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The Possible Influence of Astronomy on the Culture of Ceramic-Age, Pre-Columbian Inhabitants of Greencastle Hill in Antigua

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Introduction

When Columbus arrived in the West Indies in 1492, it is reported that the Antillean Islands were inhabited by an Amerindian culture called the Taínos. The Taíno culture was chronicled extensively by Spanish historians, but little or no information was available about their astronomical knowledge. Archaeological and mythological evidence has shown that this was extensive. Sebastian Robiou-Lamarche (1984), who has intensively researched Taíno astronomy, has shown that there is a relationship between the Taíno and Mesoamerican cultures concerning certain deities and related cultural practices. An archaeological excavation of the summit of Greencastle Hill on the island of Antigua indicated that Greencastle Hill was inhabited by a Ceramic-age Amerindian presence during the period A.D. 900-1200. Artifacts recovered during this excavation were typical of the terminal to post-Saladoid culture affiliation, classified by Caribbean archaeologists as Mamorean Troumassoids (Reid 2009). By A.D. 1200, the Mamorean culture in the Leewards had become so influenced by the Ostionoid cultures in Puerto Rico to the east that they came to be classified by some archaeologists as Eastern Taínos (Reid 2009; Rouse 1992). An array of stones on the summit of Greencastle Hill has recently been investigated to determine whether it could have been an astronomical calendar (Imbert 2007). When the bearings of the stones in the array were compared with the azimuths of stars known to have been of importance in Amerindian cultures, the correlations strongly suggested that the array was used to determine time. The results of this investigation suggested a parallel investigation of how astronomy affected the lifeways of the cultural group that inhabited Greencastle Hill, including their social life, religious ceremonies, navigation, agricultural activities, and their time reckoning of important seasonal events. The results of this investigation are presented in this paper.

Site Background

Greencastle Hill is situated in the Sherkerly Mountains of Antigua, and is an eroded volcanic dome of polygonal columns of andesite. Subsequent erosion and the action of the sea exposed columns of different sizes which litter the hill in various arrays. The random scattering of most of these columns makes a particular alignment of stones on the summit of Greencastle Hill all the more remarkable. This alignment of stone columns was first discovered by Dr W. Forrest in 1930, and he submitted a sketch plan of the area, along with compass bearings, to the then Chairman of the Glasgow Archaeological Society, Ludovick Mann. Ludovick Mann suggested that the site was an astronomical outlay for the purpose of recording time (Forrest 1935). Dr Forrest investigated the foundations of several of the stone columns and found that they were

resting on small fragments of a different type of rock which seemed to indicate an interference made by man on the site. The structure of the most easterly column in the array, popularly called the 'Sun God,' supported this suggestion of human interference. The 'Sun God' is 3-m high, and it is comprised of two rocks, one on top of the other, on a platform which is not in alignment with the upper stones as shown in Figure 1. Other stone groups of interest included two groupings of paired stones called the "female stones" which were split and inserted into the earth in an unnatural position (Figure 2)

Figure 1. The non-aligned Sun God (Photograph taken by A. Atwell and reproduced with permission).

