STONEHENGE
& THE FIBONACCI CODE

Neil L. Thomas

About the Author:

Dr Neil L Thomas, a chartered engineer in the Australian oil and gas industry, he made field trips to Ireland, Wales, England, Scotland, the Netherlands, Denmark, France, the Middle East, Egypt, India, China, Canada and the USA. Years of research led to an understanding how the myths and folklore of north-west European peoples complement prehistoric monuments, the evidence fits together like a jigsaw puzzle.

Review

"Dr Thomas like many Australians with Celtic surnames before him, went searching for his ancestors, only to stumble across an entirely pre-Celtic civilisation. His casual interest rapidly deepened, after twelve years of intensive scholarship he presented a brilliant PhD thesis – perhaps even definitive – in its interpretation of Britain and Ireland's Neolithic culture. From the vantage point of his training in engineering and mathematics, Dr Thomas obtained a fresh perspective of the design and function of the megalithic circles in Britain and Western Europe. Dr Thomas believes these ancient Britons worshipped the Sun and Moon, and probably gods corresponding to the three primary gods of the Norse pantheon – Odin Thor and Freyr. Stonehenge is the best-known of Britain's Neolithic relics."

Graeme O'Neill, retired Science Correspondent, 'The Age' newspaper, Melbourne.

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PROLOGUE

Welcome to Stonehenge

A first time visitor to Stonehenge arrives to see an assembly of very large and a scattering of smaller stones situated in the vastness of Salisbury Plain. Some columns are standing tall, others lie forlornly on the ground. Many gaps in the grouping are perceived. What one sees perhaps suggests the idea "What is all the fuss about?" But do not be too ready to make a judgement.

The "Old People" who created Stonehenge round about five thousand years ago were very knowledgeable and skilled. Between the endpapers of this booklet are explanations and copius information that explains why each of the original one hundred and sixty stone columns were placed in an exact position and for a particular purpose in the grand scheme of things.

The book sub-title '*& the Fibonacci Code'* appears to link Britain's most well-known ancient monument of Stonehenge with Italians and secret codes. Those words were carefully chosen to link today's romantic knowledge and experiences with the actual beginnings of mathematics. There is a reason, the booklet's contents is a compact history lesson; a bright light shone in Britain five thousand years ago!

Ancient mathematics began with very simple straight-forward counting techniques on fingers and thumbs. The first innovation was the use of numbers to perform additions and subtractions for

commercial reasons. Two thousand and more years ago mathematician philosopher Pythagoras lived in a Greek city and geometrician Euclid taught at the world's first university in Alexandria, Egypt. Ever since their time the twin subjects were taught in much the same way in European schools and universities. The mathematical study of geometric figures had a basis in the theorem of Pythagoras concerning triangles where one corner is a right angle: "the square of the hypotenuse (linear value) equals the sum of the squares of the other two sides". A most quoted example is the right angled triangle whose side measures are in the ratio 3, 4, 5.

Life's Ten Numbers

On the anniversary of our birth family celebrations are a very important day for baby and all involved. A second year on and the new person can talk and ask for the things it wants. Another year and three year old boy children enjoy running as fast and as far as they can, enjoying new found freedom. Girl children learn how to communicate and find ways to persuade others to do their bidding. They learn a great deal in the next two years; aged five they enjoy the company of others of their own age, play games and use their brains to imagine situations. Education begins a more formal process and experience widens far beyond their immediate family. Daily schedules are obeyed, self-help in many things are learnt and the child absorbs knowledge and many skills. Eight years of age is the time when boys and girls become distinct individuals and their own person. Teenage years begin about thirteen; many social skills and knowledge are acquired. The wider world beckons by twenty-one, the young adult is ready to take on the world.

At thirty-four, the fully fledged adult has his or her own family and is well-established in life, future prospects are a reality. Parental responsibilities occupy their minds, the couple's own children are growing into people in their own right. Their children become adults. Aged fifty-five with the children off their hands, distant destinations beckon. New facets of life appear, worldly experiences become a reality. By the age of eighty-nine life is generally much slower, and

leisure is a firm part of life, recollections and reminiscences are frequent subjects in conversations with their peers.

