ware is mirrored in the shift between chambered tomb type (Whittle 1999).

THE CHAMBERED TOMBS OF ORKNEY

Although they differ in form, the passage graves and chambered tombs of Britain are all associated with ancestor worship, fertility rites, and territorial behavior to some degree. Like all Neolithic passage graves, those of Orkney have a distinct regional structure. Orkney's cairns can be broken up into two groups: the Orkney-Cromarty type and the Maes Howe type. Orkney-Cromarty type is associated primarily with Unstan ware, while the Maes Howe type is associated with Grooved ware. Because of this dichotomy, it has been postulated in Orcadian archaeology that these two types might reflect two different, distinct cultural groups (Henshall 1985).

Orkney-Cromarty Type

The Orkney-Cromarty type (henceforth referred to as the OC type) can be broken down into three sub-types. The oldest and simplest of plans is that which is called a tripartite chamber (Davidson and Henshall 1989). It can be best described as one large chamber that has been subdivided into three parts by two pairs of upright stones. At the entrance there is typically another pair of upright stones called portal stones. At the back of the last chamber there is what is known as a back slab (Figure 2) (Davidson and Henshall 1989). The second type of OC cairn is called the stalled cairn. Basically, it resembles a tripartite chamber that has been expanded anywhere from four to fourteen chambers (Figure 3). Finally, the third type of OC cairn is called the Bookan type, another variant of the tripartite chamber (Figure 4). However, the Bookan type consists of anywhere from two to six compartments surrounding one main chamber (Davidson

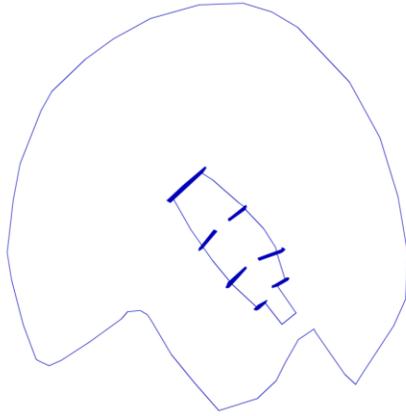


Figure 2. Tripartite Chamber (Quoys) (redrawn from Davidson and Henshall 1989: Figure ORK 56).

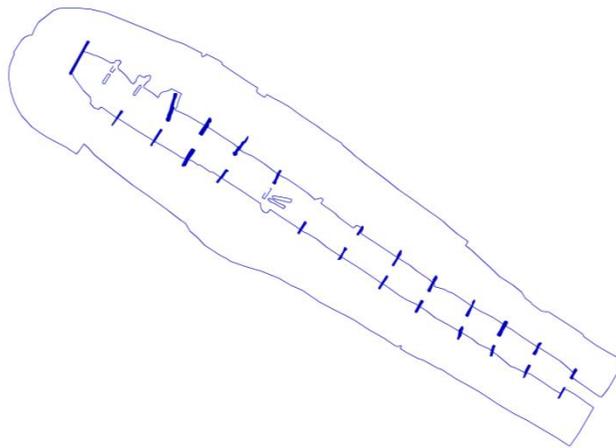


Figure 3. Stalled Chamber (Knowe of Ramsay) (redrawn from Henshall 1963: Figure 25).

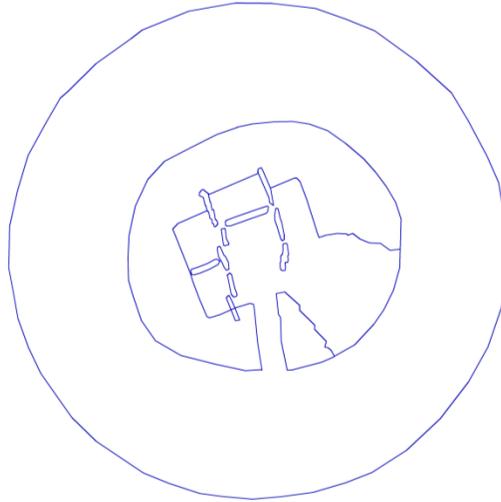


Figure 4. Bookan Chamber (Bookan) (redrawn from Henshall 1963: Figure 15).

and Henshall 1989). It is postulated that the tripartite chamber is one of the first chambers used in Orkney because it is a type used in Caithness, the area of mainland Scotland nearest Orkney and the suspected area from which the first Neolithic settlers came (Henshall 1985).

There are a few other structural attributes that OC cairns share. Most OC cairns have passages that follow the main axis of the chamber. Something that is unique to the OC cairns is the presence of benches and shelves, on which those who had died appear to have been posed as though they were asleep (Davidson and Henshall 1989). The other human remains found in these cairns seem to have been allowed to decompose and were then put into piles. However, depending on the site, it appears from the mismatched nature of the remains that bones were often removed or brought from other areas (Davidson and Henshall 1989). At some cairns, Bigland Round and Knowe of Craie in particular, it has been observed that deliberate deposits were made around the cairn. Usually these were filled with peat ash, which sometimes contained small pieces of bone, flint, or potsherds. It is uncertain whether these are found at other sites

because archaeologists simply have not looked for them (Davidson and Henshall 1989). Fire has affected the material remains of other OC cairns, so it is possible that fire played a part in ritual at these sites. Like all cairns in Orkney, when they were no longer used, the cairns and their passages were blocked with fill which often contained potsherds, animal bones, and rubble (Davidson and Henshall 1989).

