#### Stonehenge. Metrology and calendar connections.

# The Metrology of Stonehenge

This very brief commentary is intended to show that there is far more to Stonehenge than is usually portrayed. The narrative has been adapted from a longer section in the book *Measurements of the Gods* where much more explanation and detail is available.

In examining the metrology of Stonehenge at the sarsen circle it will be found it was the *inner and outer diameters*, the *lintel width* and the *lintel centre circumference* that hold the information for which we are seeking. These measures are all defined by the lintels. This then explains the carefully crafted edges of the lintels, and the mortise and tenon joints, ensuring no movement ensued that would alter what may have been seen as 'sacred dimensions' to the monument's designers.

We rarely hear the question raised of '*why is it that size*?' applied to remains exposed by archaeology and yet knowledge of ancient measurement systems can often reveal more than just a basic assessment of the dimensions of the uncovered structure. In our modern world, we are familiar with accurate measure but usually see this in relation to clean corners on buildings or other obvious situations.

As Chippindale stated in Stonehenge Complete,

Megalithic dimensions, so far as we can assess them, are almost always approximate, because the stones themselves are [except at Stonehenge itself] unshaped and usually large...these cannot be studied in the same way as a neat figure with defined spot points for corners and sides in integral multiples of a unit...<sup>4</sup>

So we look for other elements to examine...such as the centerline of a circle's stones...when this is determined its diameter can be found with no requirement for Chippindale's 'defined spot points'. This is precisely what was achieved at the Aubrey Circle of Stonehenge by Hawkins. He just had a series of holes with which to work and yet managed to arrive at an accurate value, 56 x 16 feet or 896 feet.

Some attempts have been made to ascertain what units of measure [if any] were in use in Britain during the Bronze Age and possibly earlier with the most often quoted being the 'Megalithic Yard' of Professor Alexander Thom and his son Archie. Thom has been derided most unnecessarily for his concerted efforts over an extended period and while he may not have had all his assertions correct, as he was something of a pioneer, the value of the megalithic yard [albeit with an extended fraction] certainly does apply in a number of cases, albeit not here at Stonehenge in the manner he claimed. However, at Gray Hill in Gwent we have a kerbed cairn that has 11 of these measures to the inner diameter and 12 to the outer. [Measures here derived from a survey by Gillian and Harry Sivertsen] Regarding the 'megalithic yard', in Mike Pitts book *Hengworld* we read of a derogatory statement aimed at Alexander Thom by Clive Ruggles

...the megalithic yard is a figment... and all attempts by others to prove the Thoms right by informed statistical analysis have failed

To put the attitude taken by Ruggles and others into perspective regarding measure perhaps the comment regarding stones and measure from Ruggles in *Astronomy in Prehistoric Britain and Ireland* cited by Pitts explains much.

A stone can only be reduced to a point on a plan to a precision of its width, perhaps a metre, not 1mm, yet the case for the 'megalithic yard' is entirely dependent upon precise mathematical patterns...

In fact this is not the case as can be seen from the surveys of Petrie and others. We shall briefly give some indications of what is to be seen here at Stonehenge. There of course is a great deal more but the taster here is hopefully sufficient to cast doubt upon the assertions of Ruggles.

Stonehenge displays a number of lunar associations that we have not seen described as such in any other paper or publication of which this writer is aware. Firstly the sarsen circle has an internal diameter of 28 times the width of the lintels. To the centerline of the lintels we count 29 of these widths and the outside 30.

The synodic month has [in round figures] 29 days, the mean of the synodic and sidereal month [27 days] is 28 days while the commonly utilised 360 day year has a 30 day month. Hence, the diameter of this circle displays counts of days in three different lunar configurations, a count that is completely and irrevocably dependent upon the lintel width and circle diameter. If either [A] the lintel width or [B]the circle diameter were not as they are, none of the above lunar configurations would apply. The lintel width and circle diameter are intimately and irreversibly related.

A count of three times the number of upright lintel supports of the circle,[30] marked off day by day, perhaps by moving a small stone from sarsen to sarsen, would give 90 days, a quarter year being 91.25 days. Hence, the equinoxes could easily have been calculated from a count taken from the midsummer alignment.

A continual count of 73 times the circumference [six years] would bring the 30 day month, seen here in the count of upright support stones or the lintels, in line with the 365 day year; i.e. 73 x 30 [count of stones or spaces] =  $2190 = 6 \times 365$ .

Stonehenge Sarsen Circle, whatever else it may be, was undoubtedly a calendar with strong tendencies toward a lunar count.

#### Measures

In 1740, Stukely published his interpretation of the dimensions of this monument and made the overall of the Sarsen Circle 104 feet which comprised [according to Stukely] 60 'Hebrew' cubits. We have moved on somewhat since then but he was reasonable close, within 3.269 inches. Petrie's survey, published in his 1880 work *Stonehenge: Plans, Description, and Theories*, made the inner diameter of the Sarsen Circle 97.325 feet and he claimed that this was within a maximum tolerance of 0.72 of an inch. This is much closer, in reality, than the survey conducted by Alexander Thom. The lintel width according to Atkinson in the 1950s, in agreement with Petrie, was 'about' 3.5 feet.

Utilising the measures quoted above from Petrie and Atkinson, 97.325 feet and circa 3.5 feet, we have a diameter between the *centres* of the lintels of 100.825 feet. Using *modern* pi of 3.141592654 this results in an area of 7984.106893 square feet.

We now move back in time approximately 500 years, to what we term Stonehenge 1, the works that included the Aubrey Circle.