Which brings your author to the point of all that. These ten key-note ages in everyone's life are 1, 2, 3, 5, 8, 13, 21, 34, 55 and 89. Perhaps that is why Stonehenge was designed and built in that way four and a half millennia past.

Fibonacci, the man

Leonardo da Pisa (c.1170-1250) was a thirteenth century Italian mathematician mostly referred to by the name Fibonacci. He lived in Mediterranean cities and is well known for his book "*Liber Abaci*" the "Book of Calculations" published in 1202. He was a leading figure in the movement to introduce the Hindu-Arabic number glyphs and the decimal system into Europe. The progressive arithmetic series named after him is described in *Liber Abaci* chapter twelve; 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, etc., a series derived by the addition of the previous two numbers to achieve the next, for example 1+2=3, 2+3=5, 3+5=8, 8+13=21 and so on. Stonehenge is a combination of eighty tall sarsen columns and linear dimensions that fully conform to nine items of the Fibonacci arithmetic progression series; 1, 2, 3, 5, 8, 13, 21, 34, 55, 89.

LINEAR MEASURES

The Human Form

Our view of fellow members of humanity is firmly lodged in our minds as an echo of ourselves. Departures from the norm immediately focus our attention on any variation. In turn that fuels our view of the person concerned. Leonardo da Vinci's famous sketch 'The Vitruvian Man' drawn in AD 1487 illustrates a naked man with arms uplifted and legs apart, the tips of his limbs touch a circle and the horizontal diameter passes through his navel. The proportions of the figure are immediately seen as wholly normal. The height of the figure divided by the distance of its navel above ground is 1.62, known as the golden ratio number by architects and also a

fundamental growth parameter of many living species in the natural world.

Our view of much we have to assess and deal with in our day-to-day lives often reflects our bodily characteristics. Our height is a major feature. Hands and feet have five digits with dimension, each digit has width. To determine a fundamental length employing the height of a man as the basis, consider the pacing frame. Choosing two staves whose lengths were about equal to one's height of one and a half metres, holes were drilled through the larger ends to provide standard staves with lengths of 1.47 metres from pivot hinge to toe. Configured at right angles, the hypotenuse of the equilateral triangle tip to tip length is 2.073 metres, the *faethm*.

Measures

This publication concerns Stonehenge. Widely known, the ancient monument in southern England was built about 2300 BC. To explain the Stonehenge design, one should know about two linear dimensions named in recent historic times 'Celtic foot' and 'fathom'. The 'Celtic foot' ís quoted in Dr William Stukeley's books 'Roman Prints' 1758 and '*Itinerarium Curiosum*' 1776. For consonance and ease of recall I have varied the name from 'Celtic foot' to *'fut'*, equal to 332 millimetres. The 'fathom' value was determined by Professor Alexander Thom in the nineteen sixties resulting from his statistical analysis of lengths obtained during land surveys of about 150 ancient monuments in Britain. He coined the linear unit term '*megalithic rod*' as explained in his title 'Megalithic Sites in Britain' published by the Oxford University Press in 1967. For easier comprehension linked to historical reasons I have re-named the linear unit '*faethm*', equal to 2.073 metres. Two and a half and thirty-three were employed as multiplicands of the '*fut'* and '*faethm*' to achieve larger linear values; furlongs, miles and leagues.

The larger favoured unit was 33 x 2.073 metres = 68.4 metres, I have termed '*furlang*'. It is the height from head to heel of the Long Man of Wilmington in Sussex, England. The outline figure of a man holding two vertical staves portrays I believe the ancient surveyor of prehistoric millennia, the Druid man, the Dodman. The ancient

measurement table includes the *fut, faethm, pace, furlang* and *country mile*. Two multiplication factors 2½ and 33 are used to achieve the next higher value: -