One final aspect of OC cairns that is worth mentioning is the resemblance between the cairns and the typical Neolithic Orkney house. The dwellings from this time period are made of stone, are semi-subterranean and surrounded by middens (Clarke and Sharples 1985). Both houses and cairns have shelves and benches. It is because of these and other similarities in floor plan and construction that it is a commonly held belief that the Neolithic people worshipped their ancestors, so these cairns are often viewed as houses for the dead (Ritchie 1985).

Maes Howe Type

The structure of the Maes Howe type is quite different from that of the OC type. Instead of side-chambers following one main axis, the entrance passage leads into one chamber. This main chamber then leads to three or four cells that branch off of it (Figure 5) (Davidson and Henshall 1989). It is also difficult to predict the way in which the entrance passage leads to the central chamber. The way in which they are constructed also differs because instead of using upright slabs (except in the case of Maes Howe itself), slabs and blocks of stone are laid like bricks to make impressively large and well-made chambers (Davidson and Henshall 1989). Other differences of note are that there are no shelves or benches. This evidence led some to believe that the Maes Howe type might have been derived from Irish Boyne tombs like Newgrange (a passage grave discussed later in the paper), but it is more likely that it was invented independently (Henshall 1985).

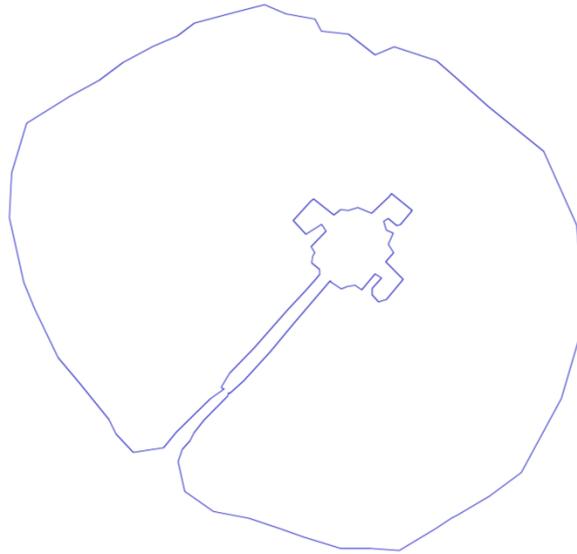


Figure 5. Maes Howe Chamber (Henshall 1963: Figure 29).

Unlike the OC cairns, the burial practices that took place in Maes Howe type cairns do not seem to be as well-defined. There are varying amounts of bone found in each cairn, from a few individuals represented, to no human remains represented at all, to Orkney's only "bonespread" at Quanterness (Davidson and Henshall 1989).

STONE CIRCLES

Although Stonehenge is the most iconic, stone circles are a common feature of the Neolithic time period. Some, including Stonehenge, also have henges, which are a combination of an external bank and an internal ditch; this aspect is unique to the British monuments (MacSween and Sharp 1990). Many theories have been postulated over time, but the one that has been given the most attention is Alexander Thom's assertion that stone circles were astronomical observatories (Thom 1967). The idea that certain constellations were their focus has been largely dismissed,

but it is still thought that the movements of the sun and moon would have been important enough to an agricultural society that these views have persisted (MacSween and Sharp 1990). Orkney is home to two of these structures, the Stones of Stenness and the Ring of Brodgar.

The Stones of Stenness was built around the early third millennium B.C. What remains of the structure are four stones of odd shape, the tallest of which being five meters in height. The spacing of the stones suggests that there were originally twelve, although the positions of at least two have been questioned (MacSween and Sharp 1990). Although the area has been ploughed, it has been projected that the ditch surrounding the stones was at least two meters deep with one entrance crossing it. Two standing stones nearby, known as the Watchhouse and the Barnhouse stones, are considered to have been associated with the structure. Excavations have also found that a timber post, and possibly an entire timber structure, once stood at the center of the circle (MacSween and Sharp 1990). This leads me to wonder how it would have been possible for the Neolithic people to make astronomical observations if the center of the circle was so obstructed.

The Ring of Brodgar was built sometime between 2500 and 2000 B.C. (Orkneyjar 2012) and still retains many of its original stones. Twenty-seven are still standing, and the positions of thirteen others are known. If the stones were equally spaced, there were probably around sixty stones erected originally. It is encircled by a henge as well, but there are two entrances that cross this henge. It has been calculated that the ditch on its own would have taken at least 80,000 man hours, equivalent to at least forty people working for ten years (MacSween and Sharp 1990).