Gerald Hawkins was the first researcher to apply computerised astronomy to the site and his investigation revealed that the Aubrey Circle pits [or stones as is now thought] *may* have been used as an eclipse calculator. In his 1965 book *Stonehenge Decoded* he recalled that,

The Aubrey Holes vary from 2.5 to almost 6 feet in width and between 2 to 5 feet in depth and were steep sided and flat bottomed. Although irregular in shape, there was little irregularity in their spacing. They formed a very accurately measured circle 288 feet in diameter with a 16 foot interval between their centre points. The greatest radial error was 19 inches and greatest circumferential or interval spacing error was 21 inches. Let it be noted that such accurate spacing of 56 holes around the circumference of so large a circle was no mean engineering feat. These variations of 19 and 21 inches can easily be accommodated by the fact that we have no idea of the dimensions of the stones that were placed here and quite possibly the centres of these were indeed at 16 feet. Perhaps more pertinent is the concept, now once more accepted, of stones being removed from these holes; during such an operation the holes would inescapably have been distorted and enlarged leading to the variation visible today. Hawkins dimensions for this circle are virtually identical to those of Petrie.

A circumference measure through the centres of the holes gives  $16 \times 56$  feet. The stated diameter of 288 feet is for the overall diameter and not the centre measure as 16 feet x 56 = 896 and the diameter would therefore be something very close to 285 feet.

The 896 feet of the Aubrey circle circumference calculated from the 56 spaces of 16 feet, again using modern pi has a diameter of 285.205658 feet and a resultant area of 63886.0674 square feet. If we now divide the smaller Sarsen Circle area into the larger Aubrey Circle area the result is 8.001654819. Here we observe that the one circle is virtually exactly 8 times the area of the other, with the smaller circle being created later than the larger and with its centre within just over 5 feet of that of the larger circle. The square area difference evaluated means that the multiple of 8 gives a larger circle which has a diameter within 0.3538996 of an inch of that evaluated by accurate survey for the Aubrey Circle.

Let us take this a little further. The circumference of the Sarsen Circle through the centres of the lintels [still with modern pi and Petrie's diameter] measures 316.7510793 feet and divided for the 30 lintels and upright supports, replicating the days in the canonical month, there is a unit measure of 10.55836931 feet, a measure that is a mere 0.01956828 inches [0.5 of a millimetre...compare to Ruggles' comments above] less than 10.56 feet.

The diameter of the Aubrey Circle divided by another monthly value representing the days in the sidereal month, 27, gives a unit measure of 10.56317252 feet which is 0.038070222 inches [0.967 of a millimetre] longer than 10.56 feet. Hence, using survey results that are not questioned, we have a mean value for the division of the Sarsen Circle lintel centre circumference divided by the 30 days of the canonical month which is denoted by the number of upright supports and lintels, of 10.55836931 feet and the Aubrey Circle diameter divided by the 27 days of the sidereal month resulting in 10.56077092 feet. Given that the difference of 10.56 feet to both units, one derived from the Sarsen and one from the Aubrey circles is less than a millimetre, as derived from highly reliable surveys, can there be any doubt that here, in the measure of 10.56 feet, we find a common denominator? In fact if 10.56 feet is utilised as the length of the lintels and an area calculated vi 22/7 and multiplied by 8 for the Aubrey Circle, we then find that the derived diameter [using 22/7] is within 0.1745 of an inch [4.4mm] of the 27 x 10.56 or 285.12 feet of the Aubrey circle, a margin of error of 1 in 19607.

It would appear that contrary to the derogatory opinion of Clive Ruggles who believes that a stone width '*perhaps a metre, not 1mm*' is as close as the ancient stone circle builders could measure, along with whose who influenced him and those he has in turn indoctrinated, the builders of Stonehenge certainly were aware of and familiar with the use of fine measurement. The evidence here gives results that are within the stated millimetre and being dependent upon the results of accurate surveys, are as fine as one can hope to achieve. It is also ironic that as the surveys utilised are those with which Ruggles will be familiar and would accept, these same investigations into the dimensions of the site prove his arguments and those of others who follow the same mind-set to be utterly fallacious. Preconceptions mitigate against discovery, while the investigations for this work were conducted with a completely open mind. What is reported is what has been discovered, no more, no less, and what is seen here is but the tip of the iceberg.

# Calendar associations.

The numerical system ascribed to the 30 stone positions of the Sarsen Circle in the early 20<sup>th</sup> century starts with no.1 at the south side of the summer solstice alignment, hence stone no.11 is immediately to the east of due south. The circle has been said to have been incomplete due primarily to the oddity of stone no. 11. So if the builders had run out of suitable stones why was it at this specific point?

All structures have a logical place at which to commence works, a setting out point. Here, this would have probably have been one the stones adjacent to the summer solstice alignment or to that of the winter solstice. These were critical directions that had to be correct. Logic dictates that the builders would have moved sequentially from this position a stone at a time until the circle was complete. Hence, if they were short of just one stone, the position of that stone would be once more adjacent to either the summer or winter solstice positions.

Again, if the five missing stones are omitted due to a shortage of material, the logical places for these to have been left out would be the five places prior to the last stone of the overall sequence, or perhaps alternatively between other stones. However, that is not what is to be seen.