Ancient Measurement Table

One Celtic foot	= the *fut,* 332 mm, Wm Stukeley's foot
2½ *fut*	= the *pace,* 830 mm, Thom's *megalithic yard*
2½ *pace*	= the *faethm, megalithic rod*, 2.073 metres.
33 *faethms*	= the *furlang,* 68.4 metres.
33 *furlangs*	= the *country mile,* 2.26 kilometres, = 1.40 statute miles
2½ *country miles*	= 1 *country league*, 5.64 kilometres, = 3.506 statute miles

'*Fut*' is an invented name. The name *faethm* is the O.E. "*fæþm*" sourced from Beowulf c.750 AD, the first tale written in early English. The *furlang* is an early spelling version of 'furlong' the English 220 statute yards measure, now given metric meaning; 33 x 2.073 metres = 68.4 metres. The English words *pace*, *country mile* and the *country league* have been adopted as expedient until more consonant names are found. Try pacing 83 cm yourself.

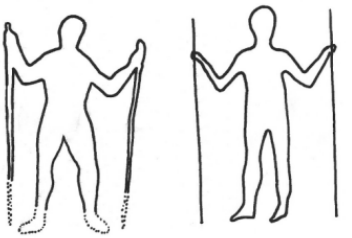
The Long Man of Wilmington

Eastbourne is not far west of Dover, the busy port on the Channel coast. Visitors to the hinterland witness the grassy South Downs rolling for mile upon mile. Inland a short distance from Eastbourne is the "The Long Man of Wilmington" as it is now named, an outline figure portrayed on a north-facing steeply sloping hillside. An excellent view may be had from the nearby road. The Long Man's height from heel to head is 68.4 metres; significant as the larger of two basic prehistoric units of

measurement, a unit I have named *furlang*.

Recent History

An article and sketch by a Dr Phene describing the Long Man of Wilmington was published in the Sussex county local 'Graphic' newspaper issue dated February 7th, 1874. The Doctor gave his idea of the original shape and proportions of the figure. The upper parts were well proportioned. The lower portions of the figure were unclear. Dark sediment washed down the $28^{\mathbf{0}}$ slope had filled the lower channels of exposed chalk that allowed grass to grow, obscuring the figure's lower limbs. A restoration effort by the Reverend W. de Saint Croix and his colleagues in April 1874 created the present Long Man of Wilmington with two thin straight staves extended above the hands. Which of the two figures most closely represented the original Long Man is open to serious question. Meanwhile it is clear that Dr Phene's figure represented an upright man holding two vertical sticks or staves in his outstretched arms, thick at one end and tapered to the tip. Hinging two staves at the thick end with a pivot pin, adding a cross brace to secure them at a 90^0 angle completed a pacing frame similar to that used today to ensure soldiers take uniformly long paces whilst marching in step. A pacing frame of that kind would have enabled a surveyor to measure a straight-line survey route as fast as he could walk. Discrepancies caused by rotating the frame 180^0 in a forward move as each stave tip was swung around would be self-correcting as the next move was made. Providing the two pacing frame staves length from pin to tip is 1.47 metres and they are braced at a right angle, the tip-to-tip distance is 2.073 metres, one *faethm,* the linear measure of antiquity. Thirty-three *faethms* equals a *furlang* = 68.4 metres, the height of the Long Man of Wilmington generously surveyed at my request by the Sussex Archaeological Society Secretary in 1980.