The dates for the end of the Neolithic seem to differ between Orkney and the rest of Britain. While the Earlier Bronze Age, the period directly following the Neolithic, takes place from 2600-1400 B.C. in Britain (Parker Pearson 1999), dates for the entire Neolithic in Orkney fall somewhere between 4000 B.C-1800 B.C. (Orkneyjar 2012). Although chambered cairns

were used for centuries after their construction, the stone circles were still created later in date than the cairns. It is important to note that both chambered tombs and stone circles went through several phases (MacSween and Sharp 1990). These changes conceivably occurred in both structures as the ideology of the society changed, reflecting their relatedness in both the religion and landscape of Neolithic Orkney. Although both have been incorporated into the belief that stone circles are celestial observatories, MacSween and Sharp make a valid observation. In their book they state that “the more stones remaining at a site, the greater the likelihood that some of them will line up with an astronomical event by coincidence (MacSween and Sharp 1990: 149).

ALIGNMENTS

Burial practices differ all over the globe, but there are some common themes observed in the orientation of bodies (Sprague 2005). In some cases, the body’s orientation might be completely random. The alignment of other graves and bodies may also be taken into account. In some, the placement might be made assuming that the dead would reverse themselves. Others were oriented based on the individual’s personal status within their group (Sprague 2005). They might be aligned to the direction of mythical or holy places. The culture’s perceived place of origin or sources of important resources might also influence the direction in which a body is oriented. They might align them with settlements, sacred or secular monuments, or holy structures. Visibility of the resting place is also considered at the time of burial, so the bodies might be aligned with gateways, walls, or paths. Natural attributes of the landscape might influence their direction, as might astronomical phenomena (Sprague 2005). Although Sprague intended for these to apply only to the directional alignment of bodies, one can see how the

majority of these could influence the orientation of burial structures, specifically the cairns of Orkney. In fact, many of these explanations have been utilized in the study of the cairns, but lately the ideas receiving the most attention are those concerning astronomical phenomena.

Astronomical Alignments and Newgrange

Newgrange is one of the best examples of an Irish Boyne tomb. These tombs are located in the Boyne Valley in Ireland and are often constructed with a long passage leading to a cruciform chamber (Stout and Stout 2008). Newgrange's primary function was that of a burial place.

Although it had been open to the elements for centuries, five adult burials were still found within its structure. Two of the skeletons were unburned, while the other three showed signs of burning. Grave goods were found with the bodies. Large stone basins found in the recesses of the chamber probably contained human remains or played a part in the preparation of bodies (Stout and Stout 2008).

Although its main purpose was for the respectful deposition of at least a few members of society, Newgrange seems also to have been used as an observatory. The entrance stone is engraved with a long, vertical groove that has been found to align with certain celestial bodies. Grooves similar to this have been found on other stones surrounding the mound (known as kerbstones), as well as on stones that are structurally significant. These grooves do not appear to have an aesthetic purpose because they are often off center and have different positions on the stones. Even the artwork seems to imitate some of the constellations, including a series of three cup marks (circular indentations carved into stone), which are interpreted as representing Orion's Belt (Stout and Stout 2008).

The most impressive of the celestial events at Newgrange is the one that occurs during the sunrise of the Midwinter solstice (Figure 6). Due to several strategic gaps in the capstones