The missing stones are numbers 13,17,18,20 and 24 [see Fig.2] hence there is no logical pattern here whatever. Certainly the builders would not have simply left out stones at completely random locations as in fact would be the case if the missing elements were non existent due to a lack of material. Any suggestion that all these stones are missing due to shortage of material implies that the gaps were left in a haphazard manner which in itself implies that those erected were additionally placed in a similar unregulated fashion: this is not the case as the refinements of the sarsen lintels clearly indicate. Hence it is relatively safe to make the assumption that the circle, with the exception of stone no. 11 was originally complete and that stones fallen have been removed for building elsewhere since the site went out of use. While the Romans were reticent to destroy or damage any sacred religious site, they may well have taken stones that were already fallen for their building purposes with others being removed since their time of occupation as at Avebury where in the 17<sup>th</sup> century John Aubrey observed the breaking up of a large stone via the use of fire and water. Stukeley also recorded such events in the following century. The earliest records and descriptions of the Stonehenge site have no indication of a full set of stones at the Sarsen Circle and hence, given that at least one of the stones has fallen in more recent times, a trilithon in 1779, shortly after John Wood drew the first accurate plan of Stonehenge in 1740, we can accept that it has been in a state of disrepair for an indefinable period but that no stones have been removed since at least the early 17<sup>th</sup> century. Wood's drawing distinguished between stones that were erect, leaning, flat, buried, and lying on the surface of other stones. So there is no doubt that with the exception of one trilithon, and more modern works, the site was the same over 350 years ago as it is today.



S= Standing F = fallen M = missing

## Fig.1 standing, fallen and missing stones. [diagrammatic view]

There are a number of fallen stones, nos. 8,9,12,14,15,19,and 26. [see Fig. 2] Whether any of these fallen stones still have the remnants of the tenons that are seen at the tops of the extant standing stones is unknown by the author of this work but again, given the disparate positions of the missing stones, it appears safe to work on the assumption that these fallen sarsens indeed were of the same pattern as those still standing.

Hence given the available information it appears that stone no.11 is the only odd one in the circumference of the circle. So this being the case, why should this very specific location be chosen for the oddity? If there was a shortage of stone feasibly this space could have been left as the implications are for a complete circle and indeed the tenons are visible at the top of its neighbour, stone no.10 and these certainly do imply that it was intended to complete the circle to it full height all round. If the space was to be left with no stone then surely the tenons would have been cut from the top of the uprights adjacent, clearly showing that that was the limitations of the circular structure and indeed longer lintels extending completely over the top of the uprights could have been produced. However, the extant tenons may also be left as a confirmatory sign the indeed the circle was *symbolically* complete and that this odd stone was intentional, that *this location was deliberately chosen for a specific purpose*.

That a direct calendar association with this stone could have been used is confirmed via the evidence that follows.





#### **Explanations**

So what may have been the reason for such an oddity? Stonehenge, as a monument is basically a calendar with very strong lunar associations. This is seen in the count of days in the Sarsen Circle perimeter where lintels [or stones] count to 30 in the complete circle. It is seen in the diameter where the lintel width is counted 30 times overall, 29 to the centres of lintels and 28 across the inner diameter, all denoting the various monthly configurations. Even more such lunar associations can be found when the dimensions of the site as a whole are taken into consideration. So it would appear that here we may have a stone indicating a specific day; in fact this is the case.

Stonehenge is unique. While some of the large early burial chambers of Britain display the use of quite intricate corbelling, no-where in early Britain does the stone mason's craft show as at Stonehenge. Here we have intricate mortice and tenon joints cut in stone, the tenon at the top of the upright stones of the Sarsen Circle and the mortices in the lintels, we have tongue and groove sections at the ends of the lintels. The lintels were carefully curved on their outer faces around the perimeter of the circle while the inner surfaces of the massive sarsen stone supports were faced to indicate the equally important value of the inner side of the circle. From the available evidence it

would appear that the skill employed here was almost certainly not from home grown sources but was probably that of people from a different region, from somewhere where meticulous stonework was more commonly deployed. This is more on a par with the Egyptian monuments where we find items such a completely hollowed out piece of granite for a sarcophagus, or the peculiar drilled stones of Karahundj in Armenia, to the east of the Black Sea. We do have a singular example of a circular hole in a stone at the Mê n-an-Tol stones in Cornwall buthis could feasibly have been derived from a natural pebble worn stream bed as while other example almost certainly will exist, it is the only British example known to the author of this paper. This is not a common occurrence in the UK.

The people who moved into Britain after the last Ice Age came ultimately from two primary locations, Iberia and the Balkans. One of the earliest movements of people toward Britain after the Ice Age was from adjacent to the north eastern shores of the Black Sea, from the region of Karahundj in Armenia where we find some high quality work in stone. These people [or more correctly, their predecessors] had moved from Britain and adjacent North Western European regions to escape the worst excesses of the Ice Age severe climate to Iberia and the Balkans having previously passed through these regions a great many generations earlier when man first populated Europe after moving out from Africa. There have been continual influxes of immigrants from these regions since the last ice age and as there were family and cultural relationships, some have invariably travelled back to their roots. There has therefore been an interchange of culture and ideas between the Ice Age retreat regions and Britain. These areas had their own connections with surrounding districts, regions that had commonalities with the cultures of India, for example Persia and Turkey.

Iberia was also a chosen region for climatic escape during the last big freeze. Indeed, as modern genetic studies indicate, this was the second major route for humans on the journey out of Africa when initially occupying these islands. Contact with regions to the east of Iberia during and after the Ice age would have ensured that a least some of the developments of Mesopotamia and Egypt for example, would have filtered through into the different cultures. This would also imply Indian elements as much in the Mesopotamian regions stems from early Indian developments. This transference of knowledge certainly appears to be the case as the measures that are evident at Stonehenge indicate, unit measures found among the pyramids of Egypt. The 'Nileometer' gauge for example was set out in cubits of 1.76 feet according to the researches of John Neal [see *All Done With Mirrors* @ Secret Academy.com] and this appears at Stonehenge, at least the reed[six cubits] associated with this value is seen as this denotes the centre positions of the sarsen uprights and therefore the lintel lengths.