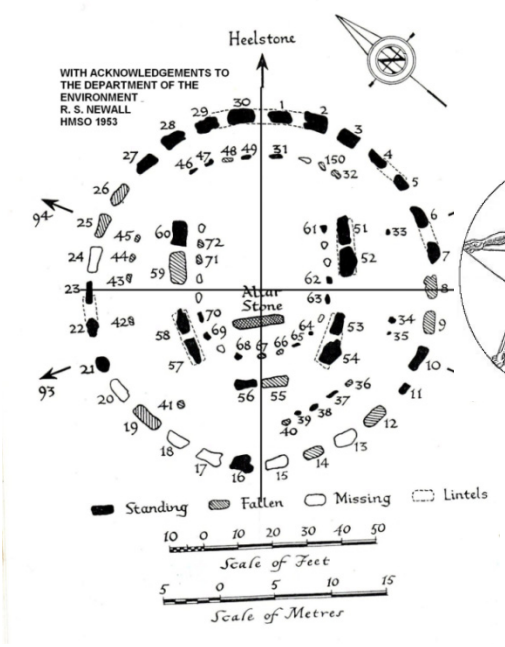


THE LONG MAN OF WILMINGTON
February 1874 April 1874
ILLUSTRATIONS FROM THE GRAPHIC NEWSPAPER

Fifty-Six Aubrey Holes A ring of fifty-six pits dug deep into the chalk subsoil and back-filled, the so-called Aubrey Holes were made about 3100 BC. Named after their discovery by John Aubrey in 1666, they form an accurate circle of contrasting white markers against the dark grass. For five hundred years this was the original *Stone*henge, its function to forecast total lunar eclipses of the Moon observed at the same place, a cycle of 223 full Moons. Exactly 56 Aubrey Holes were required to tally the eclipse cycle by a count of forward moves from one Hole to the next after each full Moon, four times around the ring of fifty-six Holes (4x56)–1 = 223 full Moons from the previous eclipse to the next eclipse about 3100 BC.

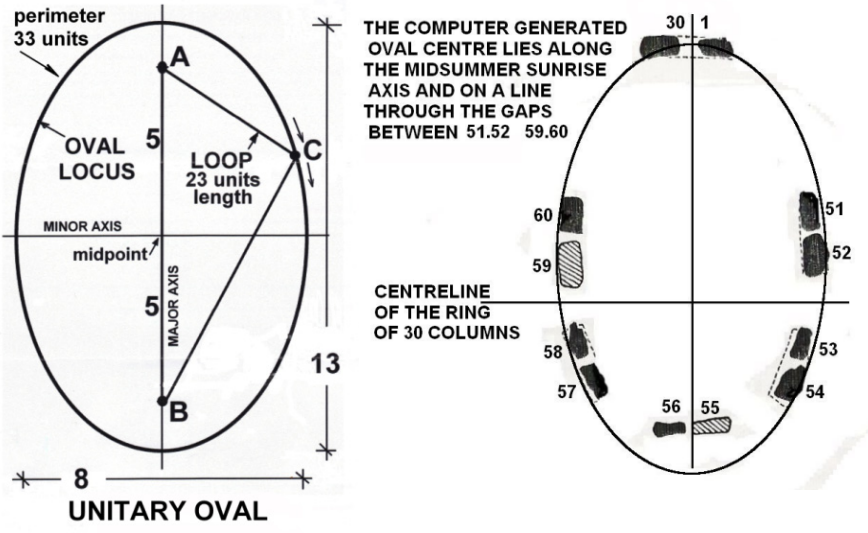
OVAL FIGURES

Stonehenge Design & Cornelius Agrippa



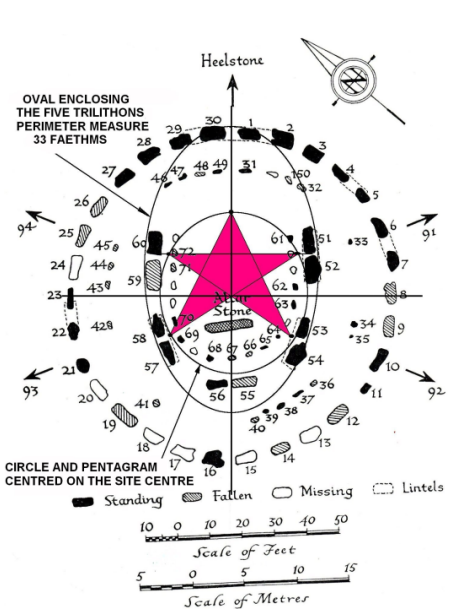
The designer's plan for a new solar **Stone**henge created about 2300 BC began with five trilithons in a U shape. I searched for a mathematical basis for the entire design. A German Cornelius Agrippa was a German doctor and lawyer (1486-1535) whose sketch of a normal human figure showed the head arms and feet coincided with five pentacle points of a regular pentagram. Observe the matching visual coincidence between his