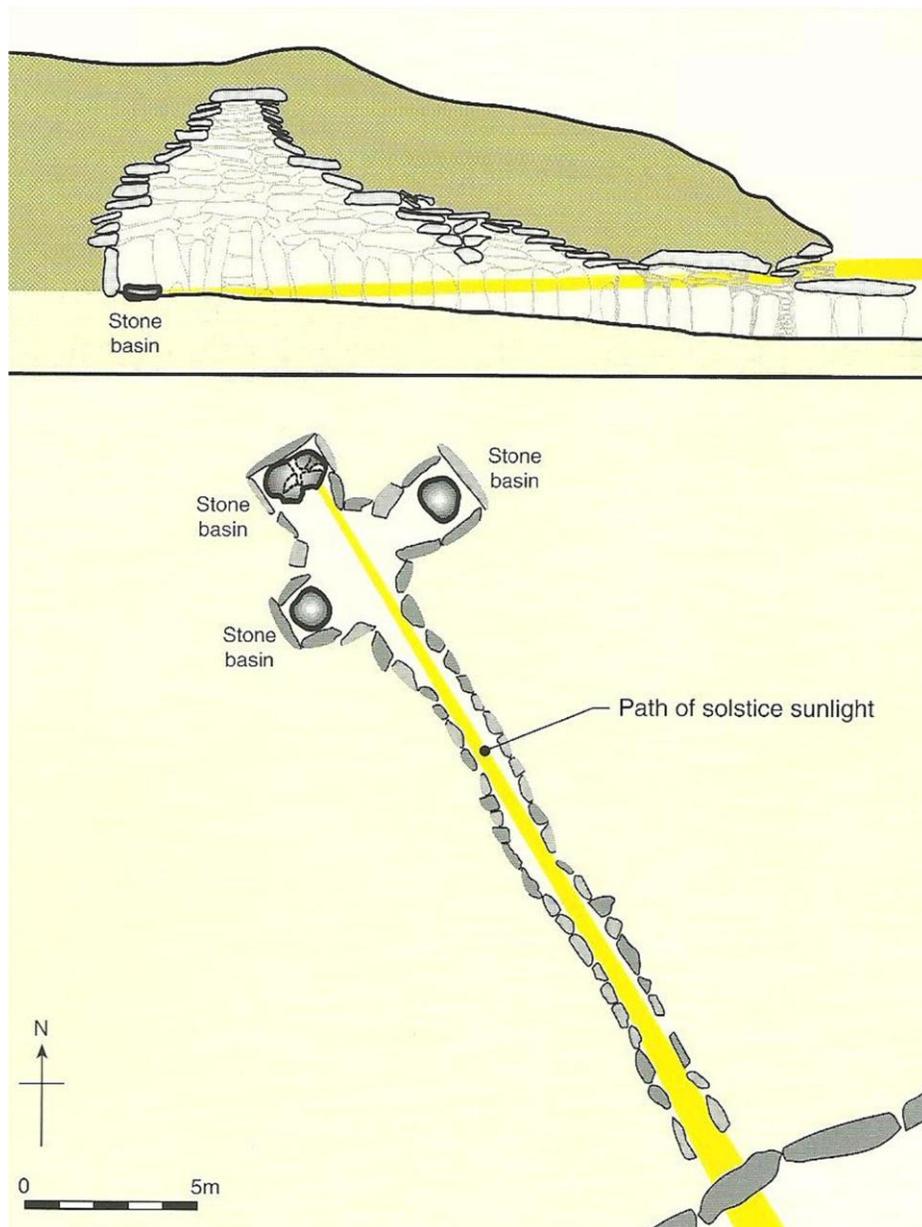


Figure 5. Diagram showing path of light at Newgrange on Midwinter sunrise (Stout and Stout 2008).

forming the roof of the stone structure and the construction of a roofbox (an open structure above the entrance and above the “ceiling” of the passage), an interesting event occurs. At 8:54 A.M. the sun begins to rise. Four minutes later, the sunlight appears on the floor in the entrance of the passage. As time goes on, the beam of sunlight is steadily narrowed by the strategic curves of the passage. After about fifteen minutes from the time the sun hit the floor of the passage, the sunlight has illuminated the backslab of the chamber. By 9:15 A.M., the tomb goes dark (Stout and Stout 2008).

In order to achieve the previously described event, much planning was required. Not only did the Irish Neolithic people find an area with an unobstructed view of the Midwinter sunrise, but they calculated the sunrise, determined when the sun struck the hill’s summit, and placed the backslab at this point (Stout and Stout 2008). They also had to calculate the gaps in the capstones in order to give the illusion of the sunlight walking up the passage. This effect would not have been possible without the roof box, which was found to be closed at the time of excavation. This suggests that the opening was only open at certain times, emphasizing the fact that it had a ritual purpose (Stout and Stout 2008).

Secular Alignments

Although many recent studies have focused on celestial alignments, others have looked at how the cairns aligned with other aspects of the landscape. In Caithness, a part of Northern Scotland, it was observed that most of the cairns were visible from known settlement sites. The round and long cairns were used in different ways to alter and emphasize parts of the landscape. Elongated cairns were often backed by the sky, while round cairns had hills in the background (Phillips 2003).

When looking at the cairns of Orkney, it appears that many of the earlier cairns were positioned on the coastline overlooking the seascape. (Here it is important to note that Phillips was focusing on the external, more public, structure of the cairn, not the internal chamber.) Most of these cairns were not very visible from land, but they were instead visible from the sea. In his study, Phillips listed several cairns that were built at important junctures to sea-faring vessels, including bays, channels, and dangerous areas of shallow water (Phillips 2003).

There is no denying that the sea played a large part in the Neolithic Orcadians' lives. Phillips has suggested that the cairns demonstrated ownership of fishing grounds, acted as a symbolic marker between land and sea, or that they symbolized the ancestors, whose subsistence no doubt focused far more on the use of the sea. Because travel by sea might have been far easier and certainly necessary in an island environment, Phillips's main argument was that they would have functioned as landmarks by which boats could navigate safely (Phillips 2003).