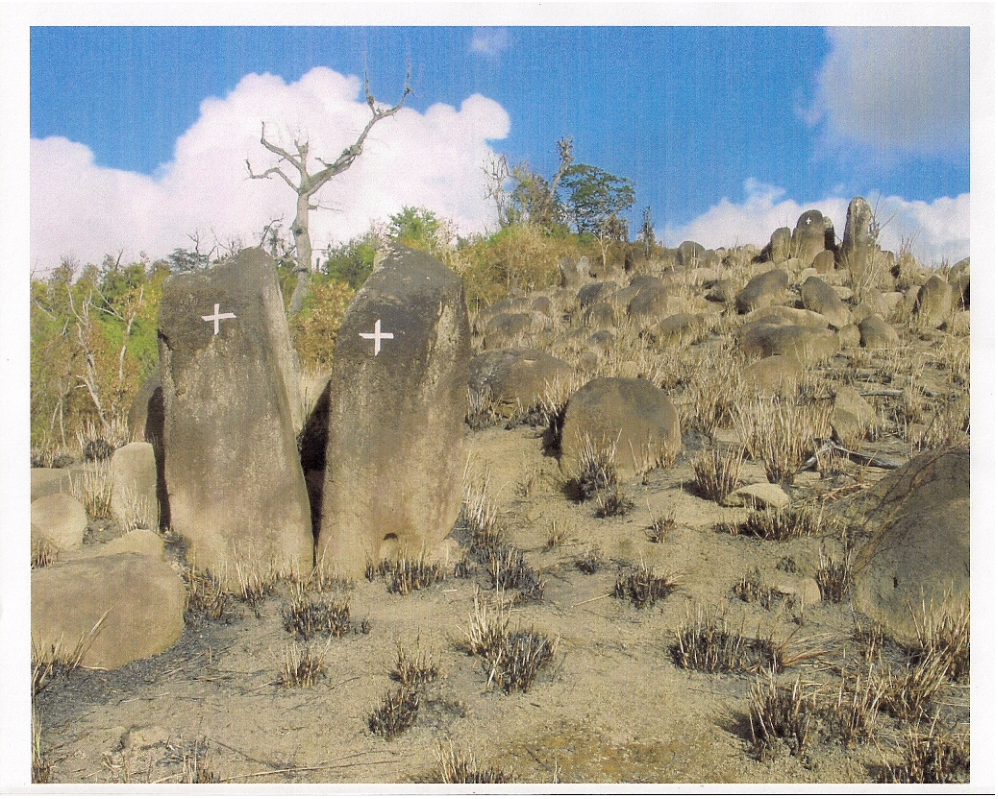

Figure 2. A pair of 'female stones in the stone array (Photograph taken by A. Atwell and reproduced by permission).

Al Hajji Talib Ahmad Dawud (1971) presented a paper entitled *Greencastle Hill, Antigua: A possible Monument of a Prehistoric Civilization* at the Fourth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles. He described these unusual megaliths and other stones which he considered to be altars and "sacrificial slabs." He also noted an isolated stone on the western edge of the plateau from which alignments could be made to numerous stone columns which suggested that it could have been used as an 'observation stone.' This spectacular array of stone columns subsequently stimulated considerable discussion about the possible function of the array and the discovery of an adorno on the hill indicated a Ceramic-age Amerindian presence. A preliminary archaeological investigation of the site, directed by archaeologist Dr. R. Murphy in 1995, included an examination of all objects excavated that were seen to be modified by humans or used in human activity. This cultural material was only found on the slopes of the hill, indicating that the flat summit may have been an "activity area." It was observed (Forrest 1935) that the artefacts were typical of the terminal to post-Saladoid cultural affiliation ca.AD 900 to 1200, classified by Caribbean archaeologists as Mamorean Troumassoids (Reid 2009). By A.D. 1200, this cultural group had evolved to become Eastern Taínos (Reid 2009).

An investigation to determine whether there was any correlation between the bearings of the stone columns in this array and the azimuths of stars (known to be relevant in Amerindian cultures) was carried out in 2001 by the author and Ms. Arlene Atwell, a final year student of the Department of Surveying and Land Information. Ms. Atwell chose the determination of the bearings of the stones as her research project in partial fulfilment for her degree under the supervision of Dr Keith Miller. She subsequently obtained an Honours B.Sc. degree and an A grade for her Antigua project.

The author subsequently used these bearing determinations in order to find correlations between them and the azimuths of stars, star groups and constellations, and to interpret these within the context of Amerindian cultural and social activities in Antigua. The number of correlations found during this investigation has been reported in a paper presented by the author at the Twenty-First Congress of the International Association for Caribbean Archaeology, which was subsequently published in the Proceedings. A computer programme called *The Sky*, which took precession into account, was used to determine these azimuths. It was observed that the "observation stone" mentioned by Dawud (1971) was a major point from which the inhabitants of the site observed the movements of the chosen stars. The Sun rose behind the 'Sun God' when observed from this stone at both the Spring and Autumnal Equinoxes. This was one of the most striking findings of the investigation of the possible astronomical significance of the array of stone columns. We were also able to make correlations between the bearings of the 'Sun God' and the 'female stones' and other stones in the array and the azimuths of significant Taíno stars at the solstices relating to May 31 (the start of the Taíno year on Greencastle Hill) and November 31 (a 'sacred day' to Taínos). These many correlations supported the postulate that the stone array on Greencastle Hill was an astronomical array for the purpose of recording time. This paper explores how the use of the array by the Amerindians who inhabited Greencastle Hill could have affected the social life, religious ceremonies, navigation and agricultural activities of the period under review.

Amerindian Astrology and Time Perception

A comprehensive literature review on stars important in Taíno astronomy and mythology identified the following stars, star groups and constellations: the Pleiades, Orion, Ursa Major, Scorpius, Pegasus, Aries, Ophiuchus , Sirius, Procyon and Aldebaran. The Pleiades or Seven Sisters, an open cluster of stars, was by far the most important star group in all Amerindian cultures.

The Importance of Taíno Astronomy to Cultural Activities

The helical (before sunrise) rising of the Pleiades in May-June, depending on latitude, marked the start of the year and a long series of ritual ceremonies in Taíno culture, including a specific Pleiades dance involving a mock fight between men and women, followed by a race. Many Amerindian cultural groups associated themselves with the Pleiades and other star groups and believed in an intrinsic relationship with them. As these cultures migrated northwards, they

brought their traditions with them and experts in the field consider that the Pleiades were as important to the Mamoran Troumassoid/ Taíno peoples of Antigua who developed autochthonously in the Caribbean, as they were to South American cultures (Jara 2002). The relationship with the Pleiades by the Taínos was featured in the social and economic exchanges between different groups and the opposing rising and setting of the Pleiades, and the constellation Scorpius represented relationships in social exchange including marriage customs. The constellations Orion and Pegasus were also associated with social relationships. An in depth study of Taíno astronomy, therefore, would contribute greatly to an understanding of the social life of these Amerindian and other prehistoric people. Robiou-Lamarche (1984) who has intensively researched Taíno astronomy, noted that Spanish historians wrote at length about the Taíno culture encountered in the Antilles but very little mention was made of their astronomical knowledge, which archaeological and mythological investigation has shown to be considerable. Reid (2009) believes that archaeology, the primary medium through which aspects of Caribbean history are investigated, 'is about people's social, economic and political relations, their religious beliefs, burial practices, community organizations, settlement patterns, diet and even the minute details of how they perceived time and history. These 'minute details," relating to the use and knowledge of astronomy by prehistoric cultures and archaeoastronomy, can make an important input into investigations of Caribbean history.