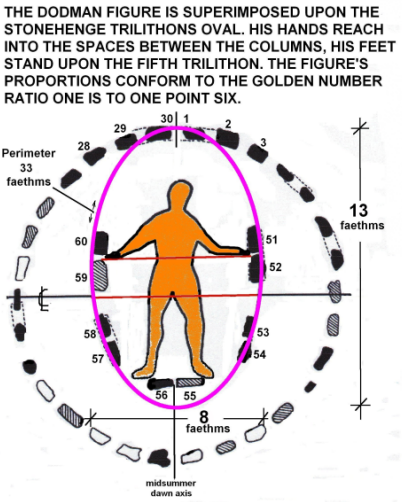
sketched figure and its hands and feet placement in relation to the known positions of four of the five trilithons at Stonehenge. An oval constructed with long axis to short axis proportion of 13 to 8 touches the outside faces of four pairs of trilithons. Its locus perimeter length is 33 *faethms,* equal to the Long Man of Wilmington's height.



Consider the trilithon pairs 51-52 and 59-60. A line drawn through the exact Stonehenge site centre axis is seen to pass south-west of 52 and 59. The placements of 51-52 and 59-60, 53-54 and 57-58 are directly opposite each other but not on a cross line midway on the axis. Clearly the placement of the four trilithon pairs around the oval locus was based upon other criteria. Next, centred on the site centre line between sarsen columns 23 and 8, I drew a circle and a pentagram. The cross line intersects the main axis where two diagonal lines joining the gaps between trilithon pairs meet on the MSSR axis. The gaps between 51-52 and 59-60, 53-54 and 57-58 identify the pentagram cross lines. Four pairs of columns, the gaps between each coincide with four pentagram apices. The figure's head is on the midsummer sunrise axis, a five point combination making it

clear that was the designer's intention. Only trilithon 55-56 situated astride the midsummer sunrise axis has yet to be explained.





The fifth trilithon pair 55-56 served to support the feet of the human-like figure, a foot-stool so to speak. It is interesting to consider the outline form of the Long Man of Wilmington in Sussex and an imaginary figure at the very centre of the new **Stone**henge.

Who is represented by the figure? Woden perhaps?

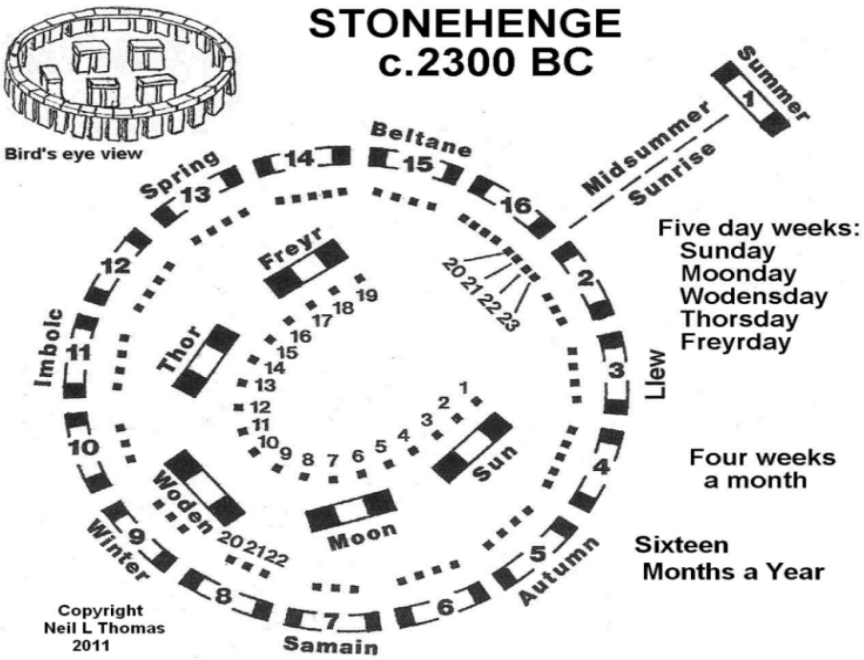
SUN & MOON CALENDARS

Most experts agree **Stone**henge had some form of calendar purpose, although I am unaware of any other fully comprehensive analysis of the kind I am about to describe. My 1991 doctorate thesis hypotheses described in detail how Stonehenge c.2300 BC was designed as a means of observing a Sun calendar, a Moon calendar and forecasting lunar eclipse events. What follows is the substance of my thesis: -