So we have measures seen in the Middle East at Stonehenge and something else, as Aubrey Burl has often pointed out, this monument's style is very similar to others seen in Brittany, it is not a UK style structure, it has no relations with a similar appearance here. One has to travel to Brittany to find another of this kind. Evidently then, the design of Stonehenge came from the other side of the English Channel and it is not a home grown product.

The cultures with whom the climatic escapees of the Ice Age came into contact not only developed some very highly skilled artisans in stone replete with sets of measures, but also utilised a calendar that had its commencement with the *first new moon after the winter solstice*. This was a commonality among many cultures and applies to early eras in the Bible, India and elsewhere. Hence it would be natural for the north western Europeans sitting out the freezing centuries to adapt and take on board this type of calendar even if they had not developed it themselves. At Stonehenge we see evidence that indeed this was the case, and with stone no. 11 we have strong evidence for its use at the site. This stone, counting a stone for a day in the direction of the daily north moving sun, is to be found at a position which is 26 days after the winter solstice at a specific date. This defines a further set of dates which relate directly to the Metonic cycle, the recurrence of sun and moon in the same relative positions every 19 years.

Further diagrammatic illustration and tables that replicate what was to be seen at the Sarsen Circle during an extended period. The dates here comply with what is understood of the developments of the site.



This applies 2550 BC and every 19 years until 2208 BC Every 19 years [within a culumative error of 1 day in 219 years] the sun and moon return to the same positions in the sky.

# Fig. 3 Count of days after winter solstice

The calendar dates given in the following tables are derived from Skymap astronomy program and here for clarity we give conventional dates against astronomical Julian dates which would not be understood by many.

The Metonic Cycle of 19 years was first written of by the Greek astronomer Meton of Athens in 432 BC but logically was observed and understood, except for its slight variation seen below, far earlier. Even this variation cancels itself out on occasions however so over a period it is a reasonable rule of thumb. This cycle determines when the sun and moon return to the same respective positions in the sky but as noted it does have its fluctuations, one of which determined when a change at Stonehenge took place. As this variation would almost certainly not have been understood during the era in question it would appear from the table that that the period of operation of this count at Stonehenge was from circa 2550 – 2200 BC. Given that a period of observation was essential, initially this takes the build commencement date very close to that revealed by other methodologies, to somewhere in the region of 2400-2500BC. Hence we now see a build and use period of circa 200 -300 years preceded by an observation time of repeated 19 year events over circa 57 years[19 x 3]. This later date, after which the accurate count of days did not apply, approximates the alterations to the inner bluestones.

The dating from astronomy agrees here with archaeological findings and carbon dating.

## Table 1

First new moon after the winter solstice between 2797 - 1733BC following the Metonic Cycle. Here the dates are set 19 years apart and the count in days noted indicating the observed changes.

Date	new moon	Sunrise winter solstice	Difference.
2797	Feb 6	12 Jan	25 days
2778	Feb 5		
2759	Feb 4		
2740	Feb 4		
2721	Feb 5		
2702	Feb 5		
2683	Feb 5	11 Jan	25 days
2664	Feb 4		
2645	Feb 5		
2626	Feb 4		
2607	Feb 4		
2588	Feb 4		
2569	Feb 5		
2550	Feb 5	10 Jan	26 days
2531	Feb 4		
2512	Feb 4		
2493	Feb 4		
2474	Feb 4		
2455	Feb 4		
2436	Feb 4	9Jan	26 days
2417	Feb 4		

The table is deliberately extended in two directions for purpose of comparison.

2398	Feb 4		
2379	Feb 3		
2360	Feb 3		
2341	Feb 3		
2322	Feb 3	8 Jan	26 days
2303	Feb 3		
2284	Feb 3		
2265	Feb 4		
2246	Feb 3		
2227	Feb 3		
2208	Feb 2	7 Jan	26 days
2189	Feb 3		
2170	Feb 3		
2151	Feb 3		
2132	Feb 3		
2113	Feb 3		
2094	Feb 2	6 Jan	27 days
2075	Feb 2		
2056	Feb 2		
2037	Feb 3		
2018	Feb 3		
1999	Feb 2		
1980	Feb 2	5 Jan	28 days
1961	Feb 2		
1942	Feb 2		
1923	Feb 2		
1904	Feb 2		
1885	Feb 3		
1866	Feb 2	4 Jan	29 days
1847	Feb 1		
1828	Feb 1		
1809	Feb 2		
1790	Feb 2		
1771	Feb 2		
1752	Feb 2		
1733	Feb 2	3 Jan	30 days

As a further comparison, Table 2 reconstructs the dates of new moons and the relevant involved stone following the count of days during the 19 year period [Metonic Cycle] between the years 2436 -2417. The count of days to the first new moon following the solstice is included.

Here we observe a great variation and while of course any of these dates are repeatable in a similar fashion as those above, *only the beginning and end of the cycle denotes the relevant stone, stone* 11.

Date	New moon	Difference to winter solstice [days]	Stone no.
2436	4 Feb	26	11
2435	24 Jan	15	22
2434	13Jan	4	5
2433	1 Feb	23	14
2432	20 Jan	11	26
2431	9 Jan	0	7
2430	28 Jan	19	18
2429	18 Jan	9	28
2328	5 Feb	27	10
2427	26 Jan	17	20
2426	15 Jan	6	1
2425	3 Feb	25	12
2424	22 Jan	13	23
2423	11 Jan	2	6
2422	30 Jan	21	16
2421	19 Jan	10	27
2420	6 Feb	28	9
2419	27 Jan	18	19
2418	17 Jan	8	29
2417	4 Feb	26	11

 Table 2 First new moon after the winter solstice 19 year period between 2436 – 2417BC

It is apparent that stone no.11 consistently relates during the period when the structure is thought to have been erected with the count of 26 days after the winter solstice day. No other stone in the circle, extant or otherwise has this relationship and indeed this is the one oddity that to date has defied explanation other than a shortage of stones.