TERRITORIAL MONUMENTS

Common explanations for the long barrows of the rest of England typically involve theories of territory. The idea behind the territorial symbolism of megalithic tombs is that they are "formal disposal areas by which corporate groups utilized lineal ties to the ancestors to control access to crucial but restricted resources (Chapman 1995:32). In this case, the corporate group referred to is the lineage or descent groups on which the British Neolithic's society is thought to have been based. The restricted resources could have been anything, although the most visible to archaeologists are that of land, access to water, cattle, or lumber. This has been substantiated in Gabriel Cooney's 1983 study of the tombs in South Leitrim, Ireland. In this case, he found that

most tombs were located near the best agricultural soils, which happened to be spatially restricted rockland soils. In some cases the territorial model would explain the distribution and location of the cairns (Chapman 1995).

Chapman took much from Renfrew on this topic. He restated Renfrew's three criteria that would point towards the territorial use of cairns and barrows. The first of these was that tombs that were used or created simultaneously should be regularly spaced. Second, there should be no evidence of hierarchy reflected in the cairns. Finally, these territories would have been defined by the actions of members of society (Chapman 1995).

Throughout all of these interpretations, a common uniting factor seems to be a focus on the ancestors. Although some of the cairns were capable of being built by a few people over many years, others, like Newgrange and Maes Howe, would have required the combined efforts of a larger group of able-bodied people.

METHODS

Because of the aforementioned information, the cairn types, regional differences, and other characteristics of the landscape were incorporated into this spatial analysis. The majority of the analysis for this project was explored through using the computer drafting program AutoCAD Map 3D (Autodesk 2011). A list of cairns and their associated floor plans were obtained through various works, including Henshall (1963), Davidson and Henshall (1989), and Castleden (1992). Although the locations for these structures were easily obtained in latitude and longitude coordinate pair format through the online records of RCAHMS (ScotlandsPlaces), AutoCAD is a program based on a Cartesian (XY) coordinate system. In order to account for the curvature of

the globe, it was necessary to first convert the latitudes and longitudes to projected map coordinates. This was accomplished using the geographical information system software package ArcGIS 10 (Esri 2011). . After the XY coordinates for each monument were obtained, digital scans of the floor plans of each was placed in AutoCAD, properly aligned to the coordinate system, and scaled based on the specifications provided by each floor plan.

The computer program Stellarium was used to determine the exact degree measurements that correspond with the Sun's position. Several of the monuments' locations and heights above sea level (measurements above sea level provided by Daft Logic) were put into the program in order to observe the sky. Although the movements of the Sun have not been affected by precession as much as the rest of the sky has, measurements were still made with the year at - 3500 (equivalent to 3500 B.C.). While tracking the Sun, the degree measurement of the azimuth was recorded when the geometric and apparent altitudes were around 0°. Several locations (including Quoyness, the farthest north, and Isbister, the farthest south) were plotted to ensure that any difference in the alignments with the Sun would be accounted for, but these differences were negligible. Because of this, the measurement for the Midwinter sunrise (on December 21st) is approximately 134°, the Midwinter sunset is aligned at about 224°, the Midsummer sunrise (June 21st) at 47°, and the Midsummer sunset at 312°.

A systematic way of finding the alignment of each structure had to be determined. In the case of the cairns, a quadrangle was drawn from the entrance of the cairn to either the end of the passage (or to the back-slab if no passage was immediately evident). The alignment was then found by drawing a line between the midpoints of each of the lines spanning the passage¹.

¹ As a side note, AutoCAD measures the degree of a line assuming that 0° is “east”, and the degrees increase as one goes from east to north; the degree measurements obtained from Stellarium assumed that 0° is “north”, with the degrees increasing as one went from north to east.

Several layers were created so that each cairn type was represented. In addition to cairn type, the alignments were also grouped by the different islands that make up Orkney. A map was obtained from the same website as the latitude and longitude calculations to ensure accuracy.

After the map had been constructed and the alignments drawn, it was plain to see that cairn typology had no bearing on where the alignment was directed. Of the eight Maes Howe types for which alignments could be calculated, some were directed East, some West, some South, and everywhere in between (Figures 6). The Orkney-Cromarty cairns were more numerous and even more varied (Figures 7).



Figure 6. Map showing the distribution of Maes Howe cairns across the northern islands of Orkney.

I have converted my measurements to reflect the fact that 0° is north. The original measurements are included in Appendix A



Figure 7. Map showing the alignments of the Orkney-Cromarty cairns in Orkney

Because there were no apparent typological patterns visible, regional variation in alignment was explored. In some cases, cairns seemed to be directed in completely opposite directions from others (Figure 8). It could be argued that this would reflect the territorial model because the structures might have acted as boundary markers and faced the territory the cairn was claiming. However, some of these cairns face the water, making it unlikely that this was the case. The actual presence of the cairn might have acted as a territorial signal, but this does not explain the possible significance of the entrance alignment. In other areas, specifically the island Rousay, cairns seemed to be facing similar directions (Figure 9). Neither typology nor locality revealed