Time Perception

The cyclical motion of celestial bodies which was observed by prehistoric cultures, and the systematic observations made over long periods of time, allowed many regularities in these celestial motions to be noted and predictions made. The skilled observations made by advanced prehistoric cultures which flourished in Mexico, Central and South America and the Far East were so accurate that ancient observations made by certain cultures can be confidently used today to determine changes in the rotation rate of the earth. Unfortunately, the various Amerindian cultures, unlike the Mayas, left no written records, and tradition was passed on from generation to generation by word of mouth. An awareness of time was important in the organization of ceremonial and agricultural activities and this awareness may be demonstrated in the construction of an astronomical calendar by the Mamorean Troumassoid/Taíno inhabitants of Greencastle Hill.

The Use of Astronomy in Navigation

Robiou-Lamarche (1984) reported how Columbus made many references to the Taínos' knowledge and skill in navigation, and it is more than likely that they could navigate at night by the stars. This adds credence to the current opinion held by Caribbean archaeologists that the various Amerindian migrations from South America need not have occurred stepwise from island to island. Some migrations could have come directly to the Antilles aided by the navigator's knowledge of the heavens, a factor seemingly completely ignored in local archaeological studies of these migrations (Callaghan 2001; Reid 2009). Many factors, including ocean currents, watercraft design, heavy cloud cover indicating the presence of islands and computer simulations are mentioned to support the postulate that instead of island-hopping, migrants from South America could have made 'direct jumps' to the northern

Caribbean(Callaghan 2001; Reid 2009). The possibility that the Mamorean Troumassoids and Taínos (or more likely their Saladoid predecessors) could cross the Caribbean Sea in their specially designed boats was suggested, but there is no mention that such crossings were aided by a knowledge of the stars when records abound of the use of the stars in navigation as a result of knowledge handed down from generation to generation by various seafaring prehistoric cultures. The Taínos could have used the bright star Aldebaran as a celestial signpost as they sailed across the Caribbean Sea. Aldebaran passes over Greencastle Hill and its azimuth in AD 1000, correlated with the bearings of the 'female stones.' The use of astronomical knowledge in Taíno navigation is another possible area of investigation where archaeoastronomy could make an input into Caribbean history.

The Value of Astronomy to Taíno Agricultural Activities

The heliacal rising and setting of the Pleiades and its celestial counterpoint, the constellation Orion, are associated with Taíno agricultural practices, including the growing of crops, hunting and fishing. Robiou-Lamarche (1984) explored the relationship between Mesoamerican and Antillean mythology, and described how the hurricane season is related to the heliacal rising of Ursa Major by both cultures. The bearings between two of the stone columns in the array on Greencastle Hill coincides with the azimuth of the rising Ursa Major at the start of the hurricane season in July. Robiou-Lamarche (1984) believed that the Taíno culture, like so many other prehistoric cultures, had a wide knowledge of basic astronomy which underlay and motivated their cultural activities.

Summary and Conclusions

As a result of an archaeological excavation directed by Dr R. Murphy in 1995, it was revealed that the summit of Greencastle Hill was inhabited by Mamorean Troumassoid/Taíno culture ca. AD 900 – AD 1200. An array of stone columns on this site was proposed to be an astronomical array by various observers, and this hypothesis led to an investigation of the bearings of the stones in the array in 2001 in order to determine whether there were any correlations between these bearings and the azimuths of stars prominent in Taíno mythology. The discovery of a number of significant correlations strongly supported the hypothesis that the array was an astronomical calendar. A comprehensive literature review of Taíno cultural activities indicated that certain stones in the array, particularly those called the 'Sun God' and the 'female stones,' were used to mark the rising and setting of the Sun and stars important in their mythology. The Sun rose behind the obviously constructed 'Sun God" at the equinoxes, and the Pleiades and Orion were of importance in the timing of seasonal agricultural activities which were divided between men and women. They also regulated the organization of all social and economic exchanges between different groups and determined how they observed time. The rising of Ursa Major behind two western stones in the array indicated the coming of the hurricane season and the necessity to carefully plan their sowing, harvesting and fishing activities, while their overall knowledge of celestial bodies allowed them to navigate by the stars. The well-documented importance of astronomy in all aspects of Taíno culture therefore indicates that an archaeoastronomical input into archaeological investigations of Caribbean history can only add depth to such investigations.

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