#### Conclusion

As the evidence here makes quite clear, it is now apparent that this stone denoted the first new moon after the winter solstice every 19 years complying with the Metonic Cycle with the sequence commencing in the year 2550BC. Further, allowing for observation of this sequence prior to building, the years during which the inner Sarsen Horseshoe would have been erected, this complies with the period during which other methodologies imply the Sarsen Circle was erected and the evaluation also gives a periodicity for the winter celebrations that evidence from the Riverside Project has revealed occurred in the region. It is therefore confirmed that the Sarsen Circle was originally completed but that the odd stone 11 was deliberately placed to mark this important calendar count.

It would appear that insufficient importance has been attached to the number of stones in the various stone circles discovered in Europe. While many remain to be fully explored many others are well known and the count of stones around their perimeters is recorded. As an example here a list of such detail relating to the South Western England is included. These are selective for obvious reasons but other counts may denote the number of days of visibility [or invisibility] of, for example, a specific star.

# Dartmoor.

At Buttern Stone Circle and at Fenworthy North Stone Circle there are counts of 30 stones in the perimeters. Grey Weathers North has 29 stones in its perimeter; clearly here there is lunar connotation in these counts of stones. Bodmin Moor

Craddock Moor has 27 stones while Goodaver, Hurlers NNE, Hurlers Centre, Leaze SE and Stipple Stones all have 28 stones in their circumferences, again with lunar implications.

At Lands End both Boscawen-Un and Merry Maidens have 19 stones, perhaps replicating the Metonic Cycle.

At these circles we have calendrical counts similar to those discovered at Stonehenge.

#### Notes

Information regarding the circles of South Western England from Burl A., 2000, *The Stone Circles of Britain, Ireland and Brittany*. Yale p160 All illustrations and tables by Harry Sivertsen

In addition to the above we need examine a lunar calendar in use in France. Wikipedia states that:-

The Gaulish Coligny calendar is possibly the oldest Celtic solar/lunar ritual calendar. The Coligny Calendar is an attempt to reconcile both the cycles of the moon and sun, as is the modern Gregorian calendar. However, the Coligny calendar considers the phases of the moon to be important, and each month always begins with the same moon phase. The calendar uses a mathematical arrangement to keep a normal 12 month calendar in sync with the moon and keeps the whole system in sync by adding an extra month every 2 1/2 years. The Coligny calendar registers a five-year cycle of 62 lunar months, divided into a "bright" and a "dark" fortnight (or half a moon cycle) each. The months were possibly taken to begin at full moon, and a 13th intercalary month was added every two and a half years to align the lunations with the solar year.

This is interesting in that in India we see a five year or 62 month 'yuga' [Note: a yuga is a period of time without definition hence the addition of the '5 year' parameter. The well known 'yugas' are a different entity in that these were initially denoted in the Mahabharata and given a commencement date and parameter.] Again here we see the division of the month into the bright and dark fortnights, precisely as in India. Stonehenge goes one further in that we see that the involved 19 year period commences not only with the first new moon after the winter solstice, but this position itself denotes that the spring quarter moon [start of the bright fortnight] coincides within a day of the start of the bright half of the year.

So indeed, the lunar calendar was of prime importance and in India there was a further connection or two. Let us first return to the Pleiades, already seen to be of importance in Gwent.

Greek myth describes the Pleiades as the seven daughters of the Titan *Atlas*. During the spring in India circa 3500BC as recorded in the Rig Veda 1.50 we find that the Pleiades were termed the *Seven Bay Steeds*, [also known as *Daughters of the Car*] the horses pulling the car or chariot of the sun. Evidently at this time the Pleiades rose long enough before the sun to be clearly visible. Indeed this was the case, the Pleiades rising at 95 degrees azimuth at three quarters of hour before the sun, long enough to be visible for the description to be viable but not so long as the Pleiades are isolated from the sun and hence not apparently connected. The description of the skies relates the approximate dating of the event and complies with tradition regarding the dating of composition of the texts that were later written down. At other times of the year the sun, as did the Egyptian Ra, traveled in a boat, the Indian version of the sun, *Surya*, here being associated with the god *Varuna*.

Some 300 years after Hesiod, the Greek astronomer *Euctenom* [c400-350BC] listed the dates of the year involved, as indeed did the early Babylonians where the forty days in association with the Pleiades here known as *Mul. Mul* is also seen in the *Mul.Apin* texts from Mesopotamia dated to circa. 2340 BC and which reveals the astronomical thinking of the time. However, the dates of the year from Euctemon differ to the Mesopotamian dates, as they should; the variation corresponds to the differences created by the shift over the period by precession, confirming the accuracy of observation at the time. Again, in Arab folklore it was commonly stated that the

Pleiades disappear from view for about forty days. So effectively this was a widespread astronomical tradition, as valid as the equinoxes and solstices. The automobile manufacturer Subaru takes its name from the Pleiades as this is the historical name for the asterism in Japan. Legends attached to the Pleiades apparently came to Japan from China [although it is highly probable that indigenous stories were in existence]. The meaning of the word is commonly thought to be 'united' while the Chinese character used for the Pleiades, [Kanji] has a correct association with 'bright'. Putting these names and meanings together we see bright derived from unification or being close together, an apt description of a small group of not so [individually] bright stars. As noted earlier, the sky was of international importance.