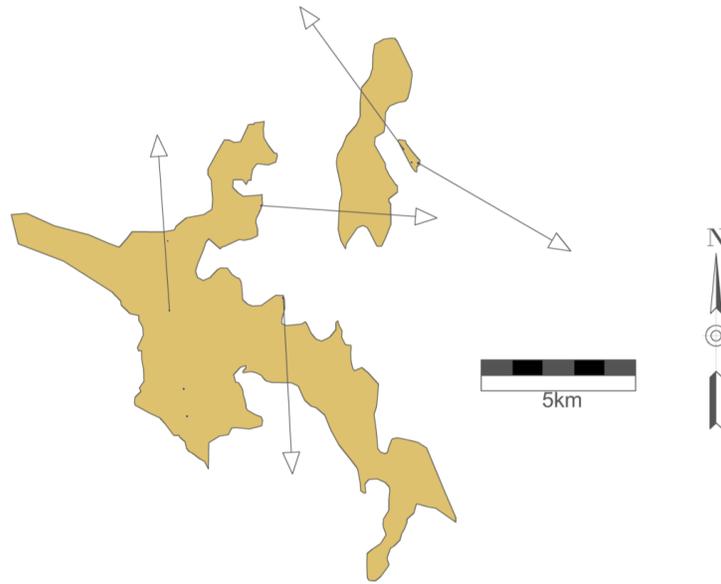


Figure 8. Alignments of cairns on Holm of Papa Westray and Westray, indicating possible territorial purposes.

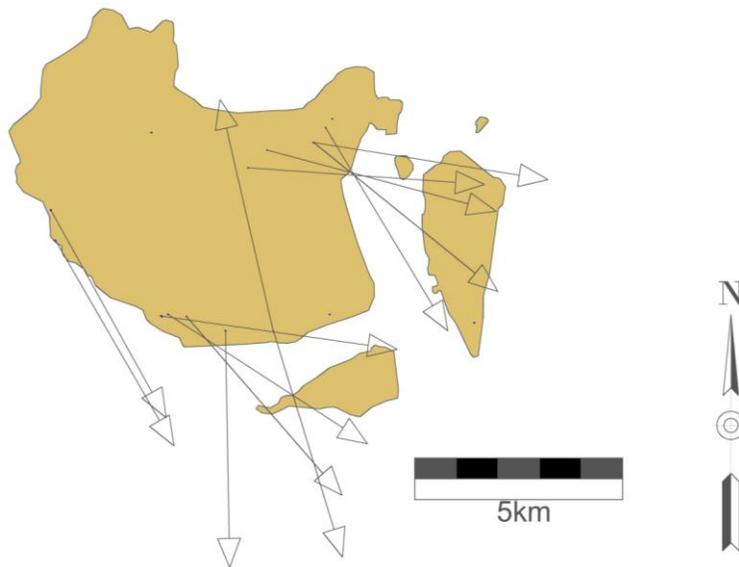


Figure 9. Alignments of cairns on Rousay. Many are too close together to suggest territoriality, but seem to be aligning in similar directions.

any patterns, so each individual structure was compared to the solar events of interest to search for further insight.

After each of the forty-two structures' alignments had been determined, their distance from each of the aforementioned solar events was measured (Table 1). Some, like Maes Howe, are aligned exactly with a celestial event (within 3°). The majority are not. Instead of trying to determine what an acceptable range of error would be, a completely subjective enterprise, the entire range of solar activity on these days was considered. On the day of the Midwinter Solstice, the sun only travels within 90° of the entire horizon in Orkney. Of the cairns studied, only 38.1% of their alignments fall within this specific range. Even allowing 20° of leeway did not improve the statistics much, only increasing it to 52.4%. Therefore, suggesting that "most" cairns align with sun positions during the Midwinter Solstice is vastly generalized. The Midsummer Solstice, on the other hand, involves the Sun traveling across 265° of the horizon, leaving only a 95° section with no solar significance whatsoever. Of the forty-two cairns, 7.14% of their alignments fall within this 95° area. Even if the Neolithic folk had been trying to roughly aim towards any of these events, one would think that they would have at least been close.

Looking at the alignments provided by the entrances of both stone circles has only strengthened this point. The Ring of Brodgar almost adheres to the idea of aligning to the sun because its southeast entrance is only 9° off of the angle of the Midwinter sunrise while its northwest entrance is only 7° off of the Midsummer sunset; however, its neighboring stone circle's (Stones of Stenness) single entrance points almost directly north (358°), within the 95° gap untouched by the Sun. If the Sun is not a uniting factor in the alignments of either the stone circles or the cairns, then what is the driving force behind cairn alignment?