The Trilithons

The U arrangement of the nineteen bluestones and five trilithons could be likened to the inner sanctum of a temple, a place protected and encircled by thirty sarsen columns and sixty-one bluestone pillars. Facing the direction of dawn at the midsummer solstice, the open-ended U arrangement can be likened to a parent with open arms outstretched to welcome the returning child, dawn sunrise.

I consider the five trilithons represented and were named for the five Sun calendar days of their week; in today's language perhaps Sunday, Moonday, Wodensday, Thorsday and Freyrday.



STONEHENGE SUN CALENDAR

Sun Calendar Days: Bluestone Columns

The Sun calendar arithmetic philosophical principle counted columns standing above ground, much as we count fence posts, not the panels between. A day tally began with nineteen bluestone pillars in the U arrangement. The first set, a week of five days Sunday, Moonday, Wodensday, Thorsday and Freyrday, were tallied on bluestones one to five. The second week, the sixth to the tenth stones, was counted in the same way. Counting continued - eleven to fifteen, finally the fourth week of only four days - sixteen to nineteen. At that point, counting switched to the two pairs of bluestones close to sarsen columns 1 and 30, a pair each side of the midsummer axis. These are numbered 20, 21, 22 and 23, thus completing a tally of 19 + 4 = 23 days, the first month. Each month thereafter, counting recommenced on all nineteen bluestones and then continued to fifteen more groups of threes, fours and fives, a total of sixty-one bluestones concentric with the thirty sarsen column ring.

Based upon sixteen monthly progressive counts of nineteen bluestone sets in the U shaped arrangement, the tally is 16 x 19 = 304 days. Adding 61 intercalary bluestones concentric with the ring of thirty sarsen columns the sum equals 365. The Stonehenge Sun calendar Ovyd priests presumably recorded 365 days and 16 months of the year as follows: -

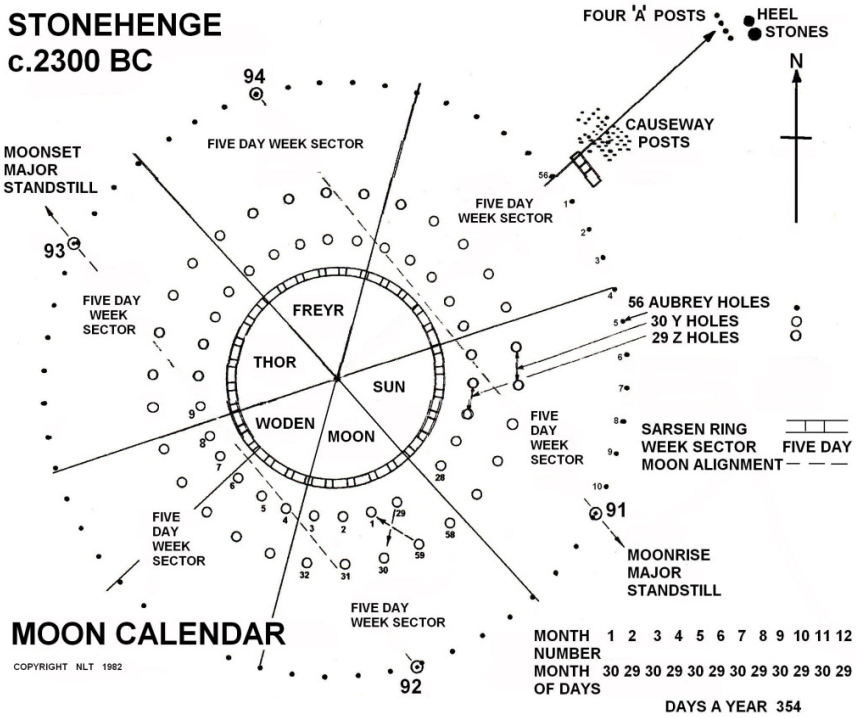
Month No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**=**	**16**
Days/month	**23**	**22**	**23**	**24**	**23**	**23**	**22**	**22**	**22**	**22**	**23**	**23**	**23**	**24**	**23**	**23**	**=**	**365**