So it is clear that the Pleiades have been closely observed by people in many places for an extended period. The Pleiades in India have close associations with the moon. Here we take a brief look at two calendars, the Naksatras and the Saptarisi calendar.

#### Naksatras

In ancient Indian astronomy, the circle of the Moon's orbit was divided into 27 units known as *naksatras* [approximate days], which results in 13.33333 degrees per naksatra. These naksatras were themselves further divided in the same fashion into 27 *upanaksatras*. Hence, there are now 27 x 27 [729] units divided into the circle of the lunar orbit of 360 degrees. This results in 0.49382716 of a degree or 29.62962963 minutes of arc of the lunar orbit.

Visually this is the diameter of the Moon [or the Sun] - half a degree or 30 minutes of arc approximately and thus appears to be the astronomical unit in use, which was then probably further subdivided via some sighting device to give finer divisions. The naksatras, however, do not represent the 27 day month but are locations in the sky, various stars that divide the *synodic* month into 27 units. The moon will reappear at the same place a *synodic* year [354 days] later than the initial observation. Occasionally in some branches of Indian astrology a 28<sup>th</sup> naksatra is added but that has no place here. The 30-day [30 *tithis*] month was associated with the 360-day year. Each of the naksatras had a name, as did each of the 12 divisions of the zodiac hence the naksatras cover the 360 degrees of lunar orbit...in the synodic period.



Fig 4 The construction of the Naksatras and their positions

[Kak S. 2003 Babylonian and Indian Astronomy: Early Connections

<u>http://uk.arxiv.org/PS\_cache/physics/pdf/0301/0301078.pdf</u> (Accessed Feb.2004)] 30 degrees covers approximately 2.25 naksatras. Here we see the relationship of the Naksatras to the lunar months. The Aries, Pleiades and Alder bran locations are given here as indicators of the

the lunar months. The Aries, Pleiades and Alder bran locations are given here as indicators of the elements utilised. The commencement location was the Pleiades or Krttika to use their Indian name.

Professor Subhash Kak notes that the commencing date for this sort of event should belong to the 3<sup>rd</sup> millennium BC *or earlier*. Here *Skymap* clearly shows this state of affairs occurred perfectly in 3256BC which is depicting a rare occasion that was observed and described in the *Taittiriya Brahmana*. This also reflects references to '*the Krttika continually rising in the east*' during this era. The Pleiades was associated with the equinox in many places at this time.



Fig 5 The New Moon in the Pleiades (Krttikas) with Sunrise in Taurus 7 days before the spring equinox in 3256BC.

Therefore we have the bright half of the month and the bright half of the solar year commencing together...interesting

#### The Saptarisi Calendar.

This Indian calendar can be seen to indicate the commencement of the Age of Gemini. Its commencement date is traditionally given as 6676 BC. It was composed of cycles of 2700 years but after one cycle this was altered to 3600 years.

There is, within the limit of 111 years a correlation to this from Greece.

The dating from Pliny indicates an era for the creation of the Greek gods, at least for Dionysus and gives a BC date of 6786.75 BC, when the calculation is based upon the ascension to the throne of Alexander.

*From the time of Father Liber* [Roman Bacchus or Greek Dionysus] *to that of Alexander the Great,* [356-323 BC, ascension in 336 BC] *one hundred and fifty-three kings of India are reckoned, extending over a period of six thousand four hundred and fifty-one years and three months.*<sup>33</sup>

Pliny the Elder, *The Natural History* (eds. John Bostock, M.D., F.R.S., H.T. Riley, Esq., B.A.) Chap 21 V 8

Here we have a date from the summer of 336 when Alexander ascended the throne. Effectively this can be seen as 335.5 BC to which we add the 6451.25 years mentioned by Pliny to arrive at a date of 6786.75 BC or the spring of 6787 BC, the vernal equinox. Here we have the onset of the Age of Gemini. The onset of the new zodiacal age is gradual and either date, 6787 or 6676 is equally viable from a visual perspective. Note also that this is a *visual* dating when the Sun rose approximately midway between Cancer and Gemini as against the modern date of 6500 which is based upon a calculated geometrical division of the sky. Also this is not Pleiades related whereas the Indian depictions are associated with Krttika.

The Saptarisi calendar commencement of 6676 BC has the moon and Pleiades being closely associated as seen in the illustration.



# Fig 6 Sun midway between Cancer and Gemini signifying the approximate commencement of the Age of Gemini. 6676BC

The sun and moon positions at the commencement date of the Saptarisi Calendar. Here we see the commencement of the bright half of both the month and of the year associated directly with the Pleiades or Krttika.

There is another element here in that the date of the Saptarisi calendar is associated with the Naksatras via the metonic cycle. This cycle does have its short term fluctuations but here we see 180 x its 19 year period giving a very neat correspondence of sun, moon and Pleiades between 6676 BC and 3256BC.

Further connections exist [traditionally] with the Saptarsi. This calendar is so called due to an association with the constellation of the Great Bear, Ursa major or the Big Dipper. It is said that the Saptarisi or the seven sages, the Great Bear, stays with each naksatra for 100 years. The correlation is supposed to be via a line from what was thought to be the axis of the universe, the pole star position where this line will bisect the seven sages at some point. Research has failed to find this but what did emerge is a correlation in such a manner for a thousand years approximately for each naksatra for a period from circa the start of the Saptarisi Calendar to well with the Christian period.

The connections with the sky extend across a lengthy period and across the nations. Connection and correlation.