Table 1. Cairn Alignment Distance from Solar Event Alignment

Monument	Alignment in ° with North = 0°	Deviation from Midwinter Sunrise	Deviation from Midwinter Sunset	Deviation from Midsummer Sunrise	Deviation from Midsummer Sunset
Bookan	172	38	52	125	140
Cuween Hill	89	45	135	42	137
The Howe	106	28	118	59	154
Maes Howe	221	87	3	174	91
Unstan	69	65	155	22	117
Quantemess	88	46	136	41	136
Quoys	143	9	81	96	169
Wideford Hill	274	140	50	133	38
Braeside	164	30	60	117	148
Huntersquoy	92	42	132	45	140
Huntersquoy Second	269	135	45	138	43
Sandyhill Smithy	108	26	116	61	156
Vinquoy Hill	178	44	46	131	134
Bigland Long	129	5	95	82	177
Bigland Long East	99	35	125	52	147
Bigland Round	149	15	75	102	163
Blackhammer	179	45	45	132	133
Kierfea Hill	105	29	119	58	153
Knowe of Craie	94	40	130	47	142
Knowe of Laird	98	36	126	51	146
Knowe of Ramsay	123	11	101	76	171
Knowe of Rowiegar	150	16	74	103	162
Knowe of Yarso	139	5	85	92	173
Mid Howe	151	17	73	104	161
Taversoe Tuick	163	29	61	116	149
Taversoe Tuick Second	347	147	123	60	35
Hesta Head	236	102	12	171	76
Isbister	77	57	147	30	125
Nev Hill	156	22	68	109	156
Calf of Eday Long	102	32	122	55	150
Calf of Eday Long (East Chamber)	61	73	163	14	109
Calf of Eday North-West	217	83	7	170	95
Calf of Eday South-East	214	80	10	167	98
Knucker Hill	356	138	132	51	44
Point of Cott	177	43	47	130	135
Vere Point	94	40	130	47	142
Helliar Holm	116	18	108	69	164
Quoyness	119	15	105	72	167
Holm of Papa Westray N	324	170	100	83	12
Redland South	231	97	7	176	81
Holm of Papa Westray S	120	14	104	73	168
Hacks Ness	51	83	173	4	99

CONCLUSIONS

While looking at the orientations of the cairns in a large group, one does not see the acclaimed southeastern alignment. Instead, one does see alignments, but with other aspects of the landscape. Some are aligned with solitary standing stones, like Braeside with the Stone of Setter (Figure 10). Maes Howe is similar in this respect, being aligned with the stone known as the Barnhouse stone. Others seem to be directed towards known settlement sites, like how Bigland Round aligns with the known site of Rinyo (Figure 11) within a single degree of measurement. The Stones of Stenness is well known to align with the Barnhouse settlement found directly to the north (Orkneyjar 2012). Finally, others seem to align to other cairns. Quoys is aligned directly to the cairn known as Redland South (Figure 12). Cuween Hill's entrance seems to direct the viewer to Quanterness, while Wideford seems to look towards Cuween Hill.

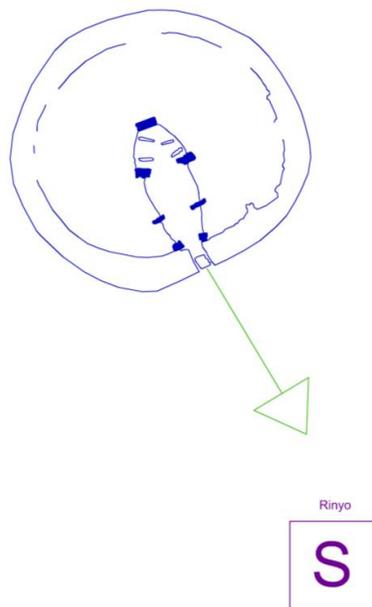


Figure 10. Bigland Round Alignment with Rinyo (Not to scale. Actual distance between Bigland Round and Rinyo is approximately 295m).

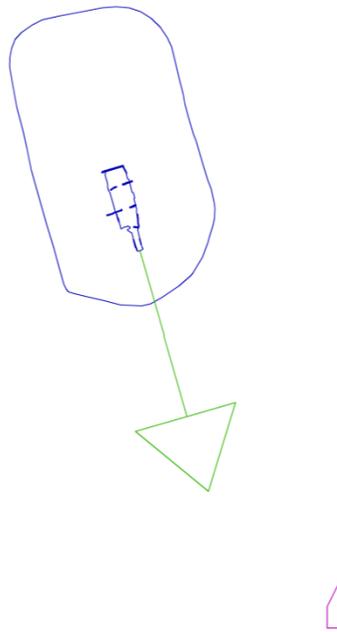


Figure 11. Braeside Alignment with Stone of Setter (Not to scale. Actual distance between Braeside and Stone of Setter is approximately 396m).