A Sun calendar first month was Summer, identified on the Slaughter stone and its missing twin astride the mid-summer dawn axis of the entire design. In a clockwise direction the months following were tallied on the fifteen pairs of sarsen columns; Two, Llew (harvest), Four, Autumn, Samian (Hallowe'en), Winter, Imbolc, Spring, Beltane (Mayday). That is why there were thirty sarsen columns that determined the apportionment of the Moon calendar days and months.

MOON CALENDAR

The Y and Z Holes

About 2300 BC the first step in the establishment of a calendar to tally the cycles of the Moon and its behaviour at the new **Stone**henge was to build the ring of thirty sarsen columns topped by a continuous ring of thirty lintels.

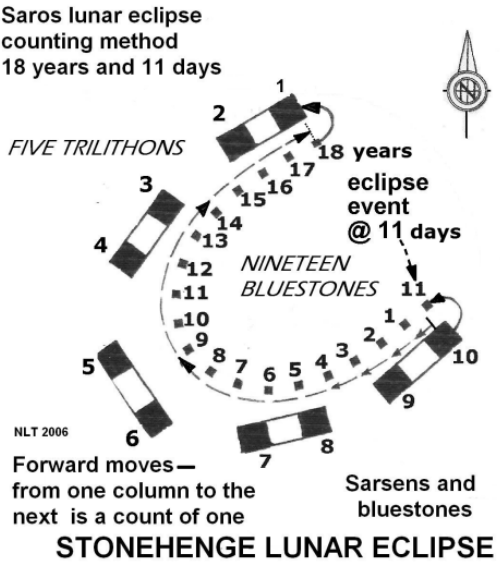


Two rings of pits now known as Y and Z Holes were dug outside the sarsen ring of columns. The inner ring numbered twenty-nine and the outer ring thirty, a total of fifty-nine pits generally in line with and radially out from the sarsen columns. The geometry of the Y and Z Holes and the five trilithons imply the Moon calendar was designed on a monthly basis of six weeks each of five nights, a count of thirty, followed by a second month of six weeks of five nights all but one

night, a count of twenty-nine. See how the illustration shows groups of five, both for the Z Holes and Y Holes. When the Y Holes count reached Y59, the count reverted back to Z1 and the bi-monthly cycle began again.

Forecasting Lunar Eclipses on the Trilithons & Bluestones

Eclipses of the Moon occur when the plane of the Moon's orbit intersects with the plane of the Earth's orbit, two occasions each month. Counting from one column to the next on the U arrangement of bluestone and sarsen columns was important. On the bluestone named 'Eclipse Event' a marker was placed by the column on the night of a lunar eclipse. One year later the marker was moved forward to bluestone number one, a count of **one**. Next year the marker was again moved forward to bluestone number two and so on. When eighteen years had elapsed the Moon eclipse marker would have been adjacent to bluestone column eighteen [years].



STONEHENGE LUNAR ECLIPSE

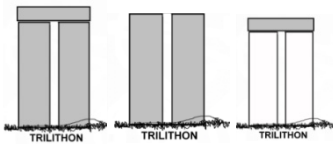
On the first day of an eleven day sequence, the marker was moved from the eighteenth bluestone forward to the Freyr trilithon column 1, a count of **one**. Each day thereafter the Moon eclipse marker was moved forward to the next sarsen column 2. After all ten trilithon columns had been sequenced and the marker placed next to Sun trilithon column position 10, the next forward count would be a move to bluestone column numbered eleven. A lunar eclipse would have happened that night, 18 years and 11 nights after the previous eclipse occasion.