Let us look at another lunar calendar before returning to the Great Bear to complete this series of articles.

#### **Enoch's Calendar**

The book of Enoch has a considerable amount of astronomy tucked away between its pages, some is of an allegorical nature and difficult to understand while some is quite straightforward. This calendar and some derived latitudes are quite easy to ascertain. Enoch also gives latitudes via available sunlight and these are noted. The results here, which are a direct correlation of the information supplied do not indicate the north of Scotland as some well known authors have stated.



Information derived from *The Book of Enoch* [R.H.Charles translation] pp 95-100 and 104-106

Fig 7 Enoch's Calendar

To complete this set of articles that mainly revolve around the use of the skies and connections across nations millennia we take a look at Silbury Hill. Here is given a plausible reason for its construction. It may be right it may eventually be seen to be wrong but it is far more logical than any other suggestion seen to date.

# Silbury Hill: A Fast Track to Heaven?

#### Introduction

Among the ancient peoples the practise of excarnation was widespread. A number of methods for de-fleshing before burial have been utilised over the ages but common to a number of cultures, including Persia, Iran and Turkey and other Mediterranean regions was the practise of leaving bodies on platforms for scavenging birds to peck at; vultures could clean a skeleton of flesh in a few hours. [See Herodotus *Histories*] Red kites, crows and other scavenging birds would perform similar actions here...we only have to see the actions of magpies, crows etc at a road kill of a rabbit to understand this.

It therefore appears likely that this methodology was practised in Britain from circa 3000BC onwards, perhaps very much earlier. Some sites near Stonehenge suggest that timber posts supported platforms designed for this purpose as was recently revealed during the Riverside Project broadcasts. Here we supply some evidence to the effect of Silbury Hill having a similar function...with a difference.

## Silbury Hill

Why was Silbury Hill built? It was under construction according to carbon dating at some time between 2445 and 2190 BC, giving a mean date of 2317.5BC and a build time of circa 140-150 years. Hence here a date of 2300BC has been taken as datum. Stabilising work and more recent [2007/2008] investigation has revealed a number of Sarsen stones in its structure, both at the base and indeed at its top with a large amount of gravel utilised in its base.

Numerous suggestions regarding the purpose of Silbury Hill have been forthcoming over the years, none of which appears to have any real foundation. These vary between a gnomon for solar time telling, for which a very large post was to have been placed upright at the top, an exercise that did not require the building of the hill but could have been conducted in any open region, to a viewing platform for various reasons, none of which has any real astronomical association but would have been connected to the local landscape.

One such notion is that it gave a view of a 'double landscape' in that the adjacent Waden Hill outline replicates the more distant horizon and this is seen quite dramatically at Beltane sunrise. However, it is unlikely that a society would go to such extreme lengths simply to view what is a not very unusual phenomenon. It has even been suggested that the hill was truncated since its erection, a seemingly nonsensical idea, to where was the displaced material moved...and by whom and of course why would this occur?

Here we note that the Northern skies have long been studied and in fact a number of cultures are said to have placed their source, their ultimate 'Garden of Eden' beneath the northern skies in the Artic regions of Earth. A good source for such ideas is the 1885 book by F. William Warren titled *Paradise Found*. According to this work such cultures as the Japanese, Indian, Egyptian, Persian and Greek along with the Akkadian, Syrian and Babylonian all shared this concept. A further 1903 work, *The Arctic Home of The Vedas* by Lokamanya Bâ Gangâdhar Tilak is also most enlightening in this direction. Ultimately, of course, it is the northern skies that were important and not the Earth beneath and this has been misconstrued. Before the discovery of the

'pole of the ecliptic', the north polar star was seen as the centre of the universe. This is recorded very clearly in early Indian texts. It will be shown here that there is a possibility that the concept of 'heaven' being in the north as was accepted further east, may have been utilised in conjunction with the practise of excarnation in Southern England.

# A New Explanation

It appears that previous investigations have not associated Silbury Hill with the northern skies. When this is accomplished a different picture of the hill emerges, one that is most intriguing. The illustrations below indicate what would have been seen, specifically clearly at midsummer when the hill was completed. This unusual picture cannot be seen today due to precession altering the position of the skies and the lead player here, the Great Bear or Big Dipper, is now seen at a much lower elevation and therefore the feature does not apply in modern times. However, even allowing for precessional drift, it would have been apparent for hundreds years, at least in an approximate manner but close enough to have been an effective visual picture.

But why, apart from the ability to stand safely, should a hill be built with a truncated top? More to the point, *a hill that appears to have had its top cut off by the actions of a heavenly constellation*, as is clear in the illustrations. Yes, this is a dramatic picture but although it is easy to understand that this may have been a reason for the structure to be constructed, is it a sufficiently strong idea? Could the notion of Ursa Major swooping down and skimming a hill top be sufficient reason for such a great effort? It is highly probable that a similar view would have been noticed elsewhere, probably along the Wylye Valley, just over 19 miles from Silbury Hill to the south west where the southern slopes of some of the hills would possibly allow such a vision. Note should also be taken that viewed from the base of the hill at the south, the Tor at Glastonbury would also have produced a vision that was virtually identical to that described here at the same time. Perhaps this is yet another reason for the importance of Glastonbury within the landscape? Possibly other, smaller man-made mounds have similar characteristics.

The drawings below indicate a sequence of events where the Great Bear or Big Dipper, a most appropriate name given what was to be observed when gazing up the deliberately created 30° south slope of Silbury Hill, 'swoops down', picking up whatever may be on top of the construction. The action skims the whole hill top as the drawings indicate. Any other angle of slope would render this vision inoperable.