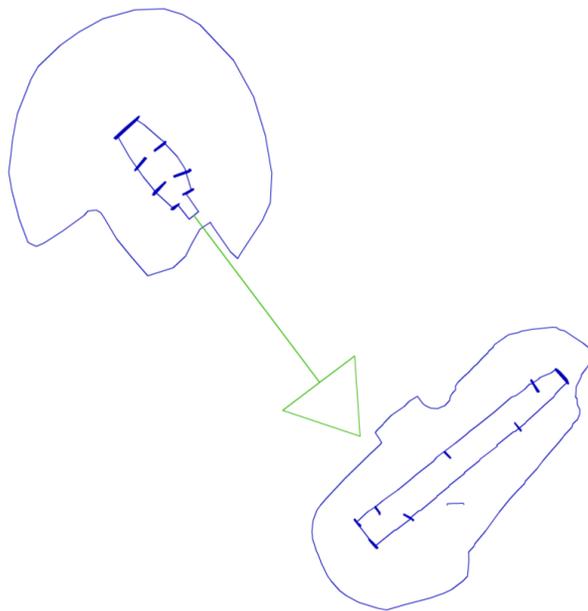


Figure 12. Quoys Alignment with Redland South (Not to scale. Actual distance between Quoys and Redland South is approximately 286m).

In total, I looked at how forty-four of the megalithic structures of Orkney aligned with water (the entrance of the cairn directed towards a water source less than half a kilometer away), known settlements, standing stones, other megalithic monuments, and solar events (within 10° of the alignment). The results are presented in Table 2.

Table 2. Percentages of Actual Cairn Alignments²

	Percent of Megalithic Monuments with Alignment	Percent of Megalithic Monuments Without Alignment
Entrance Aligned with Water	38.64%	61.36%
Entrance Aligned with Settlement	4.54%	95.46%
Entrance Aligned with Standing Stone	9.10%	90.90%
Entrance Aligned with other Megalithic Monuments	4.54%	95.46%
Entrance Aligned with Solar Event (Within 10°)	20.45%	79.55%

There is no denying that, at least in cases like Maes Howe, the Midwinter sunset was indeed the focus of the ritual. Perhaps the people of Neolithic Orkney wished to bathe their ancestors with light on this day (Stout and Stout 2008). However, in the majority of cases, the megalithic structures are not focused on this event. If cairns and stone circles were purposely aligned towards various aspects of the landscape, this sentiment seems to echo part of Phillips' article. Within the body of his essay, Phillips mentioned that it was common practice in Caithness for megalithic tombs to be directly associated with settlements (Phillips 2003). His

² Alignments with settlements, standing stones, water, and other megalithic monuments were recorded if the element was within 1km of the structure. Others were not recorded to account for visibility issues, although they might in fact align almost directly.

dismissal of this being possible in Orkney suggests that the local topography obstructs the views between these structures. Although this might be true, the alignment could be purely symbolic. If cairns were symbols of the ancestors, their alignment on each settlement might have been reassuring to the inhabitants of the site, knowing that their ancestors were watching over them. This interpretation would fit well with the territorial model. Or, if no truly difficult terrain separated the two structures, it might have been purely for the ease of access. In reality, each structure probably served a multitude of ritual functions, some of which might not have left archaeological evidence.

Although there are many suggestions as to the significance of the megalithic structures which so altered Orkney's natural landscape, one should not be so quick to search for answers. Geraldine and Matthew Stout have said that "Interpretations come in cycles, which often reflect the cultural background of the period...current interpretations, therefore, have more to do with the time we live in than with the Neolithic (Stout and Stout 2008:19)." Although this may be true to an extent, it should not keep archaeologists from striving to get as close to the truth as possible. Grouping structures under broad categories for which we have no analog models with historic groups is ill advised. The fact of the matter is that the Neolithic people were perfectly capable of aligning structures to solar events, as is evidenced by Newgrange and Maes Howe. In structures of such magnitude, "close enough" would not have sufficed. We might simply have to accept the limitations of research that time has imposed on us.

APPENDIX

Table 3. List of Monuments and their Alignments

Monument	East is 0° Alignment	North is 0° Alignment
Bookan	278	172
Cuween Hill	1	89
The Howe	344	106
Maes Howe	229	221
Unstan	21	69
Quanterness	2	88
Quoys	307	143
Wideford Hill	176	274
Braeside	286	164
Huntersquoy	358	92
Huntersquoy Second	181	269
Sandyhill Smithy	342	108
Vinquoy Hill	272	178
Bigland Long	321	129
Bigland Long East	351	99
Bigland Round	301	149
Blackhammer	271	179
Kierfea Hill	345	105
Knowe of Craie	356	94
Knowe of Laird	352	98
Knowe of Ramsay	327	123
Knowe of Rowiegar	300	150
Knowe of Yarso	311	139
Mid Howe	299	151
Taversoe Tuick	287	163
Taversoe Tuick Second	103	347
Hesta Head	214	236
Isbister	13	77
Nev Hill	294	156
Calf of Eday Long	348	102
Calf of Eday Long (East Ch	29	61
Calf of Eday North-West	233	217
Calf of Eday South-East	236	214
Knucker Hill	94	356
Point of Cott	273	177
Vere Point	356	94
Helliar Holm	334	116
Quoyness	331	119
Holm of Papa Westray N	126	324
Redland South	219	231
Holm of Papa Westray S	330	120
Hacks Ness	39	51

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