Analysis Of Stonehenge Geometry

Through an exploration of geometric systems and proportions in architecture, knowledge on the influence of quadvarium systems to have shaped the historic spatiality of buildings is illuminated. Specifically, acknowledgement of systematic belief for all geometries to be inherently associated and/or derived from the structure of a square or circle has contrived a distinct relationship to the human body. Such accord can be distinguished in three periods seen in, the prehistoric European monument Stonehenge (3001 BC), the Roman temple Pantheon (126 AD) and Chartres Cathedral in France (1194, 1220), where despite noticeable differences and contexts, all exercise significance for geometry to serve purpose in function and setting. That is, the capability for geometry to connect individuals with architects intentions has legitimized the proportion of design as knowledge of the human body has evolved and symbolic integrity in reference to archaeoastronomy.

Developments in knowledge surrounding construction and spatiality of structures entice understanding of the historic presence of quadrivium systems. Defined as the upper division of medieval liberal arts, which comprised arithmetic, geometry, music and astronomy the quadrivium holds undeniable association with architecture. Significantly, expression of geometry in application of structures has been constitute in uncovering geometrical patterns; seen in Stonehenge, as identification of patterns manifests it’s mathematical proportion and symmetry. Being one of the most well renowned prehistoric monuments in Europe, Stonehenge is considered a masterpiece of human ingenuity of those in Salisbury Plain in Wiltshire, England. Such ingenuity spanned over several stages (Fig. 1) where the original monument composed of a circular ditch (3,001 BC) formed a unique stone circle erected in the late Neolithic period. The Neolithic period (approx 9,000 BC- 2,000 BC) saw the first monoliths with religious and social significance. Being central of prehistoric burial mounds, theories of Stonehenge as a multifunctional site of Neolithic tomb culture involving spiritual rituals have been made. Thus, Stonehenge can be understood as a religious structure, where purpose in construction abides the Neolithic focus on religion and the architectural need to form structures in relation to setting and humanistic spiritual demands. An application of the quadrivium however emphasises distinct presence of archaeoastronomy, being progressive in spatial and geometric capabilites to epitomize social fascination with the circle at time of formation. The circle has and continues to hold symbolic, esoteric significance which when analyzed in Stonehenge, manifests a suggestion of extended solar orientations. The basic geometry of Stonehenge involves an assortment of circles; the surrounding ditch (ground level) as an outer circle, sarsen stones (16 ft high) form a second circle, and the inner circle (horseshoe) contains trilithons (20 ft). Bluestones form a smaller circle, between trilithons and sarsens (Fig. 2). Rising in height, this assortment forms an elevating spiral and foundation for alignment of the “main axis”. The sun’s axis forms origins of proportional divisions for reference archaeoastronomy in alignment to this “main axis” in direction of the midsummer sunrise (northeast) and the midwinter sunset in the opposite direction. This alignment exists for the short axis of the Station Stone rectangle (Fig. 2) while the longer axis is oriented southeast to the southerly moonrise, possessing what Gerald Hawkins called 'astronomical significance.' The opposite NE and SW directions of the Earth's annual season cycle, are marked by the main axis and the Avenues orientation, forming a lunar calendar. Squaring the Circle is the phenomenon of a square and a circle of equal circumference, which despite proposed problmatic by ancient geometers, occurs in

Stonehenge. The earth and moon square the circle (Fig. 3) and the same proportions (in feet rather than miles) is found at Stonehenge (Fig. 4). Such, indicates ancient measurement systems relating to solar dimensions and a distinct channel to the human body with a notable accord to Leonardo Da Vinci's 'Vitruvian Man'. The 'Vitruvian Man' represents the human body proportions with balanced harmony in two contrasting positions; first one enclosed in a square (static) and second a circle (dynamic). (Fig. 4) These shapes thus share God's creation of the human body and ultimately enforce "medical" equilibrium in architecture, with the square and circle being fundamental; whether individually or in consolidation to marking points of centrality reflecting Leonardo's premise for symmetry from perfect geometries. The main axis demonstrates the hidden nature of duality as stated by Padovan in his approach to human proportion "The axis leads us to assume a unity.. If mathematical calculation appears satisfying and harmonious, it is because they proceed from the axis".The mirrored symmetry displayed by the stones and the undisputed alignment is the solstices, ultimately reflects neolithic geometric knowledge, where migration through space and influence of solar movement moulded the equilibrium spatiality of the site.