The concept of an afterlife appears to be ancient, why else have grave goods? If, as suggested here, excarnation were practised at this location, it would be excarnation with a difference; the souls of the departed would be picked up by the 'Big Dipper' and transported to the northern heavens. 'Towers of Silence' were constructed in the region of Iran and Persia, stone towers built specifically for excarnation, almost certainly the practise was utilised in Britain and here we have a man made hill with no apparent purpose, a hill that was built in such a fashion the Great Bear or Big Dipper would be seen to skim its top. What could a constellation pick up? It has to be something of an abstract nature.

Given the importance of the northern skies this does seem to be more than coincidental, a monument that took many hours and great effort to construct with no apparent purpose but which has a very specific alignment. If the hill was taken up to its natural apex this 'swooping down and skimming the top' action by the Big Dipper would not be observed and hence given that the vision was precise when this hill was built, it would seem that here may well be the answer for its construction; a 'Tower of Silence' with its own 'Fast Track to Heaven' courtesy of the Great Bear.

Regarding the 'heavenly' prospect, the deceased royalty in Egypt were transported to the boat of the Sun god in the heavens and while we have no indicative record, perhaps a similar scenario existed in Britain.



Fig.8 Silbury Hill and Ursa Major [Big Dipper] at 20.47 PM midsummer 2300BC. [Sun has set and is just over 3° below the horizon]

Note in these illustrations how the 'cup' of the Big Dipper appears to fit the top of the hill. The truncated section of hilltop is seen in blue showing that only with the hill being truncated does this vision work.



Fig. 9 Ursa Major [Big Dipper] and Silbury Hill 22.47 PM Midsummer 2300 BC



Fig. 10 Ursa Major [Big Dipper] and Silbury Hill 0.47 AM Midsummer 2300 BC

#### Conclusion

It is suggested here that the spirits of the dead, for those residing in the Silbury region, possibly only the important chieftains, we cannot comment any further without evidence, were transported to heaven within the 'cup' of the Big Dipper from the top of Silbury Hill. As there is a path winding its way around the edifice from bottom to top, it seems possible that bodies were carried up the hill and placed here awaiting their 'lift' to the heavenly realm and greater things. It is therefore suggested that Silbury was constructed as a 'Pillar of Silence' as in the early Zoroastrian religion where bodies were laid out in the open for scavengers to pick off the flesh. As some of the tombs of the region have been found to contain bones of incomplete skeletons, this remains a possibility. It has been inferred by some archaeologists that such a process took place at nearby Overton. The skeleton remains would have been buried elsewhere after the event. However, given that numerous cultures in the Northern Hemisphere see the Northern skies as a place of importance, even the source of their race or possibly mankind, it seems that the Northern skies have a 'sacred' element that does not apply at that period to any other portion of the sky. Indeed, the North was the place of creation for the authors of a number of ancient Indian texts, a notion that spread to the Old Testament of the Bible and from there into sections of the New Testament

There does remain the problem of location however, why chose this very specific spot to build such a huge edifice. The site of any monument is obviously of importance. Here it is relatively easy to understand and in fact has been noted by others. If we examine the name of the hill, in reverse order of its component parts we see firstly 'bury' which in essence means no more than 'hill'. The second segment of the title is the all telling element because it seems to be a bastardised version of *Sul*, a British goddess who was worshipped from hills overlooking springs, where here at Silbury, we have springs adjacent to its base and a name of *The Hill of the Goddess Sul*. Hence this appears to have been a localised effort; the constellation Ursa Major giving the spirits of the departed what we may nowadays term a '*Fast Track to Heaven*' with the location's associated goddess overseeing events. It would appear likely that this goddess was previously worshipped from the high ground immediately South West of Silbury Hill, this being more favoured for the springs than Waden Hill which while close, is on the other side of the River Kennet.

From the above it does appear that here may well be the long sort after answer for a logical purpose for this hill. While no skeletal remains from the early eras have been discovered at Silbury, this does not mean that they did not exist here as all bones would of course be carefully

picked up for burial elsewhere. The vision is correct for the period, it would have applied for a few hundred years and it is virtually certain that excarnation was practised in Britain.

Harry Sivertsen July 2011

While the material from India was not written down until quite late, probably circa 1500BC or even later vast amounts of verse and information were handed down orally. The flood story, only very briefly mention in the articles was a typical example where a story was invented that put a man in place of a star. The flood story is astronomical and merely relates the sequence of pole stars as it was understood. As time passed knowledge grew and explanations expanded albeit generally stil in an allegorical form as is evident from the reference to the pole stars in the Book of Revelations where they are disguised as kings. Here we also see further mention of the skies that correlate to Indian material associated with the lengthy yugas first described in the Mahabharata now dated to circa 3500BC in its composition but in fact, in common with other Indian material such as the Skanda Purana, containing astronomical reference to the 7<sup>th</sup> millennium BC.

Classical author's works and other material should be examined for correlations to what is seen here in the UK. Britain did the same as other regions regarding the skies, watched, learned and emulated.

The information contained in this and the preceding articles has been generally extracted from the two books *Deluge:From Genesis to Atlantis* and *Measurements of the Gods*. The object here has to be to attempt to show associations across a wide area in both time and space. Connections abound in fact as all were observing the same sky and seeing the same objects and movements. This has been ongoing from a very early period as the dating from India and Greece shows.

These somewhat unusual and original books which have been well received, are available to read online or purchase, PDF or paper copy at Completlynovel.com

Measurements of the Gods http://www.completelynovel.com/books/77136 Deluge From Genesis to Atlantis http://www.completelynovel.com/books/77135

h.sivertsen@btinternet.com