THE FIBONACCI SERIES

Fibonacci, the Man

Leonardo da Pisa (c.1170-1250) was a thirteenth century Italian mathematician mostly referred to by the name Fibonacci. He lived in various Mediterranean cities and was widely known for his book "*Liber Abaci*" the "Book of Calculations" published in 1202. A leading figure in the movement to introduce the Hindu-Arabic numbering glyphs and the decimal system into Europe, the progressive arithmetic series named after him is described in *Liber Abaci* chapter twelve. The numbers 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, etc., are said to be a series relating to the growth of a rabbit population. The Fibonacci progressive arithmetic series numbers are the fundamental design basis for Stonehenge. The combination of sarsen columns counts and selected linear dimensions fully conform to the first nine items of the Fibonacci arithmetic progression series; 1, 2, 3, 5, 8, 13, 21, 34, 55. First consider the principal element of the entire Stonehenge design, a trilithon: -

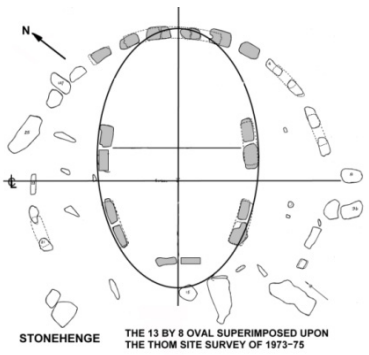
One trilithon = **1** and it comprises



two columns **2,** and
a third lintel stone **3**

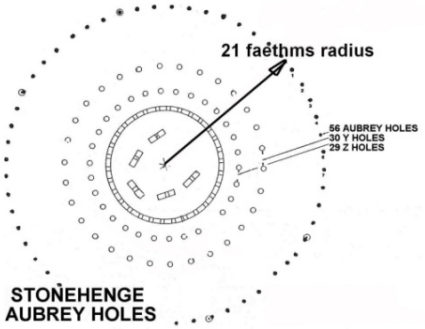
There are five trilithons **5**

Five trilithons are arranged around an oval whose short axis measured **8** *faethms* and the long axis **13** *faethms*.

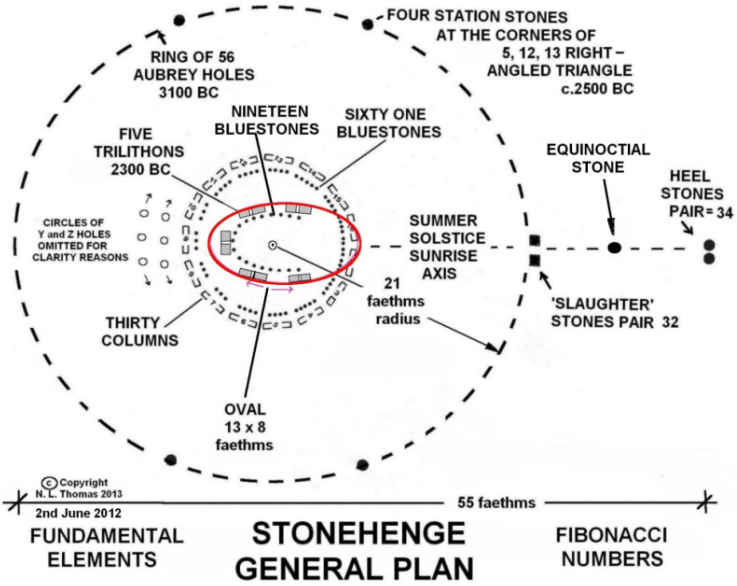


The radius of the site measured from the true centre to its outer edge, the ring of Aubrey Holes = **21** *faethms*.

There are thirty-four sarsen columns = **34**. The distance along the midsummer dawn axis from the Heel stones pair to the south-west = **55** *faethms*.



This was the reason to provide two Heel Stones and place them 55 *faethms* distant from the opposite side of the Aubrey Holes ring. By that means the Fibonacci series nine terms were completed.



The complete design of Stonehenge - every column - every linear distance - all are accounted for, nothing missing, none left over.